# MOOCs: EXPLORING REASONS FOR PARTICIPANTS' NON- CONTINUATION OF THE COURSES

## A. Biswas[1] and A. K. Upadhyay[2]

[1]DLIS, Mangalayatan University (MU), Aligarh, Uttar Pradesh, India
& Adamas University, Kolkata, West Bengal, India
[2]DLIS & Librarian, Mangalayatan University (MU), Aligarh, Uttar Pradesh, India
[1]mailalamgirbiswas@gmail.com , [2]ashoka143@gmail.com

_____

## ABSTRACT

*MOOCs are the most craving online education platform for the learners around the world. It has given freedom to learn at free (few are paid), independent time selection and still being at home. A learner can select as many courses as he/she wish. World's most successful universities and colleges have come up with innovative course content, extremely comprehensible course delivery patterns and 24x 7 course support system. The growing popularity has been facing complicated challenges where a large number of enrolled participants postpone or leave their leaning at the midway. This study will explore the possible reasons behind the non-continuation of learning by the participants and will recommend provisional way-out to fix the challenges.*

_____

*Keywords:  MOOCs, Learners, Non-Continuation, Learners' satisfaction, usage*

## Introduction

MOOCs (Massive Open Online Courses) came into existence since 2008 when University of Monitoba, Canada organised a course called "Connectivism and Connective knowledge" where 2300 students participated. However, 2012 was the year when MOOCs were recognized with the initiation of Coursera, Udacity, edX like courses. Thus, 2012 is widely known as "The Year of the MOOC. Many experts see MOOCs as a "revolution in education".

Internationally Coursera, edX, Udacity, LinkedIn Learning and nationally SWAYAM, NPTEL, e-PG Pathshala are the major MOOC providers. All of them are continuously growing since their inception, offering and updating new courses regularly. The growing popularity of this is that it can be opted by anyone, anywhere around the world. One can access to the courses and can get professional guidance from the best universities and professors in the world. The most attractive feature is that most of them are free and can be taken up at own convenience and pace.

## Literature Review

**Samanta, A. (2018)** study explored that SWAYAM is a new approach to education. It provides entire and in-depth information about various types of courses in a different discipline that will help the students to enrol in the SWAYAM courses. The aim of the study is to find out the learners enrolment in different subjects, different courses and various certificate types available in SWAYAM courses.

**Tsironis, A.; Katsanos, C.; Xeno, M. (2016)** study conducted on comparative usability evaluation of three popular MOOCs platform edx, Coursers and Udacity. Study revealed that Coursers MOOC platform was more usable compared to edx and Udacity. Results of the study showed that Coursera interaction efficiency was significantly higher than Udacity.

**Wong, J., Baars, M., de Koning, B.B., Paas, F. (2021)** The limited instructional support in Massive Open Online Courses (MOOCs) inherently demands learners to self-regulate their learning. MOOC research shows that learners are more successful when they engage in self-regulated learning (SRL) behaviors such as planning what to study and reviewing study materials.

## Methodology

To conduct the research, the authors have conducted a good number of literature study on SCOPUS, J-store, UGC care listed journals and Google Scholar using the search term: "MOOCs", "Evolution of MOOCs", "Course content development on MOOCs", "students' satisfaction on MOOCs", "Rate of

discontinuity of MOOCs participants" etc. In this paper, the authors have tried to bring out different reasons that arise among the learners where they leave courses midway or discontinue their learning.

## Analysis

In this paper, the authors have adopted SWOT (strengths, weakness, opportunities and threat) framework to analyse different reasons coming up before the learners and ultimately they leave their courses uncompleted. The SWOT analysis was described by Learned etal. (1969) and since then it has grown to be a key method to analyse complex strategic situations to assist decision-making.

## Tentative Reasons for not Registering in Moocs

MOOCs are meant to strengthen the access to non-traditional candidates who failed to get access to higher education or continuing their education due to various reasons. However, analysing different characteristics of the MOOCs candidates, it was observed that the candidates registered were mostly young, enthusiastic, having high level learning attitude and residing in cities. Since 2002, a major path breaking step towards electronic-learning was initiated with a tie-up between IITs and IISc for different programs under NPTEL. To demonstrate and encourage 'Digital India' initiative, Government of India launched SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds) which covers higher education as well as skill enhancement courses for all. Present workforce genuinely lacks the skill required for any particular job that further creates a gap between the higher education and the prescribed expectations from the employer. Here MOOCs fill the gap which focuses on skill development which normally demanded at any workplace. The courses are delivered, monitored and facilitated through reputed professionals and experts who are experienced in their areas of interest; this way participant get more practical exposure, problem solving platform, quizzes from each chapter instead of just getting theoretical concepts.

Online learning though has seen exponential growth and capturing the need of the higher education sector; however, classroom teaching which has no alternative with face-to-face physical interaction still favourites as the primary teaching environment for learning. The absence of live discussion and guidance at the high point of learning, students are generally not aware of whether they are learning the right or not. Learners get to know about, as soon as the course is completed and based on its results. Here are few identified reasons for non-enrolments of the learners. Like unfamiliarity and adoptability with the new type of online learning system, preference of physical classrooms over online teaching-learning environment, lack of face-to-face interaction, participation in group discussions in real time and unknown fear of operating MOOCs, thought of getting mistakes. The above listed reasons left a negative influence on the learners about MOOCs that keep them stay away from enrolling into the course/s.

## Possible Reasons for Discontinuance of Course in Moocs

After studying the few researches, it was observed that the primary enrolments in the MOOC courses are very high; however, not more than 10% of the enrolled participants actually complete the course. Many previous researchers have tried to identify the expected reasons for this unexpected discontinuation. A unanimous opinion is that people who are self-oriented, focussed, serious, motivated and disciplined can only successfully complete the courses. A learner who lacks such skills either doesn't enrol for MOOCs or eventually discontinues it in between. Thus, it is concluded that MOOCs are only meant for a dedicated segment who want to make the most of it and upgrade their skills. A group of participants more likely prefer MOOCs where they can have face to face interaction with the course facilitators otherwise they tend to lose attraction and ultimately drop it in between. Similarly, it is also experimented that the students are dissatisfied with the MOOCs as they lack interaction with the instructor. Consequently, they suggested some strategies that can improve the instructor-learner interaction. Detailed analysed patterns of

engagement and disengagement in MOOC, researchers have categorized the learners into four different categories:

a. **The completing learners are those** who complete the majority of assessment and tasks;
b. **The auditing learners are those** who watches most of the videos but are not eager in completing the assessment and tasks;
c. **The disengaging learners are those** who complete assessments at the beginning of the course, after that reduce their efforts and dedication in learning; and
d. **The sampling learners are those** who explore few course videos only but don't open to learn.

Similarly researchers have brought out eight factors that lead to dropouts of the learners that include:

i.    greater workload,
ii.   difficult course content,
iii.  time,
iv.   excessive pressure and a sense of community,
v.    social influence,
vi.   lengthy course , and
vii.  learning on demand.

Researchers have also identified number of reasons for participant's drop out. The reasons are:

(a) intention to complete,
(b) lack of time,
(c) course difficulty and lack of support,
(d) lack of digital skills or learning skills,
(e) bad experiences,
(f) higher expectations,
(g) starting late, and
(h) peer review.

Three most significant concerns about MOOCs that address the existing issues. They are:

a) higher drop outs and alarming declination in participation as courses start,
b) requirement of better technical skills, and
c) promoting social learning by increasing peers learning environment to help each other.

### Factors Influencing Satisfaction Level of the Participants

Technological advancement and easy access to the modern gadgets including internet services i.e. mobile devices, the adoption of new technology for social, personal and professional learning and enhancing one's performance, has been strongly influenced. Technology enabled learning is rising and seen exponential growth in last few years, that has been evident as the way the current courses have been developed at a faster pace. The learners are demonstrating how adopting the technology has led to successful learning. The "Open" & "Online" terms in MOOCs are linked in its true sense to this concept. Learning through the electronic mode is gaining popularity every day and professionals prefer this mode of learning to upgrade their existing skill and knowledge. This alternative platform of learning has experienced an exponential development of more than ten times compared to the other modern education models.Thus, the study concludes that with adoption of MOOCs, the learners' satisfaction & performance has been improved by 15%. Based upon literature review of the studies conducted from 2012 to 2015, it has identified the factors that affect a MOOC learner's satisfaction. The noted factors were summarized as interaction, motivation, collaboration, pedagogy, network opportunities, content development, assessment, usability, technology and supports from learners. Access to adequate internet speed and smart devices positively influence a learner towards MOOCs. Again, participative and open channels, sharing of feedbacks, collaborative learning also influence a learner towards MOOCs. While analysing the primary goals of MOOC participants, it was observed that personal interests and lifelong learning were the main factors that affected a participant's engagement in MOOC. Significantly, interaction with the MOOC instructor is considered to be the major factor for learner's retention into the courses. The literature review has summarized that research in MOOC has been limited and greater possibilities are waiting for the researchers. The major objectives identified by the previous researchers are intention, purpose of certifications, usability and satisfaction. Selected group of researchers have worked on the interlinkages between continuance, usability, satisfaction and reasons for enrolling in MOOCs. The present research is focused on

analysing the satisfaction level of the learners from the MOOCs with respect to its different performance parameters. The limited numbers of researches have dealt with the satisfaction factors responsible for encouraging the learners to complete their course and register in other available courses of their choice. Hence, the main objectives of the study are:

(i) to study different possible reasons for not registering in MOOCs;

(ii) to examine the reasons for discontinuation of the MOOCs; and

(iii) to find out the factors affecting learner's satisfaction level from MOOCs.

## Conclusion

MOOCs have received world-wide attention but still researchers have little understanding about students' engagement in the online courses. We can sum up that by discussing few points which can be adopted by the course developers to get better learners engagement. The learners should participate directly in the course concerned and not merely act as listener or receiver. Better engagement into course will bring better enrolment. Instructor's ability to show enthusiasm hits the learners directly. How an instructor projects himself or herself will play important role than merely putting a face in the video. While designing course structure, the most important point to be kept in the mind that each topic should be divided into certain chapters and they should be brief with enough information. Broad chapters may lead learners to start feeling monotonous and that risk should never be taken.

## Reference

1. L. Pappano (2012), "The Year of the MOOC" , The New York Times. [Online].Available:http://www.nytimes.com/2012/11/04/education/edlife/massiveopen- online-courses-are-multiplying-at-a-rapid-pace.html

2. T. L. Friedman (2013), "Revolution Hits the Universities" , The New York Times.[Online].Available:http://www.nytimes.com/2013/01/27/opinion/sunday/friedmanrevolution- hits-the-universities.html

3. Samanta, A. (2018). Analytical Study of SWAYAM. IJRAR-International Journal of Research and Analytical Reviews, 5 (3).

4. Tironis, Alexandros.; Katsanos,C.; Xenos, M(2016). Comparative Usability Evaluation of three Popular MOOC Platforms. IEEE Global Engineering Education Conference (EDUCON), DOI: 10.1109/EDUCON.2016.7474613

5. Wong, J., Baars, M., de Koning, B.B., Paas, F. (2021) Examining the use of prompts to facilitate self-regulated learning in Massive Open Online Courses. Computers in Human Behavior, 115, art. no. 106596 DOI: 10.1016/j.chb.2020.106596

6. F. M. T. D. Hollands (2014), "MOOCs: Expectations and reality. New York: Center for Benefit-Cost Studies of Education, Teachers College," Columbia University, 2014. [Online]. Available: http://cbcse.org/wordpress/wpcontent/uploads/2014/05/MOOCs_Expectations_and_Reality.pdf.

7. W. M. O. D. e. a. Shrader S (2016), "Massive open online courses (MOOCs): Participant activity, demographics and satisfaction.," Online Learning , vol. 20, no. 2, pp. 199-216.

8. R. Oliver (1999), "Exploring strategies for on-line teaching and learning," Distance Education, vol. 20, no. 2, pp. 240-254.

9. J. Young (2013), "What professors can learn from hard core MOOC students," Chronicle of Higher Education, vol. 59, no. 5.

10. S. M. &. S. J. Morris (2013), "MOOCagogy: Assessment, networked learning, and the meta-MOOC. Hybrid Pedagogy" pp.97-99.

11. L. Pappano (2012), "The Year of the MOOC" , The New York Times. [Online].Available:http://www.nytimes.com/2012/11/04/education/edlife/massiveopen- online-courses-are-multiplying-at-a-rapid-pace.html

12. T. L. Friedman (2013), "Revolution Hits the Universities" , The New York Times.[Online].Available:http://www.nyti

mes.com/2013/01/27/opinion/sunday/frie dmanrevolution- hits-the-universities.html

13. Kolowich, S. (2012). MOOCs for Credit [Blog post]. Inside Higher Ed, https://www.insidehighered.com/news/20 12/10/29/coursera-strikes-mooc-licensing-deal-antioch-university

14. Kolowich, S. (2013). How edX Plans to Earn, and Share Revenue From Its Free Online Courses [Blog post]. The Chronicle of Higher Education. Retrieved from http://chronicle.com/article/How-EdX-Plans-to-Earn-and/137433/

15. Learned, E. P., Christiansen, C. R., Andrews, K., & Guth, W. D. (1969). Business Policy: Text and Cases. Homewood, IL: Irwin.

16. Liyanagunawardena, T. R., Adams, A. A., & Williams, S. A. (2013). MOOCs: A Systematic Study of the Published Literature 2008-2012. The International Review of Research in Open and Distributed Learning, 14(3), pp.202-227.

17. Liyanagunawardena, T. R., Adams, A. A., Rassool, N., & Williams, S. A. (2014). Developing government policies for distance education: lessons learnt from two Sri Lankan case studies. International Review of Education, 60(6), pp.821-839. ISSN 1573-0638 doi: 10.1007/s11159-014-9442-0

18. Liyanagunawardena, T. R. (2012). Information communication technologies and distance education in Sri Lanka: a case study of two universities. PhD thesis, University of Reading. Pp.198-199.

19. Matthew, D. (2013, February 07). University student marketing spend up 22% [Blog post]. Times Higher Education. Retrieved from https://www.timeshighereducation.com/ne ws/university-student-marketing-spend-up-22/2001356.article

20. MIT Open Course Ware (2006). 2005 Program Evaluation Findings Report. Retrievedfromhttp://ocw.mit.edu/ans7870 /global/05_Prog_Eval_Report_Final.pdf

21. Ng, A. (2013, June 14). You can now order Coursera T-shirts and coffee mugs! (US shipping.) http://store.coursera.org/ [Tweet]. Retrieved from

https://twitter.com/andrewyng/status/3453 83129395118081

22. Oxford Dictionaries (n.d). Sustainability. Retrieved from http://www.oxforddictionaries.com/definit ion/english/sustainable?q=sustainability#s ustainable__6

23. Parr, C. (2013, April 18). How was it? The UK's first Coursera Moocs assessed [Blog post]. Times Higher Education. Retrieved from https://www.timeshighereducation.com/ne ws/how-was-it-the-uks-first-coursera-moocs-assessed/2003218.article

24. S. Swink (2014), "Is now the time to move on MOOCs?," Chief Learning Officer Magazine, pp. 6-7, August.

25. S. & L. T. C. Graf (2010), "Analysis of learners' navigational behaviour and their learning styles in an online course," Journal of Computer Assisted Learning, vol. 26, no. 2, pp. 116-131.

26. R. I. H. Y. H. &. L. C. F. Chang, "Survey of learning experiences and influence of learning style preferences on user intentions regarding MOOCs," British Journal of Educational Technology, vol. 46, no. 3, pp. 528-541, 2015.

27. D. N. A. D. C. &. C. Z. Koller (2013), "Retention and Intention in Massive Open Online Courses: In Depth," Educause Review, 3rd June 2013. [Online]. Available: https://er.educause.edu/articles/2013/6/ret ention-and-intention-in-massive-open-online-courses-in-depth. [Accessed 31st January 2020].

28. B. De Coutere (2014), "To MOOC or not to MOOC?," Training Journal, pp. 18-22.

29. U. &. K. P. Kanjilal (2016), "The Journey of SWAYAM: India MOOCs Initiative," 2016. [Online]. Available: http://oasis.col.org/handle/11599/2592.

30. K. E. S. G. R. Hone (2016), "Exploring the factors affecting MOOC retention: A survey study," Computers & Education, vol. 98, pp. 157-168.

31. H. &. E. M. Khalil (2013), "How satisfied are you with your MOOC?" – A research Study on Interaction in Huge Online Courses," in World Conference on

Educational Multimedia, Hypermedia and Telecommunications.

32. E. Scneider (2013), "Welcome to the MOOCspace: A proposed theory and taxonomy for massive open online courses," in 1st Workshop on Massive Open Online Courses at the 16th Annual Conference on Artificial Intelligence in Education, Memphis, TN.

33. D. F. S. J. a. B. R. Onah (2014), "Dropout rates of massive open online courses: Behavioural patterns," Edulearn'14, p. 5825–5834.

34. E. T. Straub (2009), "Understanding technology adoption: Theory and future directions for informal learning," Review
of educational research, vol. 79, no. 2, pp. 625-649.

35. P. R. Davis (1989), "User acceptance of computer technology: A comparison of two theoretical models," Management Science, vol. 8, no. 982–1003, p. 35.

36. A. B. Bragg (2014), "MOOC: Where to from Here?," MOOC: Where to from Here?, vol. 41, no. 1, pp. 20-21.

37. C. S. J. H. a. A. W. H. Macleod (2016), "Massive Open Online Courses: Designing for the unknown learner," Teaching in Higher Education, vol. 21, no. 1, pp. 13-24.

38. Kumar, V. (2014). Making "Freemium" Work. Harvard Business Review, May 2014. Retrieved from https://hbr.org/2014/05/making-freemium-work

39. 26. Liedtke, M. (2012). Wikipedia Donations Raise $20 Million In Annual Fundraising Drive [Blog post]. Huff Post. Retrieved from http://www.huffingtonpost.com/2012/01/03/wikipedia-donations-2011_n_1181889.html

# INDIAN BANKING SECTOR-TRENDS IN NPAS OF COMMERCIAL BANKS AND ITS RECOVERY

## R. Laxman[1] and S. Patil[2]

[1]Department of Studies and Research in Commerce, Gulbarga University, Kalaburagi, Karnataka
[2]Commerce and Management, Government First Grade College Kamalapur, Karnataka
[1]drlaxman1964@gmail.com, [2]savitaragupatil@gmail.com

_____

## ABSTRACT

*The Indian banking industry is the backbone of Indian Economy. Banks are the treated as heart of the economy. From traditional banking to the phase of modern banking there are tremendous changes have taken place in the banking sector. In today's competitive global and challenging environment banks are playing a pivotal role in the development of an economy. Though, the banking sector in India has adjusted quite fairly with the emerging environment and is trying to extend its reach and diversity, at greater issues and challenges lie ahead. The exposure to the international competition and with the changing reforms banks will have to prepare themselves to face greater challenges and issues like NPAs. The Indian banking sector has facing serious problems of raising Non-performing assets. The growth rate of NPAs have a great impact on the profitability of banks. This paper highlights on the status of NPAs, and its recovery through various channels. And its impact on the profitability of commercial banks.*

_____

*Keywords:* *NPAS, technology impact, recovery channel of SCBS.*

### Indian Banking Sector an overview

Finance is the lifeblood of a business and is also a problem to business. A business cannot move without adequate finance. Every business house requires money for which they approach the banks for the finance, and the banks provide loan to the business institutions after assessing the repayment capacity and other aspects of business units. Lending money is one of the core functions of banks. By deploying money in the form of loans and advances, banks earn interest which is the dominant source of income for them. Banks are treated as the heart of the economy.
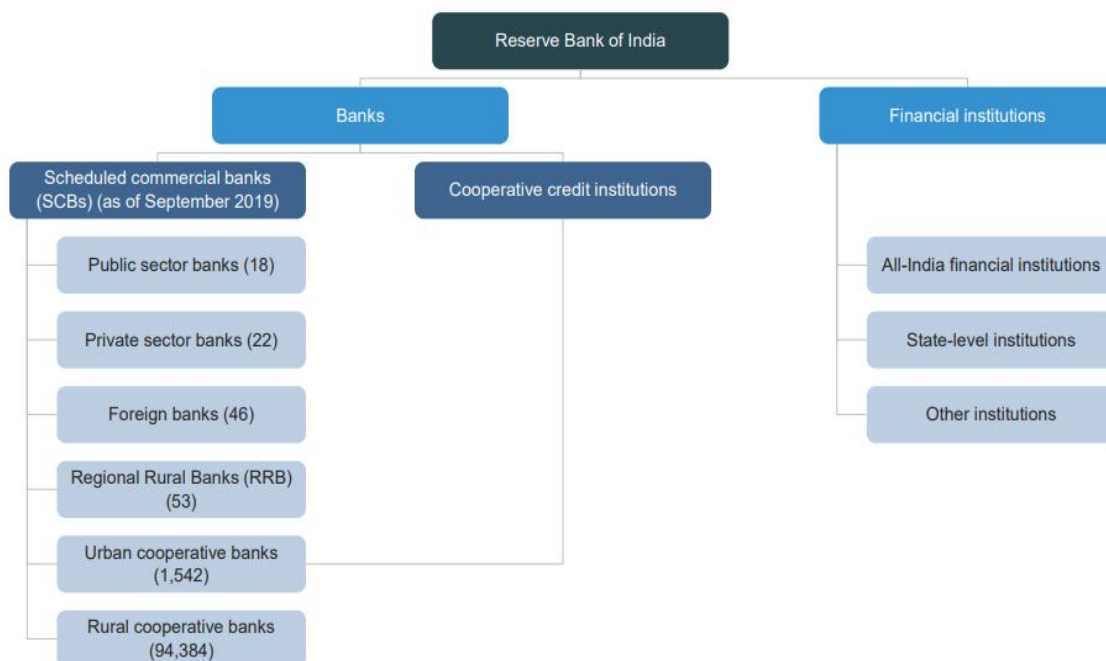


Source: Reserve Bank of India's 'Report on Trend and Progress of Banking in India'

The Indian banking structure has been divided into scheduled banks and non-scheduled banks. Scheduled commercial banks divided into Public sector, private sector, foreign banks, regional rural banks. In the year 2019 the public sector banks are 18, private sector banks are 22, foreign banks are 46, RRBs are 53, urban cooperative banks are 1542 and Rural cooperative banks are 94384.

Source; www.ibef.com

The Indian banking system consists of traditional banking system and modern banking system. The traditional banking system consists of opening of an account, creating and renewing fixed deposits, enquiry about cheque status, request for demand draft, stop payment of cheque, auto mortgage, home, equity, student or personal loan, receive investment product and service information. Order travelers' crashers and regular cheques, transfer funds between accounts within the banks.

Whereas the modern banking system consist the increased speed to process the cases due to reduction in procedures and providing clear cut responsibility to persons involved. Easy tracking of documents, irretrievability of documents. There is no scope for loss or misplacement of documents. Optimum utilization of manpower, measuring the performance ultimately successfully.

### Recent trends in banking sector;

Following are the important trends which have taken place in the banking sector.

- Improved risk management; Indian banks are increasingly focusing on adopting integrated approach to risk management.
- Banks have already embraced the international banking supervision accord of Basel I majority of the banks already meet capital requirements of Basel III, which has deadline of march 31, 2019. Following are the major features of Basel III framework;
- Revised minimum equity and tier I capital requirements
- Better capital quality
- Leverage ratio
- Liquidity ratio
- Countercyclical buffer
- Capital conservation buffer

- Technological innovations; ECS electronic clearing service, RTGS (real time gross settlement,) NEFT (national electronic funds transfer), CTS (cheque truncation system,) NFC near field communication, smartwatch banking cloud storage mobile banking, internet banking etc.

Source www.rbi.com

### Non-Performing Assets

Lending money is one of the core functions of banks. By deploying money in the form of loans and advances, banks earn interest which is the dominant source of income for them. Banks are treated as the heart of the economy. For lending loans and advances it has to consider many aspects like recovery issues and others. Then also banks are facing many challenges among them NPAS are the most important and burning issue for banking sector

An asset, including a leased asset, becomes non-performing when it ceases to generate income for the bank. A non-performing asset (NPA) was defined as a credit facility in respect of which the interest or installment or principal has remained "past due" for a specify period of time. An amount due under any credit facility is treated as past due when it has not paid within 30 days from the due date. Accordingly, as from that date, NPA shall be an advance where;

- ➢ Interest and/or installment of principal remain overdue for a period of more than 180 days in respect of a term loan.
- ➢ The account remains 'out of order' in respect of overdraft/cash credit.
- ➢ The bill remains overdue for a period of more than 180days in the case of bill purchased and discounted.
- ➢ Interest and/or installment of principal remains overdue for to harvest seasons but for a period of not exceeding two half years in the case of a advance granted for agriculture purpose and.
- ➢ Any amount to be received remains overdue for a period of more than 180 days in respect of other accounts.

### 1.1m.rbi.org.in

NPAs are to be classified into substandard doubtful or loss assets based on the period for which the asset has remained non-performing.

| Sl No | Category | Parameters |
|-------|----------|------------|
| 01 | Sub-standard assets | Remained NPA for a period not less than or equal to one year |
| 02 | Doubtful assets | Remained in sub-standard category beyond one year |
| 03 | Loss assets | Assts considered uncollectible and of little value but not written of wholly by the bank |

Source: www.ibef.com

### Review of literature;

There are various articles are available on the issue of non-performing assets. There are large number of researchers have done research on the NPAS in banking sector. A reviewed article is selected for this research article. A study on NPAs management with reference to Banks in India Mayur Rao (2015) has explained regarding the various NPA ratios by applying the least square method.

A study of NPAS of commercial banks and its recovery in India Vivek Rajbahadur Singh (2016) is highlighted on the impact of NPAs on SCBs and explained regarding the recovery aspect impact of NPAs on the profitability of banks, by analyzing the secondary data.

Suggested the to control the issue there is a need to have a proper control of credit management.

Chetan Dudhe (2017) has analyzed public sector banks have more NPA problems and adverse effect on profitability growth, with the help of secondary data. He Suggested that there is a need to have a proper credit management system, planning and credit appraisal in the banking sector before lending the loans and advances.

A study of NPAs and its impact on banking sector (2017) Dr Ujjwal M Mishra and Jayant R Pawaskar have suggested that recovery of NPAs and its impact on Indian banking sector. By analyzing the secondary data.

A critical review of NPAs in the Indian banking industry (2019) Varun Agarwal and Nidhi Agarwal have opined on growth pattern of gross NPAs what are the causes for the growth of NPAs with the help of secondary data.

### Objectives of the study

- To measure trends in NPAs of Indian scheduled commercial banks.
- To appraise the impact of NPAs on banks
- To examine the recovery of NPAs through various channels
- To offer better suggestions to control the NPAs and to introduce the better credit management tools.

### Research methodology

The data is collected from the secondary sources like articles rbi websites, books magazines annual reports etc. The paper highlights on the status of NPAs from 2014 to 2020. The impact of NPAs on the scheduled commercial banks has discussed. And the recovery channels are explained in order to control the NPAs.

Non-performing assets are considered as an important parameter to judge the performance and financial feasibility of banks. The level of NPAs is one of the important measurable parameters for the growth and survival of banks. It helps to take the decision of continuity merger and amalgamation for weak banks with the sound financial position banks. With the help of gross NPAs and gross advances it is easy to understand the status of NPAs commercial banks.

Following are the table shows the gross NPAs and gross advances of commercial banks

### Table 1.1 Showing NPAs gross advances and ratio;
**Public Sector Banks** (amount in crores)

| Year | Gross NPAs | Gross Advances | Ratio |
|------|-----------|----------------|-------|
| 2015-16 | 73508.44 | 1719168.48 | 4.28 |
| | 204959.54 | 3897549.00 | 5.26 |
| 2016-17 | 121698.56 | 1910775.52 | 6.38 |
| | 417987.78 | 3911175.56 | 10.69 |
| 2017-18 | 177810.63 | 1951931.13 | 9.11 |
| | 506921.68 | 3914442.25 | 12.95 |
| 2018-19 | 895601.30 | 6141698.16 | 14.58 |
| 2019-20 | 739541.00 | 638246.85 | 11.59 |

Source: https://dbie.rbi.org.in/DBIE/statistics.rbi?action=RL&f=365&sd=37.

The above table depicts the increase sequence of NPAs from 2015-16 to 2019-20. There are various reasons for increase in the NPAs ratio.

### External factors;

- Ineffective recovery tribunals
- Willful defaults
- Natural calamities
- Industrial sickness
- Lack of demand for start ups
- Change in Governments policies

### Internal factors;

- Defective lending process
Inappropriate technology
- Improper SWOT analysis
- poor credit appraisal system
- Managerial deficiencies
- Absence of regular industrial visit and field visit.
- Huge provision for priority sector lending.
- Poverty elevation programmes by Government like IRDP, PMRY, JRY, SUME etc.

### Table 1.2 Showing NPAS Gross Advances and Ratio
**Private Sector Banks** (amount in crores)

| Year | Gross NPAs | Gross Advances | Ratio |
|---|---|---|---|
| 2015-16 | 33690.35 | 1607339.36 | 2.10 |
| 2016-17 | 55853.12 | 1972658.82 | 2.83 |
| 2017-18 | 91914.65 | 2266720.69 | 4.05 |
| 2018-19 | 125862.89 | 2725890.72 | 4.62 |
| 2019-20 | 180872.43 | 3442346.66 | 5.25 |

Source: https://dbie.rbi.org.in/DBIE/statistics.rbi?action=RL&f=365&sd=37.

Compare to public sector banks private sector banks NPAs position is better following are the important reasons to have a control in NPAs ratio.

➤ Capital and reserve surplus is high in private sector banks compare to public sector banks
➤ Interest income is higher compare to public sector banks in private sector banks
➤ There is no interruption by Government in policy making and decision taking.
➤ Regular field visit by the officers at regular intervals of loan payment in private banks compare to public sector banks.
➤ Employee appraisal system and monitoring evaluation process is more systematic compare to public sector banks.
➤ Private banks have established panel system where senior retired officers have

to monitor the loan disbursement system, according to the repayment capacity and required norms.
➤ Private sector banks have organized awareness programmes among the borrowers successfully according to the need and requirements.
➤ These are the various important reasons there is a control over the NPAs by private sector banks compare to public sector banks.

Compare to private sector banks foreign banks are more successful in managing the NPAs. The table shows the NPAs advances and ratio compare to public sector, private sector banks Foreign banks have a better control over the NPAs.

### Table 1.3 Showing Gross Advances and NPA Ratio
**Foreign Banks** (amount in crores)

| Year | Gross NPAS | Gross advances | Ratio |
|---|---|---|---|
| 2015-16 | 10757.79 | 336609.00 | 3.20 |
| 2016-17 | 15797.99 | 376504.34 | 4.20 |
| 2017-18 | 13621.05 | 343611.18 | 3.96 |
| 2018-19 | 13829.66 | 363304.68 | 3.81 |
| 2019-20 | 12182.59 | 406881.31 | 2.99 |

Source: https://dbie.rbi.org.in/DBIE/statistics.rbi?action=RL&f=365&sd=37.

Following are the important causes to have a better control on NPAs for foreign banks compare to public sector and private sector banks;

❖ Foreign banks have successfully implemented the Basel III standards where they focused on making financial institutions more silent. Key performance indicators are strengthened the assets quality and capital adequacy.

❖ Robust mechanisms applied for credit appraisal monitoring system.

❖ No interruption by any agency or political pressure in decision making and policy making.

❖ Leverage ratios of more strengthened thrice the prescribed level.

❖ Establishment of trained and experienced officers' panel to credit management and appraisal system

❖ According to the requirements the banking provisions and policies are successfully amended.

❖ There is a provision of huge funds and reserves to control the natural calamities and recessions.

The NPAs are very big issue for the banks to control them banks have some recovery channels to recover the NPAs. Following are some important recovery channels through the NPAs can be recovered. The banking sector have introduced various recovery channels to recover the NPAs.

**Table1.4 showing NPAS recovered by SCBs through the various Lok Adalats.**
**(amount in crores)**

| Item | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Number of cases referred | 4456634 | 3555678 | 3317897 | 4080947 | 5986790 |
| Amount involved | 720 | 361 | 457 | 53506 | 67801 |
| Amount recovered | 32 | 23 | 18 | 2750 | 4211 |
| % of amount recovered | 4.4 | 6.3 | 4.0 | 5.1 | 6.2 |

Source: www.rbi.com

The above table shows the NAPs of commercial banks recovered through Lok Adalats during study period of 2015 to 2020. From the analysis of the table, it is clear that the number of cases referred to Lok Adalats for the recovery of NPAs of commercial banks has increased largely in 2015 as compared to 2019. However, if we look at the amount recovered by Lok Adalats during the study period, it shows the improvement in recovery of amount. But compare to the amount involved the recovery amount is very less. Due to its inefficiency in recovering, the amount involved, the NPAs the commercial banks resorting to others means of recovery.

**Table1.5 showing NPAS recovered by SCBs through the Debit Recovery Tribunal (DRT).**
**(amount in crores)**

| Item | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Number of cases referred | 51679 | 40818 | 29345 | 52175 | 40818 |
| Amount involved | 268413 | 245570 | 133095 | 306499 | 245570 |
| Amount recovered | 10552 | 10018 | 7235 | 10574 | 10018 |
| % of amount recovered | 3.9 | 4.1 | 4.0 | 3.5 | 4.1 |

Source; www.rbi.com

Table 1.5 is showing NPAs of commercial banks recovered DRTs during the period of 2015 to 2019. From the analysis of the table, it is clear that number of cases for the recovery of NPAs referred to DRTs is increasing and the amount involved in these cases and amount recovered through DRTs has increased. This is the basic reason the commercial banks are approaching DRTs for the recovery of their NPAs as compared to Lok Adalats in which the percentage of recovered amount of NPAs is very low.

**Table1.6 showing NPAS recovered by SCBs Recovered through Securitization And Reconstruction of Financial Assets and Enforcement of Security Interest Act (SARFAESI Act)**

**(amount in crores)**

| Item | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Number of cases referred | 173582 | 80076 | 91330 | 235437 | 105523 |
| Amount involved | 801 | 1131 | 1067 | 258642 | 196582 |
| Amount recovered | 132 | 78 | 265 | 38905 | 52563 |
| % of amount recovered | 16.3 | 6.9 | 24.8 | 15.0 | 26.7 |

Source; www.rbi.com

Table 1.6 showing NPAs of commercial banks recovered through SARFAESI Act during the period of 2015 to 2019. From the analysis of the table, it is clear that the number of cases referred to SARFAESI Act and the amount of NPAs involved is increased largely during for the five years. This Act has a positive impact on the recovery of NPAs in 2015 the percentage of recovery is 16.3 whereas during the year 2019 the percentage of recovery is 26.7. it helps the commercial banks to recover the NPAs in large number, which helps to increase the profitability.

### Impact of NPA

Commercial banks have an adverse impact on the performance of the banks. It affects the profitability, assets contraction, liquidity management. The most important impact on the credit expansion decision making. If the NPAS are not controlled they have to face the following problems;

- Lenders suffer a lowering of profit margin.
- Stress in banking sector causes lack of funds for other projects.
- Balance sheet syndrome stressed balance sheet.
- Higher rates of interest by the banks in order to maintain the profit margin
- NPAs affects the recycling of bank credits lendable resources shrink and adversely impact the profitability.
- They affect the service to good customers, as their needs may not be met. This leads to loss of business and goodwill of the banks.
- It effects on the ROI very badly which leads to the earning capacity of assets.
- The cost of capital will be increased.
- There is a big problem in the assets and liability management.

- Higher provision of NPAs adversely affect the capital adequacy ratio and the profitability both are interrelated factors.
- It affects the value of shares which causes to decrease in the value in the firm market.
- NPAs affects the risk facing ability of banks.
- The economic value addition (EVA) by banks gets upset because EVA is equal to the net operating profit minus cost of capital.

### Suggestions for management of NPAs

*There is a need to revise the credit appraisal and monitoring systems in banking sector
*Banks should introduce new loan recovery strategies like Basel III standards, strengthening the balance sheet leverage ratios at prescribed level. Robust mechanism credit appraisal system should be introduced.
*It is essential to improve the pre- and post-loan monitoring credit appraisal system for public sector banks.
*There should not be diversion of funds by the customers bankers should follow up the process at regular intervals.
*The bank officers should field visit, the sanctioning authority for credit disbursal and monitoring operations of the accounts of borrowers periodically.
*There is a need to organize the awareness campaigns by banks for borrowers in urban and rural areas.
*There should be regular monitoring on the credit history tracks of the borrowers which helps to take decision to sanction the loans.
In banking sector, they have to establish a panel consisting the experienced and retired persons to monitor the credit appraisal system.
Basel system banks should adhere according to the requirements.

Out sourcing agencies can be hired for better implementation of credit management and appraisal system.

*RBI may take strict actions against the defaulters like publishing names of defaulters in newspapers, broadcasting media and in various branches of the banks.

*Apart from all these to compromise settlement or one-time settlement LOK Adalats, debt recovery tribunals are the other ways for recovery of debts. Now banks have introduced the new SARFAESI act for the better management of NPAs

## Conclusion

The non-performing assets is one of the emerging challenges and issue for the banking sector in India. It is not only big issue to the banks but also to the economy also. The money locked up in NPAs has the adverse impact on profitability of banks directly. This study shows that extent of NPA is comparatively very high in PSBs. Although various measures and steps have been taken by Government to reduce the NPAs but still a lot to be done to curb the issue. The Indian banks NPAs level is very high as compared to the foreign banks.

There is a need to take the better decisions for banks and the government to lend the loans and advances in priority sectors according to the needs, which creates the major problem of NPAs. So, there is a need to take serious efforts to control the NPAs levels otherwise it has the impact on the profitability of banks which affects badly the economy also.

## References

1. Chatterjee, C. and Mukherjee, J and Das, R. (2012). Management of nonperforming assets -a current scenario. International Journal of Social Science & Interdisciplinary Research, Vol 1, Issue 11.
2. Khanna, P., (2012). Managing nonperformance assets in commercial banks. Gian Jyoti E-Journal, Vol No1, Issue No3 Apr-Jun, ISSN 2250-348X.
3. Rai, K. (2012) "Study of performance of NPAs of Indian commercial banks", Asian Journal of Research in Banking and finance, Vol 2, Issue 12.
4. Rao, M., and Patel, A. (2015 ) A Study of NPAs Management with reference to
5. commercial banks in India, Journal of Management and Science Vol No 5, March.
6. Singh, V. R.( 2016) A study of NPAs of commercial banks and its recovery in India. Annual research Journal of SCMS, Pune Vol No IV March 110-115.
7. Prasad, G. V. B., Veena, D. (2011) NPAs Reduction Strategies for Commercial Banks in India, IJMBS Vol No1, Issue 3, September, No 47- 50.

# LIBRARY ASSOCIATIONS IN INDIA: ROLE IN LIS EDUCATION

## U.K. Sharma[1] and A.K. Upadhyay[2]

[1,2]Mangalayatan University, Aligarh

[1]20181100_usha@mangalayatan.edu in, [2]ashok.upadhyay@mangalayatan.edu.in

_____

## ABSTRACT

*This paper presents a glimpse of LIS Education in India given by different library associations. The main objective of library associations is to upgrade library, to educate, to articulate and provide for the need of the users to rise productivity and economy of the society. Libraries play very significant role in the development of the society. The main aim of training of Library and Information Science Professionals is to improve library, to educate, to gear up the library products and services in order to satisfy the users of the library. In the present scenario of information technology, the demands of the users are growing unexpectedly and in order to satisfy these demands the quality of the service should be improved. Quality of Service depends upon the quality of education. Quality of LIS education is directly related to the development of competent library and Information Science Professionals. At present LIS education in India is passing through a turning point and has become a rapid growing subject with multidisciplinary perspective. Now a days LIS education not only comprises of library science but it also has been enhanced some subjects like Computers applications , Information Science, Management studies etc. Therefore, there is a great need of continuing professional educational education and training. LIS Education and training for LIS students and professionals has become extremely important for meeting the challenges of the 21st century. Therefore, in order to successfully deal with the challenges of the 21st century, many universities ,institutions and library associations also organise various training, refresher courses, orientation programmes, seminars and conferences etc.*

_____

## Introduction

As we know that education is very important for all round development of the personality of the individual. Development of any nation depends upon the quality of education imparted to its citizens in other words we can say that education is the key to nation building. Libraries act as gateways for educational realms. LIS Education began under the guardianship of the former Maharaja Sayaji Rao of Baroda in 1911. Presently the following LIS courses are available in India: - Certificate course in Library and Information Science ( C.lib. Sc), Diploma in Library and Information Science, B.Lib.Sc./ BLIS( Bachelor degree in Library and Information Science), M.Lib.Sc/MLIS ( Master of Library and Information Science), PGDLAN ( Post graduate Diploma in Library Automation and Networking, PhD( Doctor of Philosophy in Library and Information Science), D.Litt. in library and Information Science .

Library professionals have joined together in professional associations to settle common issues in order to progress the profession reinforce continuing education for library professionals. Library associations are concerned with principles and standards for services. The main functions of library associations are to take care of professional developments and service conditions of the libraries. Library associations play very important role in encouraging the culture of the library services, which serves the users of the libraries to their fullest extent. Mostly all associations publish journals, monographs, in order to develop policies and idea various types of seminars ,conferences, lectures, training programmes are organised by these library associations.

## Objectives

1. To know about various library associations in India.
2. To describe the functions of library associations in LIS Education.
3. To describe how library associations promote LIS Education through seminars, conferences, workshops and training programmes.

## Limitations of the study

This study is based on the information collected from various websites of some prominent library associations and it is found that all information relevant to the LIS

Education is not available on the website. Therefore, all information is not provided in this study.

There are large number of library associations from state level to national level ,few of them discussed below according to their year of establishment.

### Library Associations in India

| Name of Library Association | Year of establishment | Place where situated |
|---|---|---|
| Andhra Desa Library Association | 1914 | Andhra Pradesh |
| All India Public Library Association | 1919 | Not Found |
| Maharashtra Library Association | 1921 | Maharashtra |
| Bengal Library Association | 1925 | West Bengal |
| Baroda State Library Association | 1926 | Gujrat |
| Madras Library Association | 1928 | Madras |
| Karnataka Library Association | 1929 | Karnataka |
| Punjab Library Association | 1929 | Punjab |
| Samastha Kerala Pustakalaya Samiti | 1931 | Kerala |
| Indian Library Association | 1933 | New Delhi |
| Government of India Library Association | 1933 | Delhi |
| All India Rural Library Services Association | 1933 | Not found |
| United Provinces Library association | 1935 | Not found |
| Bombay State Library Association | 1935 | Bombay |
| Bihar Library Association | 1936 | Bihar |
| Malabar Library Association | 1937 | Kerala |
| Assam Library Association | 1938 | Assam |
| Utkal Library Association | 1944 | Orissa |
| All India Manuscript Library Association | 1944 | Not found |
| Travancore Library Association | 1945 | Travancore |
| Central Provinces and Berar Library Association | 1945 | Not found |
| Kerala Library Association | 1945 | Kerala |
| Hyderabad Library Association | 1951 | Hyderabad |
| U.P.Library Association | 1951 | Uttar Pradesh |
| Library Field Worker Association | 1951 | Not found |
| Delhi Library Association | 1953 | Delhi |
| Gujarat library Association | 1953 | Gujarat |
| Indian Association of Special Libraries and Information Centres | 1955 | West Bengal |
| Madhya Pradesh Library Association | 1957 | Madhya Pradesh |
| Gomantak Library Association | 1961 | Not found |
| Rajasthan Library Association | 1962 | Rajasthan |
| Academy of Library Science and Documentation | 1965 | Hyderabad |
| Jammu & Kashmir Library Association | 1966 | Jammu & Kashmir |
| Haryana library Association | 1966 | Haryana |
| All India college Library Association | 1966 | Not found |
| Association of Agricultural Librarians and Documentalist of India | 1966 | Not found |
| Tripura Library Association | 1967 | Tripura |
| Indian Association of Teachers of Library and Information Science | 1969 | Hyderabad |
| Bombay Science Librarians Association | 1975. | Bombay |
| Indian Association of academic Librarians | 1977 | |
| Medical Library Association of India | 1981 | New Delhi |
| Indian Theological Library association | 1985 | Maharashtra |

| Manipur Library Association | 1987 | Manipur |
|---|---|---|
| Association of Government Librarian and Information Specialist | 1987 | Not found |
| Mizoram Library Association | 1987 | Mizoram |
| Meghalaya Library Association | 1994 | Meghalaya |
| Nagaland Library Association | 1996 | Nagaland |
| Society for Advancement of Library and Information Science | 2002 | Tamilnadu |
| Central Government Library Association | 2004 | Uttarakhand |
| Jharkhand Information and Library Association | 2007 | Jharkhand |
| Academic Library association of Goa | Not Found | Goa |
| Chhattisgarh Library Association | Not Found | Chhattisgarh |
| Uttarakhand Library Association | Not Found | Uttarakhand |
| Himachal Pradesh Librarians Association | Not Found | Himachal Pradesh |

### Role of library associations in LIS Education

Library Associations play very significant role in the all round development of the library personnel's by various educational programmes like training courses, seminars, conferences, workshop's etc .Although most of these initiatives are progressing till now, some of these are terminated as follow up plan. The Publications of the Library associations also educate and update the library personnel. Thus, the role of library associations may be abridge by the following :

### Courses provided by library Associations

In India most the universities and institutions provided formal library and information science courses. However, short term training courses are also provided by few library associations. These courses play very significant role in improving the quality of services in the libraries by educating library personnel, Some of the library associations that offered short term courses are discussed below according to their year of establishment.

### Indian Association of Special Libraries and information Centres

Short- term training courses are organised by th3se organisations and these short- term training courses are usually held in collaboration with university departments, specialized institutions, National library of India and other professional bodies etc. at different parts of India.

### Delhi library association

It has been conducting various training courses at the certificate level in morning shift since 1955. Diploma course in library and information technology are also conducted.

### Medical library Association of India

Various training course are also offered by MLA

### Indian Association of Teachers of library and Information Sciences

Various training programmes are organised for the teachers of library and information science in India.

### Society for Advancement of Library and Information Sciences

Various training programmes are organised.

### Indian Theological Library Association

In order to build quality leadership various training programmes are organised for theological college library staff.

### Manipur library Association

In the year2012,it offered orientation training programmes for community library.

### Haryana Library Association

Six months duration course was changed into course of one year duration in 1981.

### Gomantak Library Association

In 1983, it offered a certificate course of two month duration.

### Conclusion

Library Associations play very important role in providing LIS Education in India. National Association organise seminars and conferences based on the latest trends and technology for knowledge enhancement. But the work done by

state and regional association needs evaluation. Indian library Association, Indian Association of Special Libraries and Information Centres, Indian Association of Teachers of library and Information Science are trying regularly to revise and update the syllabus according to the present demand. But still as per the universal requirements it is required to be well framed. In order to increase the capability and knowledge of the library professionals in the practice of modern technology in their work different types of training programmes, Conferences, Seminars, Workshops should be organised by library Associations. Due to the impact of information technology traditional libraries are changed into hybrid to digital libraries. In India LIS Education should begin a conversion both in balancing technology and tradition, restructuring and incorporating the current trends and development. In the time of knowledge society, library professionals have to preserve their tradition of capturing, processing and disseminating knowledge with the support of modern technology. In the present scenario of information Technology, it is the time for the library professionals to reposition themselves in the central stage and lead from the front in the knowledge management by overcoming all shortcomings.

**References**

1. Das Biswas, M. & Biswas, A. (2014). Re-evaluation and restructuring of library associations in India: a proposal to be mooted by Indian LIS professionals, International Journal of Library and Information Science, 3(1), 82-89.
2. Kumar, Krishan.(2008). Library organization. New Delhi: Vikas Publishing.
3. http://www.jiarm.com
4. http://www.accel-india.com/mala
5. http://www.alaggoa.weebly.com
6. http://www.alsdhyd.wordpress.com
7. http://www.apla.tecra.com
8. http://www.autolib-india.net/salis
9. http://www.blacal.org
10. http://www.cgla.org
11. http://www.dlaindia.org
12. http://www.en.m.wikipedia.org
13. http://www.iaslic1955.org
14. http://www.ila-india.org

# PERFORMANCE OF MANET ROUTING PROTOCOLS WITH VARYING MOBILITY SPEED AND GROUP MOBILITY MODEL

**R.K. Upadhyay[1], S. Kumar[2] and J. Wasim[3]**

[1,2,3]Institute of Engineering & Technology, Mangalayatan University, Aligarh, Uttar Pradesh

[1]rajeshupadhyay1@gmail.com, [2]subodhsharma.86@gmail.com, [3] javed.wasim@mangalayatan.edu.in

---

## ABSTRACT

*Mobility pattern and speed of mobile nodes have an important role in term of performance of routing protocols in a Mobile Ad-hoc Network. The performance of MANET routing protocols can be tested in terms of performance metrics namely Average Throughput (bits/s), Average End to End Delay (s) and Average Jitter (s). To evaluate the performance of AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols, the researcher has conducted simulation based study using QualNet simulator. Group mobility model has been selected to show the realistic environment of the movement of mobile nodes under the varying mobility speed of nodes and CBR traffic pattern. The results of the study has shown that mobility of speed has adverse effect on the performance of routing protocols.*

---

*Keywords: MANET, QualNet, Throughput, End to End Delay, Jitter and Routing Protocols*

## 1. Introduction

Mobile Ad-hoc network (MANET) is a self-configuring network which forms an unpredictable network of mobile nodes. In the MANET, all the nodes are movable and can be connected dynamically in accordance to the need of communication of the data from one node to another node without any centralized control (Kumar, Agrawal and Sharma, 2017, Upadhyay, Kumar, and Rana, 2019). In MANET, the routes are not fixed and get change with the movement of nodes (Larsson and Hedman, 1998). In this paper, researchers made an effort to analyze the effect of mobility on performance of MANET routing protocols namely AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP in terms of namely Average Throughput (bits/s), Average End to End Delay (s) and Average Jitter (s) under the varying mobility speed of mobile nodes using group mobility model to demonstrate the realistic network using simulation method ((Kumar, Agrawal and Sharma, 2014). Various research have shown in their studies that node mobility have negative impact on the performance of routing protocols (Maan and Mazhar, 2011, Dhakal and Gautam, 2013).

## 2. Performance Metrics

The following performance metrics have been used to evaluate the performance of MANETs routing protocols in presented study ((Varshney, Agrawal and Sharma, 2016).

### 1) Average Jitter(s)

The time variation between arrival of data packets due to change in route and congestion etc. is known as average jitter. The average jitter is normally used as an indicator to evaluate the stability and consistency of a network. The average jitter should be small for a routing protocol to perform better.

### 2) Average Throughput (bit/s)

The average rate of data packet received by the node per unit time successfully is known as throughput. High average throughput is always desirable in a communication system.

### 3) Average End-to-End Delay(s)

The average time consumed by the network when packets are sent from any source node to destination node is called average end to end delay. The average end-to-end delay should be small for a routing protocol to perform better.

## 3. Simulation Scenario and Related Parameters

The performance of six routing protocols namely AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP with varying mobility speed has been evaluated under the Group mobility model in this study. The numerous network scenarios have been designed using QualNet simulator to assess the performance of routing

---

protocols with varying mobility speed of 0-10, 10-20, 20-30, 30-40 and 40-50 m/s in MANET with the node density of 50 nodes and CBR traffic pattern in the terrain size of 500x500 m². The simulation setup is executed for 120 seconds.

## 4. Results and Discussion

Three performance metrics namely Average Throughput (bits/s), Average End to End Delay (s) and Average Jitter (s) have been used to analyze the performance of routing protocols. Interpretation of results has been described as follows:

### 1) Average Throughput

The performance comparison of Average Throughput (bits/s) for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols under the Group mobility model with varying mobility speed has been conducted. The resultant Average Throughput of routing protocols has been shown in scientific value format for the ease of analysis. The results of Average Throughput are shown in Table 1 and graphical representation shown in Figure 1.

**Table 1. Average Throughput for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols with varying mobility speed under group mobility model**

| Average Throughput (bits/s) | | | | | |
|---|---|---|---|---|---|
| Protocol | Mobility Speed (m/s) | | | | |
| | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| AODV | 4.28E+03 | 4.28E+03 | 4.24E+03 | 3.57E+03 | 4.20E+03 |
| DSR | 4.32E+03 | 4.32E+03 | 4.30E+03 | 4.31E+03 | 4.29E+03 |
| DYMO | 4.28E+03 | 4.28E+03 | 4.28E+03 | 4.30E+03 | 4.28E+03 |
| OLSR | 4.30E+03 | 4.29E+03 | 4.29E+03 | 4.29E+03 | 4.29E+03 |
| Bellman Ford | 4.41E+03 | 4.35E+03 | 4.30E+03 | 4.24E+03 | 4.27E+03 |
| ZRP | 4.27E+03 | 4.27E+03 | 3.95E+03 | 4.27E+03 | 4.27E+03 |

The graph indicates that the Bellman Ford protocol has outperformed all the other routing protocols in case of Average Throughput at the mobility speed of 0-10, 10-20 and 20-30 m/s but it has shown minor fluctuation at the mobility speed of 30-40 and 40-50 m/s. Overall, DSR protocol has shown best performance with almost constant Average Throughput for all the mobility speed of nodes

under consideration in this study. DYMO and OLSR have also shown good performance with increased mobility speeds. On the Other hand, ZRP performed satisfactorily with lower and higher side of mobility speed but it has shown poor performance at the mobility speed of 20-30 m/s and similarly, AODV performed worst at the mobility speed varying between 30 to 40 m/s.
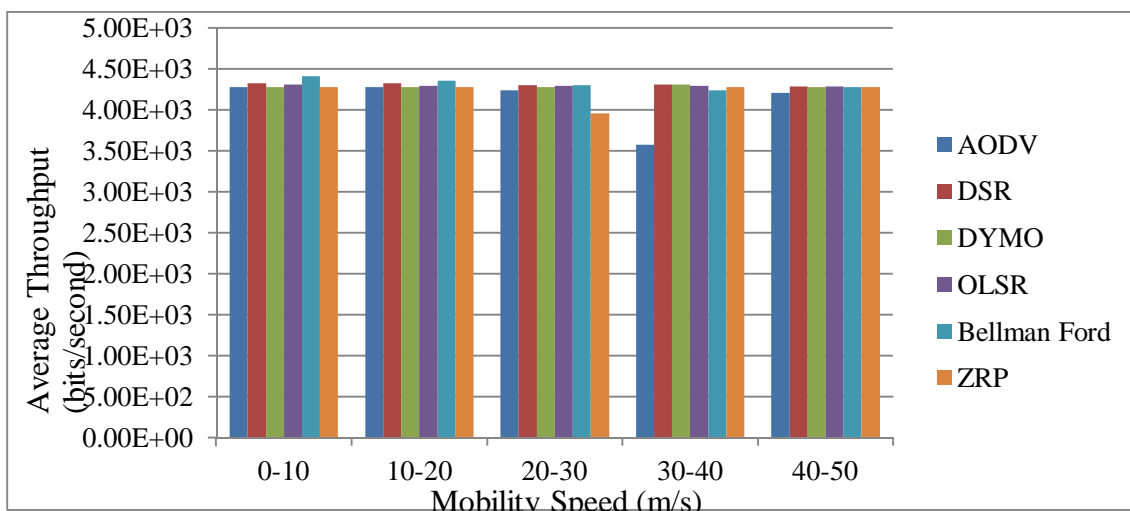


Figure 1.  Average Throughput for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols with varying mobility speed under group mobility model

## 2) Average End to End Delay

The performance comparison of Average End to End Delay (s) for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols under the Group mobility model with varying mobility speed of nodes has been conducted. The resultant Average End to End Delay of routing protocols has been shown in scientific value format for easy understanding. The results of Average End to End Delay are shown in Table 2 and graphical representation shown in Figure 2.

It is clear from the graph that DSR routing protocol has shown worst performance with increasing mobility speed as compared to other routing protocols in terms of End to End Delay. However, DSR routing protocol has shown some improvement in End to End Delay with increasing mobility speed. ZRP protocol has also shown poor performance with the increasing mobility speed. On the other hand, OLSR routing protocols has outperformed all the other routing protocols with increasing mobility speed. DYMO routing has also performed well but it has shown increment in
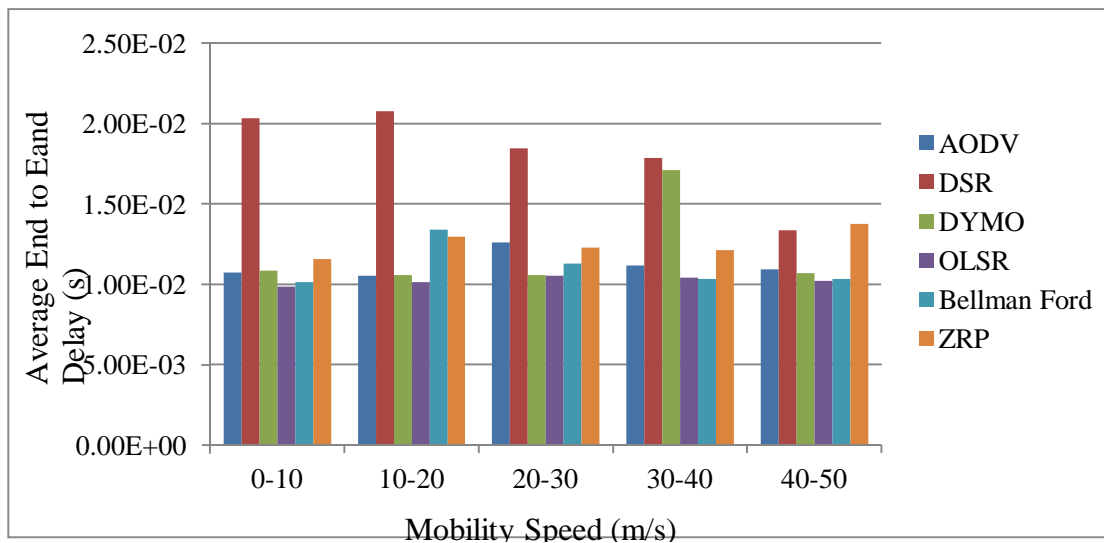
**Table 2. Average End to End Delay for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols with varying mobility speed under group mobility model**

| Average End to End Delay (s) | | | | | |
|---|---|---|---|---|---|
| Protocol | Mobility Speed (m/s) | | | | |
| | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| AODV | 1.08E-02 | 1.05E-02 | 1.26E-02 | 1.12E-02 | 1.10E-02 |
| DSR | 2.03E-02 | 2.08E-02 | 1.85E-02 | 1.79E-02 | 1.34E-02 |
| DYMO | 1.09E-02 | 1.06E-02 | 1.06E-02 | 1.71E-02 | 1.07E-02 |
| OLSR | 9.88E-03 | 1.01E-02 | 1.05E-02 | 1.04E-02 | 1.02E-02 |
| Bellman Ford | 1.02E-02 | 1.34E-02 | 1.13E-02 | 1.04E-02 | 1.04E-02 |
| ZRP | 1.16E-02 | 1.30E-02 | 1.23E-02 | 1.21E-02 | 1.38E-02 |



Figure 2. Average End to End Delay for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols with varying mobility speed under group mobility model

End to End Delay for the mobility speed 30-40 m/s. AODV and Bellman Ford routing protocols has also performed satisfactorily and shown decrement in End to End Delay with increasing mobility speed. AODV and Bellman Ford have shown some increament in End to End Delay at the mobility speed of 20-30 and 10-20 m/s respectively.

## 3) Average Jitter (s)

The performance comparison of Average Jitter (s) for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols under the Group mobility model with varying mobility speed has been conducted. The resultant Average Jitter of routing protocols has been shown in scientific value format for easy

understanding. The results of Average Jitter are shown in Table 3 and graphical representation shown in Figure 3.

**Table 3.Average Jitter for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols with varying mobility speed under group mobility model**

| | Average Jitter (s) | | | | |
|---|---|---|---|---|---|
| Protocol | Mobility Speed (m/s) | | | | |
| | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| AODV | 3.02E-03 | 2.76E-03 | 3.70E-03 | 3.02E-03 | 3.34E-03 |
| DSR | 1.02E-02 | 1.10E-02 | 7.60E-03 | 9.24E-03 | 4.54E-03 |
| DYMO | 2.89E-03 | 2.96E-03 | 2.70E-03 | 7.97E-03 | 3.06E-03 |
| OLSR | 2.67E-03 | 2.51E-03 | 2.82E-03 | 2.58E-03 | 2.19E-03 |
| Bellman Ford | 2.02E-03 | 2.20E-03 | 2.63E-03 | 2.88E-03 | 3.25E-03 |
| ZRP | 3.67E-03 | 4.58E-03 | 4.07E-03 | 4.56E-03 | 5.60E-03 |
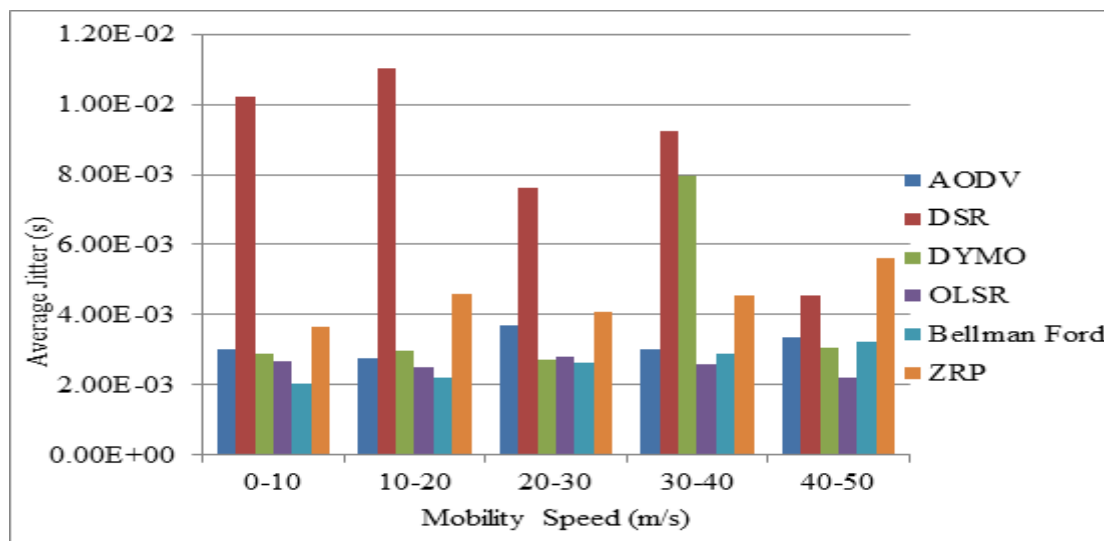


Figure 3. Average Jitter for AODV, DSR, DYMO, OLSR, Bellman Ford and ZRP routing protocols with varying mobility speed under group mobility model

It is clear from the graph that Bellman Ford routing protocols has outperformed all the other routing protocols in term of Average Jitter at the mobility speed of 0-10, 10-20, 20-30 m/s but shown some increament in Average Jitter at the mobility speed of 30-40 and 40-50 m/s. OLSR protocol has also shown good performance with the increasing mobility speed. On the other hand, AODV and ZRP routing protocols have shown increament in Average Jitter with the increasing mobility speeds. DYMO routing protocols has performed satisfactorily at all mobility speed except 30-40 m/s where it has shown high Average Jitter. Overall, DSR routing protocol has shown worst performance for all mobility speeds as compared to other routing protocols under study but it has shown some correction in Average Jitter with increasing mobility speeds of nodes.

**5. Conclusion**

Performance analysis of the used routing protocols has been carried out by the researchers under the varying mobility speed and group mobility model. It is concluded from the results that mobility speed has impacted on the performance of routing protocols with increasing mobility speed. DSR and Bellman Ford routing protocols performed good with varying mobility speed in term of Average Throughput. OLSR has outperformed other routing protocols in case of Average End to End Delay. Bellman Ford and OLSR routing protocols performed well in term of Average Jitter with varying mobility speed in comparison to other routing protocols under the group mobility.

**References**

1. Dhakal, D. and Gautam, K. (2013) 'Performance Comparison of AODV and DSR Routing Protocols in Mobile Ad-hoc Networks: A Survey', International Journal of Engineering Science and Innovative Technology (IJESIT), ISSN: 23195967, Vol. 2, Issue 3, pp. 258-265.

2. Kumar, S., Agrawal, G. S. and Sharma, S.K. (2017) 'Impact of Mobility on MANETs Routing Protocols using Group Mobility Model', International Journal of Wireless and Microwave Technologies, Modern Education and Computer Science Press, pp. 1-12.

3. Kumar, S., Agrawal, G. S. and Sharma, S.K (2014) 'Performance Comparison of OLSR and Star Routing Protocols in MANETS using Random Waypoint Mobility Model', International Journal of Development Research, ISSN 22309926, pp. 1656-1659.

4. Larsson T. and Hedman N. (1998) 'Routing Protocols in Wireless Ad-hoc Networks: A Simulation Study, Master's Thesis, Lulea Tekniska University of Technology, Stockholm.

5. Maan, F. and Mazhar, N. (2011) 'MANET Routing Protocols Vs Mobility Models: A Performance Evaluation' 3rd International Conference on Ubiquitous and Future Networks, IEEE, pp.179-184.

6. Upadhyay, R.K., Kumar, S. and Rana, M.K. (2019) 'Impact of Energy and Mobility on MANETs Routing Protocols: AODV and DSR', International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN: 2278-3075, Volume-8, Issue-10, pp. 2346-2352.

7. Varshney, P. K., Agrawal, G.S. and Sharma, S. K. (2016) 'Analysis the Impact of Radio Energy Models on Aspects of Power Consumption in Routing Protocols of Wireless Ad-hoc Networks using FTP traffic pattern', International Journal of Modern Computer Science and Applications, Vol 4, Issue 1, pp. 13-18.

# REVEALING THE SECRET: WHAT ENABLE IT SOFTWARE COMPANIES TO DRIVE INNOVATION

## A. Ghodke[1] and A. Shelke[2]

[1,2]Department of Management Science, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India

_____

## ABSTRACT

*Purpose – The aim of this study is to identify and rank the enablers of innovation capabilities (IC) in IT software organizations. This study focuses on discovering the important enablers that help in strengthening innovation capabilities with a representational focus on the IT software organization in Pune. Design/methodology/approach – This paper proposes a multicriteria decision-making methodology, which is based on analytic hierarchical process to prioritize the enablers that enhance the Innovation capabilities of IT software organizations, finally, consistency analysis is conducted to examine the ranking stability. Finding – This paper purpose was to find what enables IT software organisation to innovate and remain competitive. Organisation atmosphere and collaboration are one of the most top enablers that help IT software organization to innovate. Incubation center seems to be the least preferred factor that could support in organizations innovation journey. Originality/value - Prioritization performed in the study allows companies to recognize the key enablers for organizations innovation capabilities and take proactive attention. Enhance it to meet customer expectations, generate profits, and enhance competitiveness.*

_____

*Keyword: Pune, MCDM, ITS Software, AHP, Innovation Capabilities, Enablers*

## Introduction

For several companies, innovation is an appealing yet elusive target. It focuses on improving profitability, fulfilling customer needs, increasing market exposure, obtaining the competitive advantage, sustainable growth and better performance( Gunday et al., 2011; Kuratko et al., 2005; Chen et al., 2018; Swann, 2018; Srivastava et al., 2017; Teece, 2007; Stock et al., 2002). The technology service sector's growth was persistent and substantial from about $177 billion in 1992 to nearly $1.4 trillion in 2017.Cheaper and faster-has always been the main differentiator for IT services. Recently there is a paradigm shift in the IT service Industry to be more innovation-driven with the growth of digital technology and increased competition.

Enablers help in enhancing the Innovation capabilities of organization, which brings sustainability and competitiveness in business. Innovation capability is potential of organization to innovate (Neely et al., 2001). Accelerators like incubation center play an important role in stimulating innovation (Pauwels, C., et.al, 2015). In a dynamic business context, an organization needs to be able to rebuild, update and reinvent the resources available to build innovation capabilities. The innovation capabilities of an organization can be viewed via different understanding. Thus, Innovation Capability includes the ability to adapt to the business dynamics, technical and organizational learning and workflow (Bergendahl et al. (2008)). Lawson and Samson (2001) put Innovation capability itself is not a separately identifiable construct. The capability is composed of reinforcing practices and processes within the firm. These processes are a key mechanism for stimulating, measuring and reinforcing innovation. Whereas, Olsson et al. (2009) identified six important factors for an innovative company: user understanding; resources; risk taking environment; learning and re-use of knowledge; balancing creativity and structure; and leadership.

The key value addition of this study is the application of the technique and it's managerial Inference. As the enablers of innovation capabilities are connected, organizations must rank their selection, application, review and maintenance on those drivers that are extremely important. The analytic hierarchical process (AHP) technique has been applied in this study to determine the organization preference of enablers for Innovation Capabilities from IT Software sector .The rationale of the study is to provide a better

understanding on enablers of innovation,. Finally, to ensure the robustness of the findings, consistency analysis was also performed.

This study is expressed into six parts. Part 1 describes the introduction of the study. Part2 explains the factors of Innovation Capabilities and its related literature, followed by IT Software companies in Pune. In Part3, methodology used in the study is explained. Part4 provides the results of this study, followed by Part5, which deals with consistency analysis.

## Literature Review

1. Available literature related to enablers of innovation

Researcher have done extensive study of enablers for innovation. Organisation who are aware of such factors are able to prioritize their effort on improving those enablers, which really affect them in the context of their business environment. Knowledge sharing creates opportunities to maximize organization ability to meet those needs and generates solutions and efficiencies that provide a business with a competitive advantage (Reid, 2003).

Knowledge management has recently emerged as a new discipline in its own way. Knowledge management plays an important supporting function by providing a coordinating mechanism to enhance the conversion of resources into capabilities. Firms effectively managing knowledge were also more innovative and performed better and knowledge management positively affected innovation, responsiveness, and performance (Jenny Darroch, (2005). It is important for both innovation and knowledge management professionals to understand the systemic relationship between knowledge management and innovation programs and the value that it can generate in respect of creating and maintaining sustainable competitive advantage for organizations.

Strategic innovation capacity is strengthened when managers deliberately install specific learning mechanisms on absorptive capacity, whereas knowledge recognition, assimilation and exploitation are

key areas (Berghman et al.,2013).A firm can successfully promote a knowledge distribution culture not only by directly incorporating knowledge in its business strategy, but also by changing employee attitudes and behaviors to promote willing and consistent knowledge sharing(Connelly and Kelloway, 2003; Lin and Lee, 2004). Moreover, various studies focused on the relationship between knowledge sharing enablers and processes (Van den Hooff and Van Weenen, 2004a; Van den Hooff and Van Weenen, 2004b; Bocket al., 2005; Yehet al., 2006), while others have focused on the relationship between knowledge sharing enablers and innovation performance (Calantone et al., 2002; Syed-Ikhsan and Rowland, 2004). However, researchers and practitioners have not tried an integrative model that explores the effectiveness of knowledge sharing from a holistic perspective, and little empirical research has examined the relationships among knowledge sharing enablers, processes, and firm innovation capability.

Herrmann et al. (2007) add that transformation capabilities and risk-propensity are essential for developing radical innovations.Jaworski and Kohli (1993) also saw a causal relationship between ''a willingness to take risks and accepting occasional failures as being natural'' and the likelihood of a company to ''introduce new offerings in response to changes in customer needs.''Gassmann (2001) stresses the significance of risk taking for radical innovations quite explicitly: ''Achieving a quantum leap without taking risks is not possible.'' The organization is not likely to miss the opportunities created by emerging market demand because it has the knowledge and ability to understand and anticipate customer needs (Damanpour, F, (1919), Cahill DJ, (1996)). To stress the importance of understanding those needs, Urban and Hauser [35] use the term''core benefits proposition,'' which states that a firm must build on its full understanding of expressed and latent customer needs. New products must reflect customer values (Urban GL et.al, 1993) if the risk of failure is to be minimized.

Nessim et al. (1995) Business-product companies tend to organize more along cross-functional lines, place heavier emphasis on customers as sources of ideas, and place heavier emphasis on finding new uses or markets for their products. In the business markets, Philips applies the idea of lead customer-driven innovation (Von Hippel, 1986). Lead customers are business clients with a major interest in a specific innovation. Innovations that take respect to integrated, sustainable value chains can help to increase financial performance (Clemens and Bakstran, 2010; Zhu et al., 2008) and it drives profit to integrate suppliers into the innovation process (Hagedoorn, 2002), and thus to integrate them to achieve the goal of sustainable innovation. Li, Ragu-Nathan, Ragu-Nathan and Subba Rao (2006) also argue that strategic partnerships with suppliers enable organizations to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products.

(Feng et al., 2010). Morrison et al. (2000) also concluded that in developed economies, majority of technological innovations had been generated through involvement of customers in the innovation processes.Li, Ragu-Nathan, Ragu-Nathan and Subba Rao (2006) also argue that strategic partnerships with suppliers enable organizations to work more effectively with a few important suppliers who are willing to share responsibility for the success of the products. Research shows that chief executive officer (CEO) attention is an important driver of innovation regardless of whether the focus of attention is specifically on innovation, on external events, or on the future (O'Connor and Veryzer, 2001; Yadav, Prabhu, and Chandy, 2007).

Besides stakeholder role beliefs, norms, values and assumptions also determine the environment of innovation in an business enterprise.Martensen et al. (2007) and Neely et al. (2001) found that the organizational atmosphere support the culture of innovation in an organization and add in increasing the number of innovations. Smith et al. (2008); Wan et al. (2005) and Lawson and Samson (2001) stressed the importance of the organization atmosphere in facilitating right communication in organizations, supporting

role of atmosphere in enhanced collaboration with other organizations (Smith et al., 2000),which in turn helped in developing the Innovation Capability of an organization. Several other authors, such as Slater et al. (2014); Saunila and Ukko (2013); Sharifirad and Ataei (2012); Kallio et al. (2012); Rujirawanich et al. (2011); Skarzynski and Gibson (2008); Leskovar-Spacapan and Bastic (2007) and Lawson and Samson (2001), have stressed the importance of the OC in developing Innovation capability.

External collaboration has significantly different effects on the degree of newness depending on the type of external partners involved, and they also show that radical innovation output is positively related to involving the R&D department (internal) and universities (external involvement) and negatively related to involving suppliers(Astrid Heidemann Lassen, Bjørge Timenes Laugen, 2017).These various types of inter-firm alliances take on many forms, ranging from R&D partnerships to equity joint ventures to collaborative manufacturing. The link between innovation and collaboration is often emphasized and acknowledged as a source of competitive advantage (Argote and Ingram, 2000).Littler et al. (1995) argue that collaboration can affect a firm's innovative output positively by providing three substantive benefits: knowledge sharing, risk reduction, and speed of development. In addition, Chesbrough's (2003) argue that a closed innovation system based solely on the use of internal competencies is inadequate for developing a significant competitive advantage in today's markets.

Finally, Prior research hints at the accelerator as a new generation incubation model. Accelerators have become an umbrella term for any program providing a service structure of mentorship, networking opportunities and access to funding.Pauwels, C. et al. (2015) Accelerators play an important role in stimulating entrepreneurship. Scholars,policymakers,and practitioners increasingly recognize the importance of seeding and accelerating entrepreneurship and technological innovation t through incubation mechanisms that offer economic well-being through sustainable competitive Advantage

(Aernoudt, 2004; Barberoetal., 2012). Consequently, there is a tremendous value in understanding the mechanisms that make Technological Business Incubations more effective. Mian (2011) believe that Incubating innovative firms with the involvement of research universities continues to be a favored policy option for those interested in stimulating knowledge-based entrepreneurial growth

.

| S.No | Innovation Capability enabler | Reference | Description |
|------|-------------------------------|-----------|-------------|
| 1 | Incubation Center | Pauwels, C. et al. (2015), Mian, Sarfraz. et al. (2016), Aernoudt,2004; Barbero et al.(2012), Mian, S.A. (2011) | Accelerators like incubation center play an important role in stimulating innovation |
| 2 | Risk Taking | Herrmann et al. (2007) , Camps and Marques (2014), Jaworski and Kohli (1993), Gassmann, O.(2001), Urban GL(1993), Cahill DJ (1996), Guan and Ma (2003), Akman and Yilmaz (2008), Hull and Covin (2010), | Ability to try new path and approaches without any control over the outcome |
| 3 | Knowledge Management | Jenny Darroch, (2005), du Plessis, M. (2007), Berghman et al., 2013, Reid, F. (2003), Yehet al., 2006, Connelly and Kelloway, 2003; Lin and Lee, 2004 | Prior related knowledge, managing customer and employee knowledge , Knowledge generation and transfer. |
| 4 | Stakeholders Participation | Nessim et al. (1995) , Von Hippel, E. (1986), Feng, T., Sun, L. and Zhang, Y. (2010), Li et.al (2006), O'Connor et al. (2001) | Stakeholder participation includes participation of customers, suppliers and employees in the process of innovation |
| 5 | Organisation Atmosphere | Slater et al. (2014),Hull and Covin (2010), Wonglimpiyarat (2010), Martinez-Roman et al. (2011), Kallio et al. (2012), Saunila and Ukko (2013), Lawson and Samson (2001),Guan and Ma (2003), Brockman and Morgan (2003),Donkor et al. (2018), Wan et al. (2005), Li and Kozhikode (2009) | It constitute level of democratization of power, control and supervision (hierarchical power), presence of communication system and liaison resources in an organization, organizational structure and culture and reward System. Values, beliefs and norms |
| 6 | Collaboration | Astrid et al. (2017), Argote and Ingram (2000), Littler et al. (1995), Chesbrough's (2003) | Inter team collaboration and collaboration with external government/ non-government organization and other industries |

## 1.1 IT Software journey in Maharashtra and Pune

The Government of Maharashtra announced its IT Policy in 1998. It was followed by the Information Technology and Information Technology Enabled Services (IT/ITES) Policy-2003 and IT/ITES Policy-2009 to generate employment, increase efficiency and to improve the quality of life.

Due to the policy initiative, IT sector in the State has grown by leaps & bounds during the last decade. According to data of Software Technology Parks of India (STPI), the export by IT sector in Maharashtra was Rs. 5,508 Crores in FY-2003, which has reached to Rs.49, 796 Crores in FY-2013, recording an increase of 800 percent. The share of IT export from the State of Maharashtra is 20 % of IT export from the country. The State ranks 2nd in IT in the country based on overall performance. The IT Industry in Pune has matured enough over last few years. From a mere $20 Million exports in 1995-96, today IT industry from Pune region exports over $5 billion. The IT industry began with huge talent pool drawn from manufacturing industries and Engineering colleges and professional training institutions. The Industry continues its growth with the entry of more and more IT companies from India and abroad. Strong educational institutions, which courses as per the needs of IT Industry, support the growth in IT industry.

## 1.2 Definition of IT Software

In the context of Information Technology and Information Technology Enabled Services Policy, the Information Technology industry

consists of IT Software, IT hardware, and IT Enabled services as defined below:

"IT Software is defined as any representation of instruction, data, sound or image, including source code or object code, recorded in machine readable form and capable of being manipulated to providing interactivity to a user with the means of a computer."

## Research Methodology

In this document, following methodology has been put for evaluation and ranking the innovation enablers. A random response size of 50 was analyzed, each respondent represent unique organization ranging from entry level to mid-level management. Questionnaire were made as per AHP process requirement. This paper used the analytical hierarchical process to get weights of criteria and prioritize to find the final rank among decided criteria.

Analytical hierarchical process (AHP) is a multicriteria decision-making (MCDM) tool. Further researcher also find consistent of the judgments through consistency ratio. This method is suitable in such a complex multicriteria decision environment.

Figure 1 shows a pictorially the proposed research methodology.

The proposed outline of this research work is illustrated through Figure 1. Initially, identification of enablers were done through an in-depth literature analysis. After that, pairwise comparison through a questionnaire are obtained for listed factors. Hereafter, specific factors are evaluated and respective weights of the factors are determined by using AHP. After that, factors are prioritized and analyzed further, as highlighted through the figure.
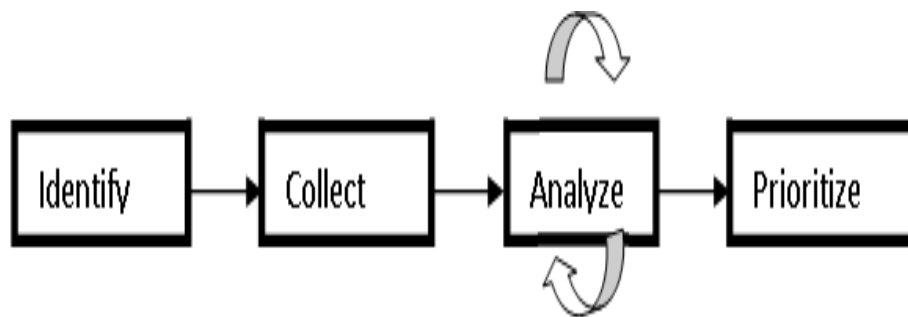


Figure 1: Step for AHP implementation

3.1 Analytic hierarchy process (AHP)

The analytic hierarchy process (AHP) is developed by Saaty (1980) is a mathematical approach of MCDM as a multicriteria decision-making approach, which aids the decision maker to set relative priorities and to make the best decision. AHP has found to be one of the most successful approaches for evaluations the relative priorities of different criteria and for selection between alternatives. It gains recently high attention for many applications. AHP is especially suitable for complex decisions, which involve the comparison of decision elements, which are difficult to quantify. It is a technique for decision-making where there are a limited number of choices and these choices are characterized by a set of attributes

(criteria). Each of these choices has different attributes' value.

A pairwise comparison is a process used to compare the criteria in pairs to judge which criteria is more important than the others using Saaty's nine-point scale of pairwise comparison as shown in Table 2.

AHP procedure can be explained in five steps using following example\;

Step1: Identify goal to achieve. Here we have six criteria. We want to know /list criteria in order of preference .Table-1 exhibit the criteria of goal.

Step2: Construct goal and criteria hierarchy. Here goal is to list criteria in order of importance.
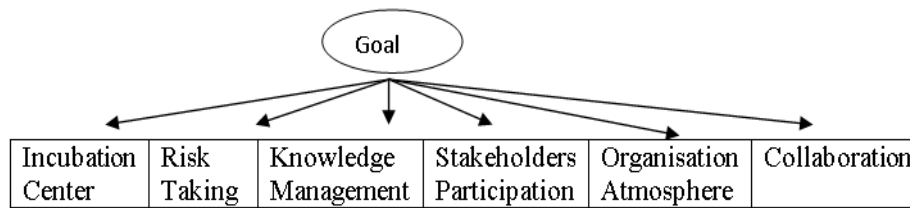
In general, consider a matrix Z with n x n matrix, where n is the number of evaluation criteria

Considered. Each entry zij of the matrix Z represents the importance of the ith criteria relative to the

jth criteria. If zij > 1, then the ith criteria is more important than the jth criteria and in the otherwise,

If zij < 1, then the ith criteria is less important than the jth criteria. If ith criteria and jth criteria

have the same importance, and then the entry zij is 1. The entries zij and zji satisfy the following constraint:

zij .zji = 1

| level of importance | Definition |
|---|---|
| 1 | Equally important |
| 3 | Moderately important |
| 5 | Strongly important |
| 7 | Very strongly important |
| 9 | Extremely important |
| 2,4,6,8 | Intermediate value between adjacent scales |

**Table- 2: Saaty's nine-point scale of pairwise comparison**

Step3: Construct a set of pairwise comparison matrices. Each element in an upper level is used to compare the elements in the level immediately below with respect to it.

To make comparisons, we need a scale of numbers that indicates how many times more

important or dominant one element is over another element with respect to the criteria or property with respect to which they are compared. Table-3 exhibits the scale

|  | Risk Taking | Knowledge Management | Stakeholders Participation | Organisation Atmosphere | Collaboration | Incubation Center |
|---|---|---|---|---|---|---|
| Risk Taking | 1 | 3 | 3 | 1/9 | 1/3 | 5 |
| Knowledge Management | 1/3 | 1 | 1/5 | 1/5 | 1/3 | 1 |
| Stakeholders Participation | 1/3 | 5 | 1 | 1/2 | 1/7 | 1/2 |
| Organization Atmosphere | 9 | 5 | 2 | 1 | 1 | 7 |
| Collaboration | 3 | 3 | 7 | 1 | 1 | 7 |
| Incubation Center | 1/5 | 1 | 2 | 1/7 | 1/7 | 1 |

**Table-3: Comparison matrix of 'innovation capability enabler' goal**

Step4: Use the priorities obtained from the comparisons to weigh the priorities in the level immediately below. Do this for every element. Then for each element in the level below add its weighed values and obtain its overall or global priority. Continue this process of weighing and adding until the final priorities of

the alternatives in the bottom most level are obtained. Calculate the total of each column

Total is calculated by adding value of each column

T1 (total for individual column) = zij+ zkl+ zmn+…………

| | Risk Taking | Knowledge Management | Stakeholders Participation | Organisation Atmosphere | Collaboration | Incubation Center |
|---|---|---|---|---|---|---|
| Risk Taking | 1 | 3 | 3 | 1/9 | 1/3 | 5 |
| Knowledge Management | 1/3 | 1 | 1/5 | 1/5 | 1/3 | 1 |
| Stakeholders Participation | 1/3 | 5 | 1 | 1/2 | 1/7 | 1/2 |
| Organization Atmosphere | 9 | 5 | 2 | 1 | 1 | 7 |
| Collaboration | 3 | 3 | 7 | 1 | 1 | 7 |
| Incubation Center | 1/5 | 1 | 2 | 1/7 | 1/7 | 1 |
| Total(T) | 13.86(T1) | 18(T2) | 15.2(T3) | 2.95(T4) | *2.94(T5)* | *21.5(T6)* |

**Table-4: showing total of each column**

In order to interpret and give relative weights (Priority vector) to each criteria, it is necessary to normalize the above comparison matrix. The normalization is made by dividing each value by the total column value (see Table 4)

Priority vector $(w_{ij}) = z_{ij}/T1$

Similarly $(w_{kl}) = z_{kl}/T2$

$w_{mn} = z_{mn}/T3$

$w_{op} = \dots$

| | Risk Taking | Knowledge Management | Stakeholders Participation | Organisation Atmosphere | Collaboration | Incubation Center |
|---|---|---|---|---|---|---|
| Risk Taking | 1/13.86=0.072 | 0.166 | 0.1972 | 0.0376 | 0.113 | 0.232 |
| Knowledge Management | [(1/3)/13.86]=0.023 | 0.055 | 0.013 | 0.067 | 0.113 | 0.0465 |
| Stakeholders Participation | [(1/3)/13.86]=0.023 | 0.277 | 0.065 | 0.169 | 0.485 | 0.023 |
| Organization Atmosphere | 9/13.86=0.649 | 0. 277 | 0.135 | 0.338 | 0.340 | 0.325 |
| Collaboration | 3/13.86=0.216 | 0.166 | 0.460 | 0.338 | 0.340 | 0.325 |
| Incubation Center | [(1/5)/13.86]=0.0144 | 0.055 | 0.135 | 0.0484 | 0.485 | 0.0465 |

**Table-5: normalization table**

The contribution of each criteria to the organizational goal is determined by calculations made using the priority vector. The priority vector shows the relative weights between each criteria; it is obtained in an approximate manner by calculating the mathematical average of all criteria.

| | Priority Vector(calculation) | Priority Vector |
|---|---|---|
| Risk Taking | (0.072+0.166+0.1972+0.0376+0.113+0.232)/6=0.136 | 0.136 (13.6 %) |
| Knowledge Management | (0.023+0.055+0.013+0.067+0.113+0.0465)/6=0.053 | 0.053 (5.3 %) |
| Stakeholders Participation | (0.023+0.277+0.065+0.169+0.485+0.023)/6=0.173 | 0.173 (17.3 %) |
| Organization Atmosphere | (0.649+0.277+0.135+0.338+0.340+0.325)/6=0.344 | 0.344 (34.4 %) |
| Collaboration | (0.216+0.166+0.460+0.338+0.340+0.325)/6=0.3075 | 0.307 (30.75 %) |
| Incubation Center | (0.0144+0.055+0.135+0.0484+0.485+0.0465)/6=0.049 | 0.049 (4.9 %) |

**Table-6: calculating priority vector (Eigenvalue)**

### Result and Discussion

The values found in the vector have a direct physical meaning in AHP; they determine the participation or weight of that criteria relative to the total result of the goal. From the result we can very well see that 'Organisation Atmosphere' and 'Collaboration' are the priority factor followed by risk taking

capability for IT software organization to drive innovation in todays competitive business environment.These finding are very much in line with finding  (Astrid Heidemann Lassen et.al, 2017) that collaboration is an important prerequisite for the ability to collaborate efficiently within, and thus to absorb and exploit the useful competencies of other and thereby enhance the firm's own knowledge base and innovation performance. Organizational atmosphere is found to be one of the key factors associated with the organization. For the organizations to gain strength and success it is important to build a environment that facilitates and supports creativity. The organization's environment is the frequent patterns of behavior, attitudes and feelings, which are displayed in the daily environment of the organization and the individuals of the organization experience  and understand it (Isaksen and Lauer,  1999).Incubation center is least factor to contribute in innovation process, this is due that fact that even if there are incubation center in an organization and if the people don't get necessary collaboration and the right environment to work then the incubation facility  fail to deliver the oranisation goal w. r. t innovativeness..

## Confirming consistency of selection through consistency ratio (CR)

Measure how consistent the judgments have been relative to large samples of purely random judgments. If the CR is much in excess of 0.1, the judgments are untrustworthy because they are too close for comfort and randomness and the exercise is valued less or must be repeated. It is easy to make a minimum number of judgments after which the rest can be calculated to enforce a perhaps unrealistically perfect consistency.

To begin with, the inconsistency index is based on maximum Eigenvalue, which is calculated by summing the product of each element in the Eigenvector (or priority vector) by the respective column total of the original comparison matrix as show below.

| Eigenvector | 0.136 | 0.053 | .0173 | .344 | .307 | .049 |
|---|---|---|---|---|---|---|
| Total (Sum) | 13.86 | 18 | 15.2 | 2.95 | 2.94 | 21.5 |
| Maximum Eigenvalue ($\lambda$max) | [(0.136*13.86)+( 0.053*18)+(0.0173*15.2)+(0.344*2.95)+(0.307*2.94)+(0.049*21.50)]=6.07 | | | | | |

**Table-7: calculating maximum eigenvalue**

The calculation of the consistency index (Jose et.al, 2005) is given by the following formula

CI= ($\lambda$max-n)/ (n -1)

Where CI is the consistency index and n is the number of evaluated criteria.

So for innovation enabler criteria

CI= ($\lambda$max-n)/ (n -1) =   (6.07-6)/ (6-1) =0.012

To verify whether the consistency index (CI) is adequate, find  consistency  rate (CR), which is determined by the ratio between the consistency index and the random index (RI). The matrix will be considered consistent if the resulting ratio is less than 10%.

CR= (CI/RI) <10%

The RI value (SAATY, 1980) is fixed and is based on the number of evaluated criteria (shown below)

| n | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| RI | 0 | 0 | 0.58 | 0.9 | 1.12 | 1.24 | 1.32 | 1.41 | 1.45 | 1.49 |

CR=0.012/1.24 =0.0096 ~ 1%

Since its value is less than 10%, the matrix can be Considered to be consistent

**References**

1. Aernoudt, R., (2004) Incubators: tool for entrepreneurship.SmallBus.Econ.23 (2), 127–135.

2. Argote, L. and Ingram, P. (2000), "Knowledge transfer: a basis for competitive advantage in firms", Organisational Behavior and Human Decision Process, Vol. 82 No. 1, pp. 150-169.

3. Astrid Heidemann Lassen, Bjørge Timenes Laugen, (2017) "Open innovation: on the influence of internal and external collaboration on degree of newness", Business Process Management Journal, Vol. 23 Issue: 6, pp.1129-1143.

4. Barbero, J.L., Casillas, J.C., Ramos, A., Guitar, S., (2012). Revisiting incubation performance how incubator typology affects results.Technol.Forecast.Social.Chang. 79 (5), 888–902.

5. Bergendahl, M.N., Blomé, M., Guve, B., Kaulio, M., Odenrick, P. and Olsson, A. (2008), "How to shape an innovative company", Innovation Capability, pp. 18-39.

6. Bergman, J., Jantunen, A. & Saksa, J-M. (2009) Enabling Open Innovation Process through Interactive Methods: Scenarios and Group Decision Support Systems. International Journal of Innovation Management, 13(1), 139-156.

7. Brockman, B.K. and Morgan, R.M. (2003), "The role of existing knowledge in new product innovativeness and performance", Decision Sciences, Vol. 34 No. 2, pp. 385-419.

8. Cahill DJ. Entrepreneurial orientation or pioneer advantage. AcadManage Rev 1996; 21:603–5.

9. Calantone, R.J., Cavusgil, S.T. And Zhao, Y. (2002), "Learning orientation, firm innovation capability, and firm performance", Industrial Marketing Management, Vol. 31 No. 6, pp. 515-24.

10. Chen, T. Cheng, H.K. Jin, Y. Li, S. and Qiu, L. (2018), "To trump or not to trump? Impact of competition on innovations of IT industry".

11. Chesbrough, H.W. (2003), "The logic of open innovation: managing intellectual property", California Management Review, Vol. 45 No. 3, pp. 33-58

12. Clemens, B. and Bakstran, L. (2010), "A framework of theoretical lenses and strategic purposes to describe relationships among firm environmental strategy, financial performance, and environmental performance", Management Research Review, Vol. 33 No. 4, pp. 393-405.

13. Connelly, C.E. and Kelloway, E.K. (2003), "Predictors of employees' perceptions of knowledge sharing culture", Leadership & Organization Development Journal, Vol. 24 No. 5, pp. 294-301.

14. Damanpour F. Organizational innovation: a meta-analysis of effects of determinants and moderators. Acad Manage J 1991; 34(3):555–90.

15. Donkor, J., Donkor, G.N.A., Kankam-Kwarteng, C. and Aidoo, E. (2018), "Innovative capability, strategic goals and financial performance of SMEs in Ghana", Asia Pacific Journal of Innovation and Entrepreneurship, Vol. 12 No. 2, pp. 238-254 du Plessis, M. (2007), "The role of knowledge management in innovation", Journal of Knowledge Management, Vol. 11 No. 4, pp. 20-29.

16. Feng, T., Sun, L. and Zhang, Y. (2010), "The effects of customer and supplier involvement on competitive advantage: an empirical study in China", Industrial Marketing Management, Vol. 39No. 8, pp. 1384-1394

17. Feng, T., Sun, L. and Zhang, Y. (2010), "The effects of customer and supplier involvement on competitive advantage: an empirical study in China", Industrial Marketing Management, Vol. 39No. 8, pp. 1384-1394.

18. Gassmann, O., 2001. High-risk projekte als erfolgsfaktor in dynamischen industrien. In: Gassmann, O., Kobe, C., Voit, E. (Eds.), and High risk projects: Successfully manage quantum leaps in

development. Springer Verlag, New York.

19. Guan, J. and Ma, N. (2003), "Innovative capability and export performance of Chinese firms", Technovation, Vol. 23 No. 9, pp. 737-747.

20. Gunday, G., Ulusoy, G., Kilic, K. and Alpkan, L. (2011), "Effects of innovation types on firm performance", International Journal of Production Economics, Vol. 133 No. 2, pp. 662-676.

21. Herrmann, A., Gassmann, O., Eisert, U., 2007. An empirical study of the antecedents for radical product innovations and capabilities for transformation. Journal of Engineering and Technology Management 24 (1–2), 92–120.

22. Hull, C.E. and Covin, J.G. (2010), "Learning capability, technological parity, and innovation mode use", Journal of Product Innovation Management, Vol. 27 No. 1, pp. 97-114.

23. Jaworski, J.B., Kohli, A.K., ( 1993). Market orientation: antecedents and consequences. Journal of Marketing 57, 53–70.

24. Jenny Darroch, (2005) "Knowledge management, innovation and firm performance", Journal of Knowledge Management, Vol. 9 Issue: 3, pp.101-115

25. JOSÉ ANTONIO ALONSO and M. TERESA LAMATA (2006), consistency in the analytic hierarchy process: a new approach, International Journal of Uncertainty, Fuzziness and Knowledge-Based SystemsVol. 14, No. 04, pp. 445-459

26. Juhi Raghuvanshi, Chandra Prakash Garg, (2018) "Time to get into the action: Unveiling the unknown of innovation capability in Indian MSMEs", Asia Pacific Journal of Innovation and Entrepreneurship, Vol. 12 Issue: 3, pp.279-299.

27. Kallio, A., Kujansivu, P. and Parjanen, S. (2012), "Locating the weak points of innovation capability before launching a development project", Interdisciplinary Journal of Information, Knowledge and Management, Vol. 7.

28. Kuratko, D.F., Ireland, R.D., Covin, J.G. and Hornsby, J.S. (2005), "A model of middle–level managers' entrepreneurial behavior", Entrepreneurship Theory and Practice, Vol. 29 No. 6, pp. 699-716.

29. Mian, S., Lamine, W., & Fayolle, A. (2016). Technology Business Incubation: An overview of the state of knowledge. Technovation, 50-51, 1–12.

30. Lawson, B. and Samson, D. (2001), "Developing innovation capability in organizations: a dynamic capabilities approach", International Journal of Innovation Management, Vol. 5 No. 3, pp. 377-400.

31. Li, J. and Kozhikode, R.K. (2009), "Developing new innovation models: shifts in the innovation landscapes in emerging economies and implications for global R&D management", Journal of International Management, Vol. 15 No. 3, pp. 328-339.

32. Li, S., Ragu-Nathan, B., Ragu-Nathan, T. S., & Subba Rao, S. (2006). The impact of supply chain management practices on competitive advantage and organizationalperformance.Omega, 34(2), 107−124.

33. Lin, H.F. And Lee, G.G. (2004), "Perceptions of senior managers toward knowledge-sharing behavior", Management Decision, Vol. 42 No. 1, pp. 108-25.

34. Littler, D., Leverick, F. and Bruce, M. (1995), "Factors affecting the process of collaborative product development: a study of UK manufactures of information and communications technology products", Journal of Product Innovation Management, Vol. 2 No. 1, pp. 16-23.

35. Maharashtra's Information Technology/InformationTechnology Enabled Services (IT / ITES) Policy – 2015, https://www.maharashtra.gov.in/PDF/Web_Marathi_IT-ITES_Policy_2015.pdf (accessed on 01 March 2020)

36. Martinez-Roman, J.A., Gamero, J. and Tamayo, J.A. (2011), "Analysis of innovation in SMEs using an innovative capability-based non-linear model: a study in the province of Seville (Spain)",

Technovation, Vol. 31 No. 9, pp. 459-475.

37. Mian, S.A., and 2011.University's Involvement in Technology Business Incubation: what Theory and Practice Tell US? Int.J.Entrep.Innov.Manag.3 (2), 113–121.

38. Morrison, P.D., Roberts, J.H. and Von Hippel, E. (2000), "Determinants of user innovation and innovation sharing in a local market", Management Science, Vol. 46 No. 12, pp. 1513-1527.

39. Neely, A., Filippini, R., Forza, C., Vinelli, A. and Hii, J. (2001), "A framework for analysing business performance, firm innovation and related contextual factors: perceptions of managers and policy makers in two European regions", Integrated Manufacturing Systems, Vol. 12 No. 2, pp. 114-124.

40. Nessim, H., Ayers, D.J., Ridnour, R.E. and Gordon, G.L. (1995), "New product development practices in consumer versus business products organizations", Journal of Product and Brand Management, Vol. 4 No. 1, pp. 33-55.

41. O'Connor, G. C., and R. Veryzer. 2001. The nature of market visioning for technology-based radical innovation. Journal of Product Innovation Management 18: 231–46.

42. Olsson, A., Blomé, M., Guve, B., Kaulio, M., Norell Bergendahl, M. and Odenrick, P. (2009), "Organizational factors affecting product innovation capability: findings from the med-tech industry". DS 58-1: Proceedings of ICED 09, the 17th International Conference on EngineeringDesign, Vol. 1, Design

43. Processes, Palo Alto, CA, 24-27 08 2009.

44. Pauwels, C., et al., Understanding a new generation incubation model: The accelerator. Technovation (2015).

45. Reid, F. (2003), "Creating a knowledge sharing culture among diverse business units", Employment Relations Today, Vol. 30 No. 3, pp. 43-9.

46. Saaty, T.L. (1980), The Analytical Hierarchy Process, Planning, Priority. Resource Allocation, RWS Publications.

47. Saaty, T.L. (2008) 'Decision making with the analytic hierarchy process', Int. J. Services Sciences, Vol. 1, No. 1, pp.83–98.

48. saksen SG, Lauer KJ (1999). The Relationship between Cognitive Style and Individual Psychological Climate: Reflections on a Previous Study. Studia Psychologica, 41: 177–191

49. Saunila, M. and Ukko, J. (2013), "Facilitating innovation capability through performance measurement: a study of Finnish SMEs", Management Research Review, Vol. 36 No. 10, pp. 991-1010.

50. Slater, S.F., Mohr, J.J. and Sengupta, S. (2014), "Radical product innovation capability: literature review, synthesis, and illustrative research propositions", Journal of Product Innovation Management, Vol. 31 No. 3, pp. 552-566.

51. Stock, G.N., Greis, N.P. and Fischer, W.A. (2002), "Firm size and dynamic technological innovation", Technovation, Vol. 22 No. 9, pp. 537-549.

52. S wann, P. (Ed.) (2018), New Technologies and the Firm: Innovation and Competition, Routledge, Vol. 48.

53. Syed-Ikhsan, S.O. and Rowland, F. (2004), "Knowledge management in a public organization: a study on the relationship between organizational elements and the performance of knowledge transfer", Journal of Knowledge Management, Vol. 8 No. 2, pp. 95-111.

54. Teece, D.J. (2007), "Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance", Strategic Management Journal, Vol. 28 No. 13, pp. 1319-1350.

55. Urban GL, Hauser JR. Design and marketing of new products. 2nd ed.Englewood Cliffs (NJ): Prentice-Hall, 1993.

56. Van den Hooff, B. and Van Weenen, F.D.L. (2004a), "Committed to share: commitment and CMC use as antecedents of knowledge sharing",

Knowledge and Process Management, Vol. 11No. 1, pp. 13-24.

57. Van den Hooff, B. and Van Weenen, F.D.L. (2004b), "Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing", Journal of Knowledge Management, Vol. 8 No. 6, pp. 117-30.

58. Von Hippel, E. (1986), "Lead users: a source of novel product concepts", Management Science, Vol. 32, July, pp. 57-71.

59. Wan, D., Ong, C.H. and Lee, F. (2005), "Determinants of firm innovation in Singapore", Technovation, Vol. 25 No. 3, pp. 261-268.

60. Wonglimpiyarat, J. (2010), "Innovation index and the innovative capacity of nations", Futures, Vol. 42 No. 3, pp. 247-253.

61. Yadav, M., J. Prabhu, and R. Chandy. 2007. Managing the future: CEO attention and innovation outcomes. Journal of Marketing 71 (4):84–101.

62. Zhu, Q., Crotty, J. and Sarkis, J. (2008), "A cross-country empirical comparison of environmental supply chain management practices in the automotive industry", Asian Business & Management, Vol. 7 No. 4, pp. 467-488.

# SCIENCE OF TOWN PLANNING IN RAMAYANA AND MAHABHARATA

## Maithreyee K.G.[1] and R. Jairam[2]

[1,2]Jain (Deemed to be University), Bengaluru, Karnataka

---

## ABSTRACT

*Hinduism is the oldest religion that has survived despite all kinds of ravages and destructions of time. It is one of the oldest living cultures that has been evolving continuously by accepting all the new thoughts and beliefs being propagated. The change always affected the political, social and cultural aspects of the society but could preserve its basic essence. It has a peculiar way of recording its history through literature that has been transmitted between generations by oral tradition. Epics of Ramayana and Mahabharata are two such important literary works which not only recorded the historical events that occurred in the past but they have also recorded the human achievements in various fields of science and art and town planning is one example of such knowledge they possessed. It has been noticed that the conscious effort in planning and construction are evident in the descriptions of cities referred to in Ramayana and Mahabharat. My aim is to analyse and enlist the salient features of these cities and those can be compared with the planning principles discussed in the treatise of shilpashastra or the texts on traditional Indian architecture and town planning. Translated works of Ramayana , Mahabharat and Shilpa shtatras like Narada shilpashastra, Mansara and scholarly works of Dr. G.Jnananda and B.B.Dutt are being referred to postulate this study.*

---

*Keywords: Religion, Ramayana, Hinduism, Mahabaharata*

## Introduction

Ramayana and Mahabharat are the two great epics of India. These two epics are just not stories of kings and queens but are witnesses of various true historical facts and past events that occurred in ancient India.

Ramayana beautifully elucidates the victory of Rama, the prince of *Ayodhya* over the very powerful demon king Ravana, the lord of Lanka; whereas Mahabharat gives detailed description of great war fought between Pandavas and Kauravas, its cause and consequences. These two epics highlight the triumph of righteousness (dharma) over wickedness (adharma). At the same time both the epics describe the political, social, cultural and spiritual aspects of contemporary society and the accepted social belief and responsibilities practised in everyday life. These epics are passed on to generations for thousands of years through an oral tradition and had a great influence on our art such as dance, music, dramas, literature, painting, sculpture, architecture etc. till date.

These stories are told and retold several times making its strong presence imprint in our society. But the descriptions available in these literary sources on the subjects of art, architecture and science and the glory that was achieved during those periods have been ignored. Science of town planning is one such field. Hence the description on cities of Lanka, Ayodhya, Indraprasta, Dwaraka, Hastinapura, Varanavat as described in the epics of Ramayana and Mahabharat are evaluated to understand the principle of town planning and construction engineering practiced in ancient India.

Well Planned, fortified Town or *Nagara* that has been explicitly discussed in Ramayana is the city Lanka and to some extant City of *Ayodhya*.

Following provides references to the aspect of town planning

### The City of Lanka

o It was ruled by Ravana the Rakshasa king and was **designed** by **architect Vishwakarma**.

o **Size** - A **breadth of ten yojana and a length of twenty yojana**.

o It was **located** in the island of Shrilanka, on the **top** of a mountain Trikuta and **surrounded** by Mountain of Suveru and Lamba.

o It was **protected** by a **deep moat/trench** (Parikha) **filled with water** lilies and lotuses and from **there raised a tall golden Rampart/buttressed wall** (prakaara) with **imposing arched gateways**/**entrance** (Pratoli). There were four beautiful gates on **four directions**, well protected by mighty Rakshasa warriors.

---

o Four fairly big and extensive gates (Dwara) are fitted with **strong doors** (kavata) along with **huge beams** for locking those gates. Strong and mighty ballista (shupayantra) capable of hurling darts and stones have been attached to them. Anterior to the four gateways, there were four very extensive **draw-bridges** (samkrama), equipped with numerous engines. **Dangerous and sharp edged** Sataghnis made of iron, have been kept in readiness in hundreds at the gates.

o It is a celestial citadel (**Devadurga**)surrounded by water and built on a mountain, hence it had **four-fold defences and they were water, mountain, forest and artificial fortification.**

o It was a beautiful city with well defined **main streets dividing wards** of sufficient size (suvibhakatam Mahapatham) and these streets were flanked by **series of white mansions (prasada) of seven or eight storeys high.** Pillars, windows and top portions of the buildings were decorated with gold, pearl and other precious stones. There were **buildings (Bhavanani) of various shapes and forms**.

**Ravana's Palace complex, The Citadel**

o The palace of Ravana was filled with many edifices and was **half a Yojana long and one Yojana wide.**

o It was a city within a city, s**urrounded by moat, filled with white lotus and Ramparts of silver and gold with a beautiful arched doorway**. **Interior** was adorned with priceless pearls and gems. Walls were washed with aloes and sandal paste.

o It had a **golden court-yard** and **pavilions** (kakshya), decorated by pearls and diamonds. It was protected by great warriors and filled with valuable artefacts, utensils, chariots, the best women with the best jewellery and various kinds of animals and birds.

o Ravana's palace was surrounded by mansions of great Rakshasa warriors like Prahasta, Mahaparshva, Indrajitu, Vibhishan and many others.

o In the **palace complex** (*nivesham*) of *Ravana*, there were palanquins(*shibika*) of various shapes, wonderful **bowers** (*latha griha*), **art galleries** (*chitra shala*) and other **pleasure houses** (*kridagriha*), house for sexual delight (*kamasya grihakam*) and a beautiful diurnal house(*divagrihakam*). There were various **halls** (shala) for storing conches, bows, and other weapons. These houses were provided by windows (*gawaksha*) in golden hue, embedded with diamond and precious gems. There was the best aeroplane called *Pushpaka* with an excellent form decorated by rows of upper floors. There were many **pools, lakes, artificial mountains, springs and raised platforms** (*jagathi*) surrounded by beautiful flowering trees.

## The City of Ayodhya

A world-renowned city in that kingdom of Kosala, which was **personally built by Manu**, the foremost ruler of mankind.

The glorious city was **twelve *yojanas* lengthwise and three *yojanas* breadth wise.**

It was made unassailable with **a strong fort (*Praakaar*) and deep moat/trenches (*parikha*).**

It was surrounded by ornamental arched gateways and furnished by every machine of war, all kinds of weaponry and hundreds of *shataghnsi*.

Well laid **great royal highways** (*Rajamarga*) were long and straight and well-watered every day. Frontage of the buildings facing these streets were well defined.

**Multistoried mansions** were studded with precious gems.

Buildings and houses were laid out in **8 equal parts (*ashtapadakarama -8x8 vastupadamandala*) on levelled flat land (*samabhumi*). The housing (*Griha*) was very dense and there was no place or ground unutilized.**

It was filed with brahmins well versed in *Vedas*, thousands of archers, and with speediest chariot-warriors, danseuses and theatrical groups (*Nataka Sangha*) tribute paying feudatories, traders from many countries, engineers and men of every craft (shilpibhi).

## City of Hastinapura

Hastinapura the capital of the Kurus, full as the ocean, teeming with hundreds of palaces (prasada) and mansions, and possessing gates(Dwara) and arches (thorana).

It sported rivers, lakes pools, groves abounded with trees. The prosperous country became so contented that the subjects of other kingdoms came to dwell there.

## City of Indraprastha

o This city was **built by architect Vishvakarma**, as ordered by Krishna.
o On an auspicious hour of a day, on a suitable site (shive deshe) the sacred rituals were performed (shantim). **The land for building a city was being measured (mapayamasu) under the assistance of Maharshi Vyasa**.
o A wide trench/ moat (parikha), as wide as sea was dug and buttressed walls plastered white were erected. Imposing, **high gateways (prakaradwara) looked like outstretched wings of Garuda were erected**. This fort wall was well furnished with all kinds of weapons, machinery of warfare and shathaghnis and was lined with numerous warriors along the whole length of it. There were large iron wheels planted on them.
o **The streets (suvibhakta maharathyam) were all wide and laid out excellently**; and there was no fear in them of accidents. These streets were decked with innumerable white plastered beautiful mansions (Bhavanani).
o In a delightful and auspicious part of the city (shivedeshe) rose the palace of the Pandavas filled with every kind of wealth.
o Around the city were laid out many delightful gardens (udyana) adorned with numerous trees bearing both fruits and flowers. There were various pleasure houses, bowers of creepers (lathagriha), art galleries (chitra griha) , artificial mountains, lakes and pools filled with lilies and lotus and adorned with swans and ducks.
o There came numerous persons belonging to all four varnas (professions). There were engineers or shilpis well versed in any form of arts providing for any needs.

## The City of Dwarika

o This city of Lord Krishna was built by Vishvakarma.

o Size of the city was **twelve yojana in width eight yojana in length and extended by a satellite town (upanivesham) of double the size**.
o The city was surrounded by parikha as wide as rivers Ganga and Sindhu and within that stood a white buttressed wall (prakara) that was flanked by fifty gates. There were numerous weapons and machinery of war, shathaghni-s and eight thousand chariots adorned with bells.
o There were orchids (upavana) named Nanadanavana, Mishrakavana, Chitravana, and vaibhrajavana filled with tall trees flowering throughout the year around the city.
o It was surrounded by **four mountains Raivathaka, Lathaveshta, sashaksha and Venimanta on east, south west and north direction**
o **A large lake (pushkarini) of area of 100 dhanasu was present on the eastern side of the city.**
o There were **eight primary streets (ashtamargam)** and **sixteen pavilions (Mahakakshyam)** at the junctions of these streets and a web of seven royal streets (mahapatha) in the central part or citadel of the town.
o City was filled with numerous white plastered multi storied mansions illuminated with golden hue and adorned with precious gems.

## Important features of capital as discussed by King Dhritharastra with Yudushtir in Ashramavasa prva

The citadel should be properly protected with strong walls and arched gates. On every side of the walls, with watch-towers on them standing close to one another, should be such as to admit six persons walking side by side on top of that wall. The gates should all be large and sufficiently strong. Kept in proper places, those gates should be carefully guarded.

## Salient features of these ancient Towns explained in the Epics of Ramayana and Mahabharat.

All these cities were built by an architect named Vishwakarma. Those were not necessarily the same person but architects who

belonged to that school of architecture or parampara but referred to as Vishwakarma (the best among the architects).

Some of the above referred towns provide a Clear reference of size along with a proportional dimensions of length and breadth.

| City | Length and Breadth in *yojana* | Ratio |
|------|-------------------------------|-------|
| Ayodhya | 3 X12 | 1:4 |
| Lanka | 10X20 | 1:2 |
| Dwaraka | 8X12 | 3:4 |

Every city is well protected by A deep moat *(Parikha)*, a plastered high wall *(Prakara)*or ramparts with arched gateways *(Dwaratorana)*. It was well guarded by all kinds of arms and weapons, machinery, *shataghni*-s and brave warriors.

On an auspicious hour of a day, once the sacred rituals were performed, a plot of land of required size was being measured (*mapanam*) and its boundaries were fixed.

There were well laid wide streets, lined with trees on either side and on the junctions of these streets quadrangles/pavilions or *(chatwara)* were erected. These streets divided (*suvibhakta*)the site into wards or *pada-s* of sufficient size. There were multi-storeyed public buildings (*bhavanam*), dwelling units (*graham, veshma*), palaces (*prasada*), markets (*apana*)art gallery (*chitrashala)*, pleasure house (*krridagriha)*, dance theatre *(natyashala)* erected. These buildings were plastered white and decorated with gold and precious gems.

These cities were distributed with gardens, orchids (*upavana, udyana*) and artificial hillocks, full of various kinds of flower and fruit bearing trees. There were beautiful lakes, ponds and rivers adorned with white lilies and lotuses and raised platforms at convenient places for the relaxation of its inhabitants.

People belonging to all professions and castes were encouraged to live here by providing them all comforts and convenience they required.

### Principles of Shilpashastra as per traditional texts

*Manasara, Narada Shilpashastra, Mayamatha* are few of the treatises on shilpashastra which discusses Town planning concepts of ancient India extensively. The town planning concepts as discussed in Narada Shilpa shastra and Manasra are briefed here.

The foremost activity prior to the construction of any kind is **selection of site by inspection and preliminary survey of the site**. That would include inspection of colour, taste, smell, odour, fertility of soil, slope of the site, availability of ground water and nearby water source etc. once the suitable site is selected on an auspicious time and a day propitiatory rites are conducted and the **land is measured.** This will be followed by **levelling of site, marking of boundaries and then dividing the whole site into grids for land use zoning.** This tradition of marking grids is called *Vastupadamanadala*. Site will be **divided into grids** starting from 1X1 to 32X32 (32 types) **as per the scale of the project** and the level of detailing required. These *Vastupadamandala-s* are applicable on any shape starting from square, rectangle, circle, hexagon, octogen, flower shape (*padmaka*) or bow shape. Here each *pada* or grid is denoted by the name of a specific deity called *Padadevatha*, counting to a total number of forty-five. These pada or grids are then divided and subdivided for further detailing. **All these stages are common in any kind of construction such as building a temple, a town or a house**.

For the planning of village or town, **once the approach roads from other villages, cities are established, the approved parcel of land is then divided into wards as per *Vastupadamandala*.** Primary streets and chariot streets are laid forming plots for various activities. **Allocation of various activities (called zoning in modern architecture)** on these wards are based on profession and social order of the occupants. These land divisions are then **subdivided by secondary and tertiary roads. Hierarchy of road widths, size of the land parcels and built forms are established according to a system of relative measurement**. Hence the **road widths and plot sizes are proportional to each other and to the site as well**. Constructions of various components of towns like moat, fort, buildings, gardens, lakes, pavilions are elaborately explained in *Shilpasasytra*.
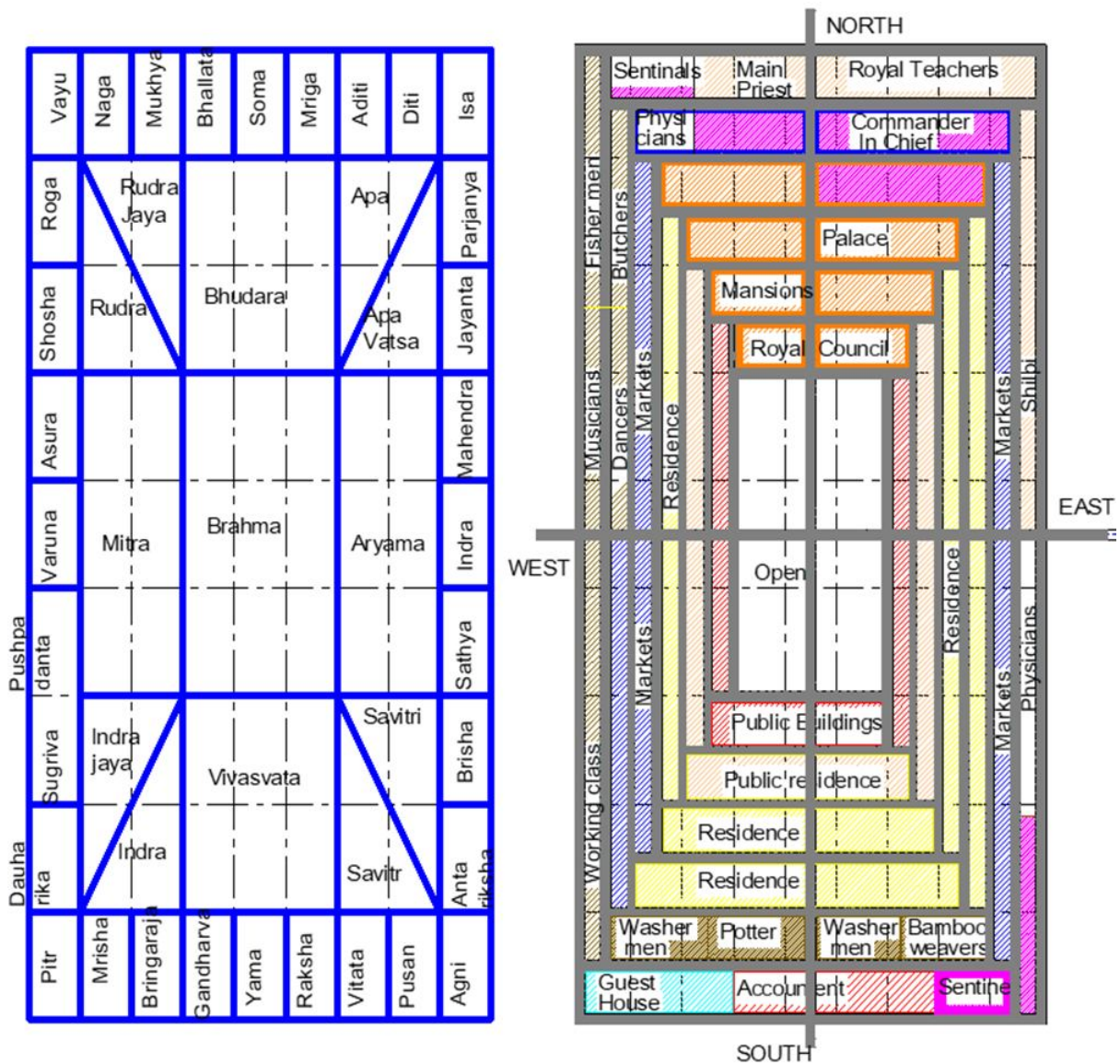
Illustration showing concept of Vastupurusha Mandal and development of a planning scheme based on it. In the above illustration the ratio of width to length is 1:2

## Conclusion

It is very evident and clear that there existed very sophisticated and meticulously planned towns and cities in ancient India. The cities were laid down systematically and scientifically by highly qualified civic architects called *shilpi-s who* belonged to the family of venerable sages who expounded the *shilpshastra-s*. They had mastered the knowledge of *Shilpa shastra*, *Vedas* and all other *shastras*. This science of planning towns and construction engineering has continuously evolved over thousands of years. We can see the designing and construction of forts and cities as per *Shilpashastra* was in practice till

the recent past. The city of Jaipur established by Raja Jaisihm in the eighteenth century is one such example. These age-old techniques of planning towns disappeared slowly as India was under foreign rule for centuries. The industrial revolution that triggered the mass migration to urban areas altered the social order which existed for centuries. Our ancient knowledge, which was all integral part of our culture, was lost because of Introduction of modern education, changing lifestyle , advent of new technologies and new transportation facilities to name a few.

It is our duty to preserve ancient science to understand the achievements of our ancestors and there is a possibility of incorporating these well-established knowledge into our modern application. But the task of preservation of our rich heritage of planning cities is very challenging. As most of these cities are being

inhabited continuously over thousands of years and have been destroyed and rebuilt over and over again. Hence finding the evidence is not easy. Evaluating the description available from epics, mythology and other literary works corroborating them with treatises of shilpa shastra and archaeological excavation with modern scientific tools would help us to trace back the origin and growth of science of architecture and town planning in ancient India.

## Bibilography

1. Kannada Mahabharathadalli Shilpi mathu Shilpa:A thesis submitted by Dr. G.Jnananda for D.Litt.degree to Kannada Vishvavidyalaya.Hampi**.**
2. Narada Silpasastra, Snaskrit Twxt on Architectureal Civil Engineering, by K.S.Kannan, R.N.Iyengar and S.Y.Wakankar, Jain University Press.
3. Town planning in Ancient India by B.B.Dutt (2009), Isha Books Puublications, New Belhi.
4. SimadvalmikiRamayanam translated by N.Raghunathan, Vol-I &II, Vifhneswara Publishing House, Bangalore.
5. Shrimadramayana (kannada), Bharatha Darshan Prakashana, Bangalore.
6. Shrimadmahabharatha (kannada), Bharatha Darshana Prakashan , Bengalore
7. https://www.valmikiramayan.net
8. https://holybooks-lichtenbergpress.netdna-ssl.com/
9. Shrimadramayanam Sundara Kanda, Sarga -2-10,Yuddha Kanda, Sarga -3 & 39 https://www.valmikiramayan.net
10. Shrimadramayanam, Balkanda , Sarga -5 https://www.valmikiramayan.net/utf8/baala/sarga5/ bala_5_frame.htm
11. Mahabharata Adiparva 108 https://holybooks-lichtenbergpress.netdna-ssl.com/
12. Mahabharata Adiparva 206
13. Mahabharata Sabhaparva between 38 and 39 as referred to in 'kannadaMahabharatadalli shilpi mathu Shilpa ' by Dr.G.Jnananda.
14. Kannadadalli Shilpa mathu shilpi,' by Dr.G.Jnanananda, p.no- 177

# SCIENTOMETRIC ANALYSIS USING BIBLIOMETRIX AN R-TOOL

## A.K. Upadhyay[1] and M. Raza[2]

[1]Department of Library & Information Science & Librarian, Mangalayatan University, Aligarh (UP)
[2]Learning Resource Centre, Indian School of Business, Mohali
[1]ashoka143@gmail.com , [2]mmasoodraza@gmail.com

_____

## ABSTRACT

*The study investigates a Scientometric analysis of scholarly published literature on Human Resource Management from 2000 to 2015. For this study's data was retrieved from the Scopus database and explored with Open Source Software Bibliometrix, an R-Package to find out lead productive countries in Human Resource Management, their share of publications, top institutions, Journals, author, citation impact, and their contribution.*

_____

*Keywords: Scientometric, Bibliometric Analysis, Open Source Software, Human Resource Management.*

## Introduction

Scientometric is an emerging area of research in the department of "Library and Information Science". This tool was used in the science and technology state and was observed under communication traces in this field's system. Scientometrics involves studies about innovation, technology, analyzing as well as the measurement of science. Scientometrics was originated from a Russian phrase concerning the quantitative methods applied to scientific history, although the scope and objected now are considerably broadening.

## Review of Related Literature

Sudarsana and Sai Baba. (2019) studied on scientometric analysis of global nuclear fuel research during 2000 to 2017. The main objective of the study was to find out publication output, Prolific author and collaboration network. A Total of 7402 bibliographic records from WOS were taken as a data source and analyzed using CiteSpace and VosViewer Software. The analysis indicated that half of publication was published during 2011-2017 and the year 2017 has highest number of publication and the most significant development in nuclear fuel research is from USA, France, South Korea and Germany.

Yan, Jiang and Li. (2019) analyzed the patent application trends, regional distribution and R&D institutions of flexible display technology and found that the continuous expansion of the flexible display market, various new technologies are emerging and developing rapidly, and patent applications in China are also rapidly increasing. Chinese enterprises have made many breakthroughs in key technologies of flexible display. However, at this stage, Korea and Japan have obvious advantages in patent layout due to their mature technologies.

Thompson. (2019) in their study entitled "Bibliometric Analysis of Pharmacology Publications in the United States: A State-Level Evaluation" attempts to study the Pharmacology and Pharmacy publications in the United States at a state-by-state level and to determine correlations with the help of economic and population parameters. It was found that Pharmacology publications represent a small percentage of state publications (highest 5.4%).

Sahu, Harish (2017) studied on the research entitled "A Bibliometric Analysis of Research Contribution in the Journal PEARL: A Journal of Library & Information Science, 2012 – 2016" and found that the contributions of articles to journal were not only from in India but also from foreign countries. Two authored articles are found to the highest followed by single and three authored articles.

Savita K S (2017) studied on the research entitled "A Bibliometric Study of Directory of Open Access Journals: Special reference to Microbiology" and found that 134 e-journals are available in DOAJ. It is also found from the study that India, UK, USA are the three dominating countries which publish Microbiology journals in DOAJ. English is the dominant language among the 16 languages.

## Objectives of the Study

The present study is objected to identify and describe the characteristics of published literature for the "Human Resource Management" for the last 15-years in the year 2000-2015, in terms of the year of identification, type of document, language, origin country where published the publication.

## Data Analysis and Interpretation

The study retrieved and downloaded 15-year publications data of the world in Human Resource Management from the Scopus database (http://www.scopus.com) covering the period 2000-15. Keywords such as "Human Resource Management' were tagged to "Title" and the search period '2000-15' to "date range tag." We retrieved a total of 2923 results for the period of 2000- 2015. We have performed data analysis with MS Excel and RStudio (Biblioshiny model) software.

### 1.1 Description of Data

**Table - 1**

| Timespan | 2000-2015 |
|---|---|
| Sources (Journals, Books, etc) | 1271 |
| Documents | 2923 |
| Average years from publication | 10.6 |
| Average citations per documents | 19.67 |
| Average citations per year per doc | 1.606 |

From the above Table-1 It is clear that the Timespan the period of data retrieval is from 2000-2015. The total of publication with the subject title heading are 2923 in which 1271 are from Journals, books, etc. Average citation per document is 19.67 and the average citations per year per doc is 1.606.

### 1.2 Types of document

**Table – 1.1**

| | |
|---|---|
| Article | 1620 |
| Book | 83 |
| Book chapter | 429 |
| Conference paper | 489 |
| Conference review | 1 |
| Editorial | 83 |
| Erratum | 28 |
| Note | 22 |
| Retracted | 6 |
| Review | 161 |
| Short survey | 1 |
| Total | 2923 |

From Table 1.1, the total articles were published during the period is 1620 articles with the title "Human Resource Management" The book with the same  subject  heading is 83

and the book chapters containing the said title is 429. The conference papers published during the period is 489 with the subject heading.

### 1.3 Annual Scientific Production

**Table 1.2**

| Year | Articles |
|------|----------|
| 2000 | 65 |
| 2001 | 75 |
| 2002 | 97 |
| 2003 | 107 |
| 2004 | 107 |
| 2005 | 129 |
| 2006 | 163 |
| 2007 | 142 |
| 2008 | 203 |
| 2009 | 197 |
| 2010 | 291 |
| 2011 | 266 |
| 2012 | 263 |
| 2013 | 299 |
| 2014 | 248 |
| 2015 | 271 |
| Total | 2923 |
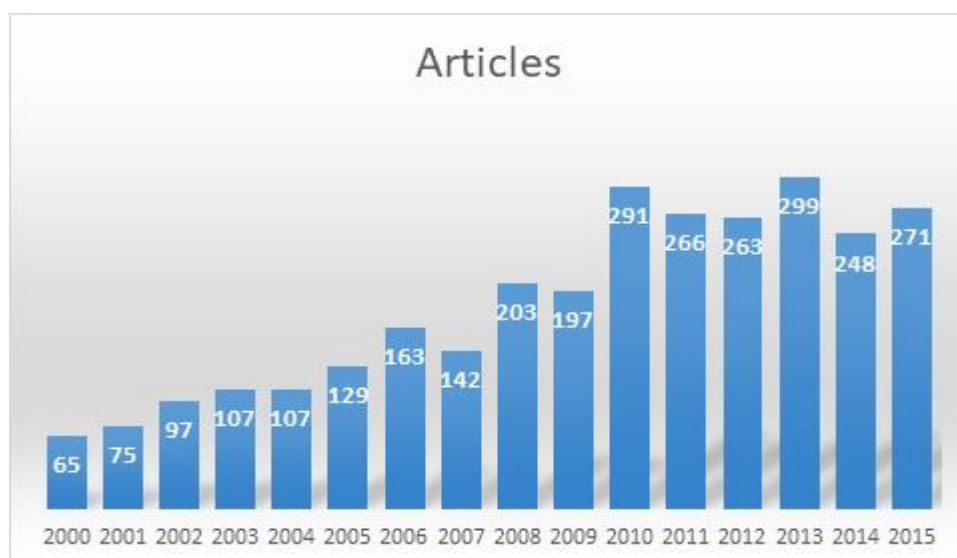


Figure 1

In Scopus database, the publication on Human Resource Management goes on increasing from 65 to 299 documents during the period of 2000- 2015 during the period 2013, 299 documents indicates the most productive year and least productive is 2000 as it can be seen from Table 1.2 above.

**1.4 Most Productive Country**

**Table 1.3**

| Region | Frequency |
|---|---|
| USA | 884 |
| UK | 642 |
| CHINA | 567 |
| AUSTRALIA | 332 |
| SPAIN | 199 |
| GERMANY | 161 |
| CANADA | 144 |
| FRANCE | 117 |
| NETHERLANDS | 103 |
| MALAYSIA | 93 |
| IRAN | 87 |
| BRAZIL | 83 |
| INDIA | 73 |
| JAPAN | 60 |
| ITALY | 51 |
| GREECE | 48 |
| TURKEY | 46 |
| FINLAND | 45 |
| SOUTH KOREA | 45 |
| ROMANIA | 44 |

In figure 1.3, it can be visualzied that USA has 884 documents and in the country UK the documents prodcution is 642 and China is having production of 567 documents. The least production of document by country Romania with the production of 44 documents. It is also seen that the country Australia is having the production is 332 documents followed by sapin 199 documents. The most productive country is USA is the most productive country with the maximum number of documents during the period from 2000-2015.
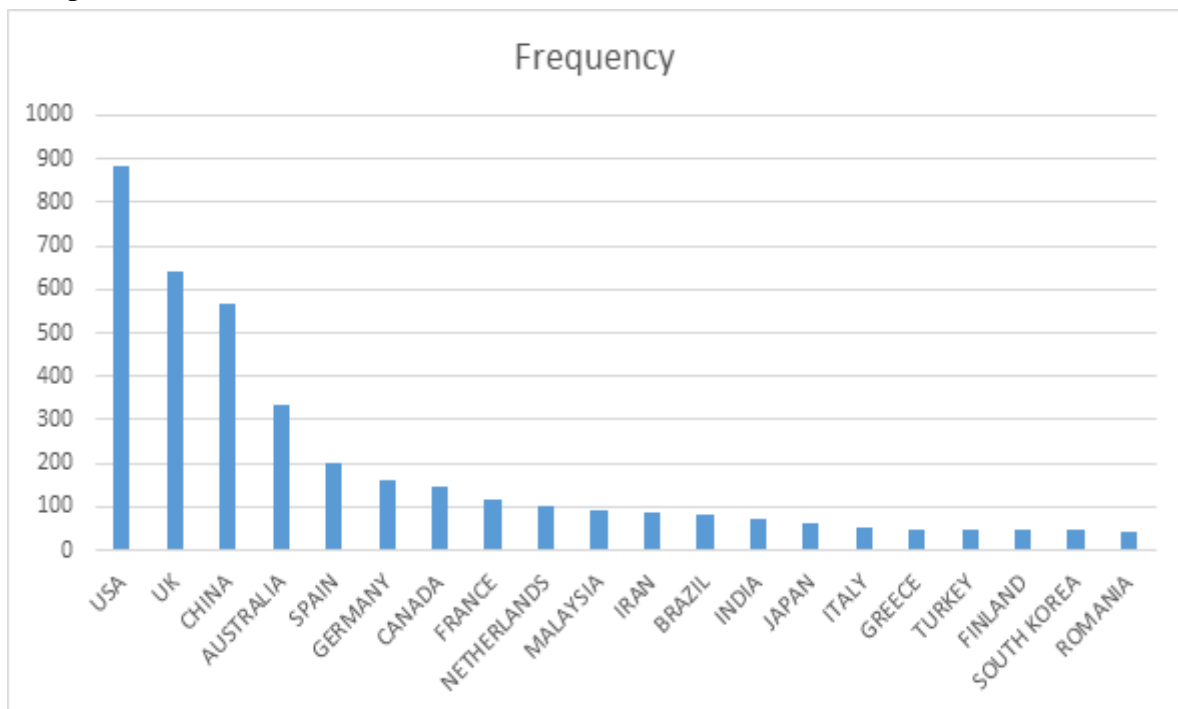


Figure 1.1

**1.5**

**Most Relevant Countries by Corresponding Author**

**Table 1.4**

| Country | Articles | Frequency | SCP | MCP | MCP_Ratio |
|---|---|---|---|---|---|
| CHINA | 312 | 0.19024 | 291 | 21 | 0.0673 |
| USA | 253 | 0.15427 | 215 | 38 | 0.1502 |
| UNITED KINGDOM | 160 | 0.09756 | 123 | 37 | 0.2313 |
| AUSTRALIA | 106 | 0.06463 | 81 | 25 | 0.2358 |
| SPAIN | 87 | 0.05305 | 74 | 13 | 0.1494 |
| GERMANY | 66 | 0.04024 | 53 | 13 | 0.197 |
| CANADA | 46 | 0.02805 | 31 | 15 | 0.3261 |
| MALAYSIA | 35 | 0.02134 | 33 | 2 | 0.0571 |
| FRANCE | 32 | 0.01951 | 27 | 5 | 0.1562 |
| BRAZIL | 31 | 0.0189 | 26 | 5 | 0.1613 |
| HONG KONG | 31 | 0.0189 | 18 | 13 | 0.4194 |
| IRAN | 24 | 0.01463 | 23 | 1 | 0.0417 |
| ROMANIA | 24 | 0.01463 | 22 | 2 | 0.0833 |
| JAPAN | 22 | 0.01341 | 19 | 3 | 0.1364 |
| KOREA | 22 | 0.01341 | 16 | 6 | 0.2727 |
| NETHERLANDS | 22 | 0.01341 | 17 | 5 | 0.2273 |
| INDIA | 20 | 0.0122 | 17 | 3 | 0.15 |
| GREECE | 18 | 0.01098 | 15 | 3 | 0.1667 |
| TURKEY | 18 | 0.01098 | 16 | 2 | 0.1111 |
| ITALY | 17 | 0.01037 | 15 | 2 | 0.1176 |
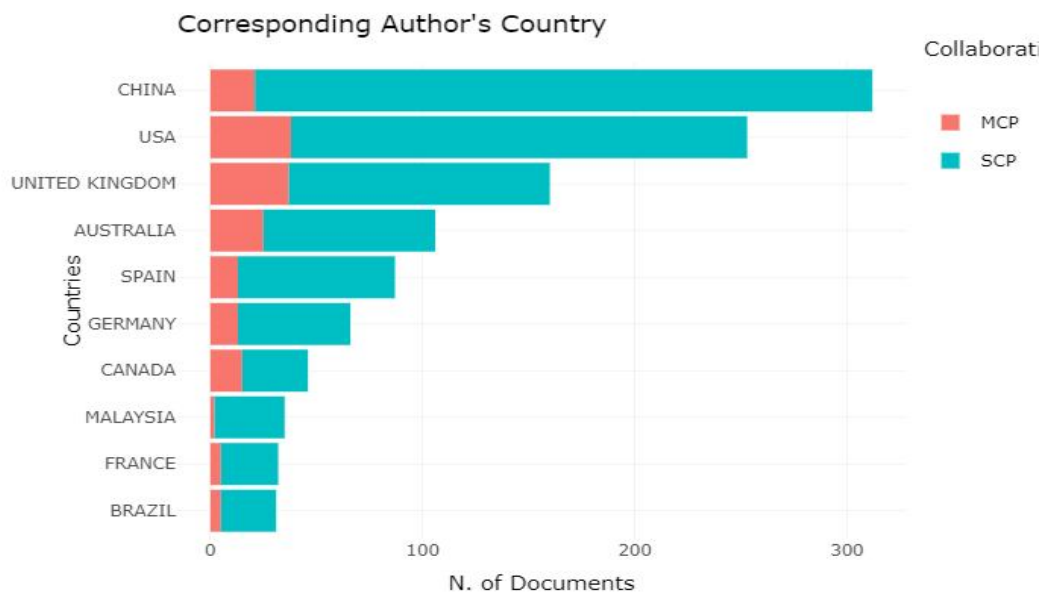


Figure 1.2

From Figure 1.2 it has been shown 20 top countries corresponding authors that has been extracted from the Scopus database with the most relevant countries by corresponding authors. The highest country China has 312 articles with SCP (Single Country Publications) of 291 and MCP (Multiple Country Publications) of 21 followed by USA with 253 articles with SCP (Single Country Publications) of 215 and MCP (Multiple Country Publications) of 38. The United Kingdom was having 160 articles with SCP

(Single Country Publications) of 123 and MCP (Multiple Country Publications) of 37.

**1.6 Most Global Highly Cited Papers**

**Table 1.5**

| Paper | Total Citations | TC per Year |
|---|---|---|
| JIANG K, 2012, ACAD MANAGE J | 769 | 85.4444 |
| BECKER BE, 2006, J MANAGE | 711 | 47.4 |
| COLLINS CJ, 2003, ACAD MANAGE J | 710 | 39.4444 |
| DATTA DK, 2005, ACAD MANAGE J | 690 | 43.125 |
| CHEN CJ, 2009, J BUS RES | 626 | 52.1667 |
| WRIGHT PM, 2002, J MANAGE | 585 | 30.7895 |
| GUEST DE, 2011, HUM RESOUR MANAGE J | 495 | 49.5 |
| LAURSEN K, 2003, CAMB J ECON | 479 | 26.6111 |
| GUEST DE, 2003, BR J IND RELAT | 459 | 25.5 |

Figure 1.5 shows the top 10 most cited papers. The top most author with highest citation is Jiang, K with the 769 citations published in Academy of Management Journal followed by Becker B E with 711 citations published in Journal of Management followed by Collins C J with 710 citations published in Academy of Management Journal.

According to Hirsch, the h index is defined as "A scientist has index h if h of his or her Np papers have at least h citations each and the other (Np – h) papers have ≤h citations each."

E.g.: An h index of 10 means that among all publications by 1 author, 10 of these publications have received at least 10 citations each.

**1.7 H- Index of Author**

Author Impact
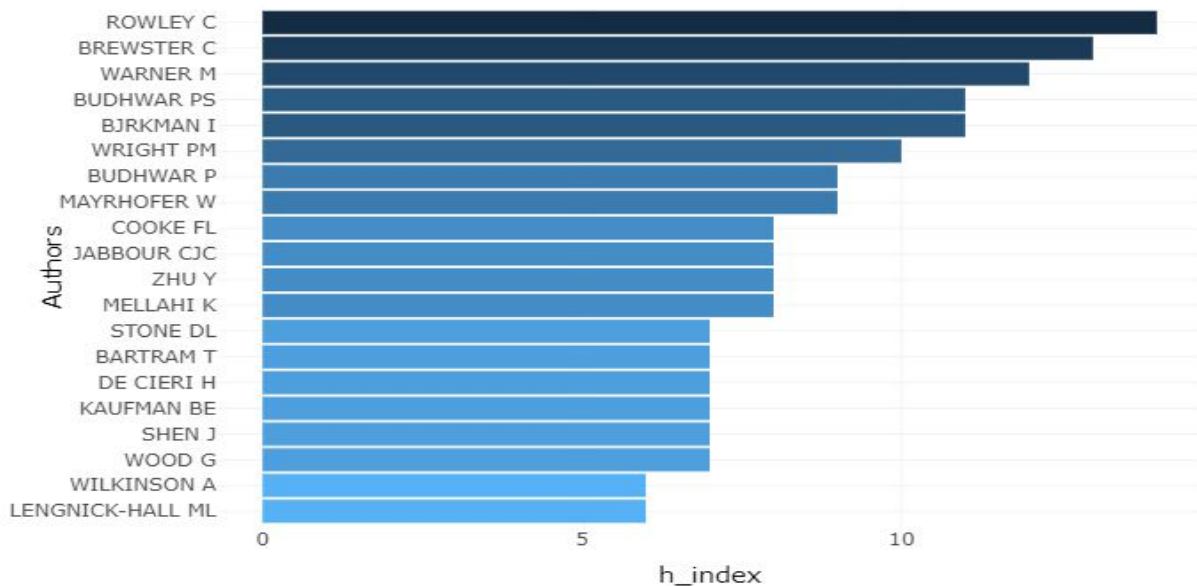


Figure 1.4

H-index of the top 20 authors in descending order using bibliometric open source software biblioshiny. From the above figure, it can be seen that author Rowley C has highest h index of 14 and Brewster C is h index is 13, and Warner M h index is 12 among the top 20 most prolific authors across the globe.

**1. 8 Three Field Plots**

From the below figure, we can see that three fields are there in the plot. The middle of the field represent keyword, left field represent affiliation of the author and the right field represents the source. The data of top 10 universities has been taken and most

commonly, key word used by all of them is human resource management and the highest source of publication is International Journal of Human Resource Management with 130 Publications during the period.
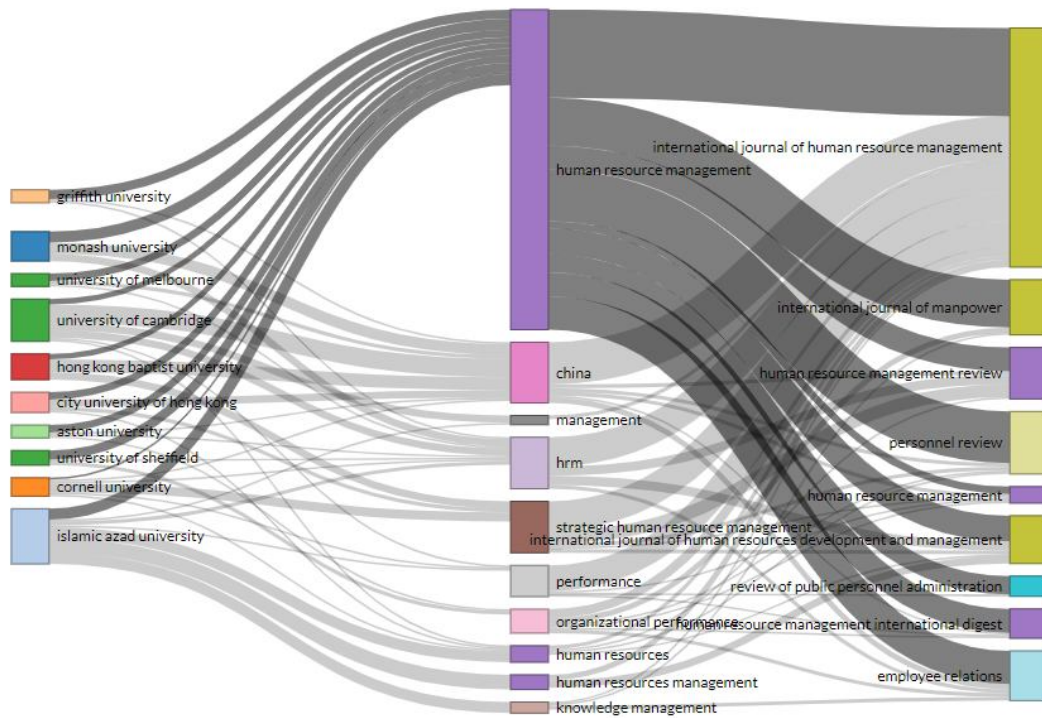


Figure 1.5

## 1.9 Most Relevant Affiliation

**Table 1.6**

| Affiliations | Articles |
|---|---|
| MONASH UNIVERSITY | 42 |
| ISLAMIC AZAD UNIVERSITY | 34 |
| CORNELL UNIVERSITY | 27 |
| GRIFFITH UNIVERSITY | 26 |
| UNIVERSITY OF MELBOURNE | 23 |
| ASTON UNIVERSITY | 21 |
| UNIVERSITY OF CAMBRIDGE | 21 |
| UNIVERSITY OF SHEFFIELD | 21 |
| CITY UNIVERSITY | 19 |
| CITY UNIVERSITY OF HONG KONG | 19 |
| CRANFIELD UNIVERSITY | 19 |
| HONG KONG BAPTIST UNIVERSITY | 19 |
| NOTREPORTED | 19 |
| UNIVERSITY OF LONDON | 19 |
| LA TROBE UNIVERSITY | 18 |
| UNIVERSITY OF TEXAS AT SAN ANTONIO | 18 |
| MICHIGAN STATE UNIVERSITY | 17 |
| RUTGERS UNIVERSITY | 17 |
| SCHOOL OF MANAGEMENT | 17 |
| YORK UNIVERSITY | 17 |

Table 1.6 shows the research output of top 20 universities around the world. Monash University with 42 articles is ranked 1st followed by Islamic Azad University with (34) articles followed by Cornell University (27) articles, followed by Griffith University (26) articles followed by University of Melbourne (23) articles and so on this shows that Monash University is most productive Institutions across the globe and the least productive institutions are Michigan State University, Rutgers University, School of Management and York University which produces only 17 articles during the span of 15 years.

## 1.10 Most Frequent Author Keywords

**Table 1.7**

| Author Keywords | Occurrences |
|---|---|
| Human resource management | 679 |
| Human resources | 164 |
| HRM | 91 |
| Strategic human resource management | 85 |
| Knowledge management | 70 |
| Organizational performance | 47 |
| Management | 44 |
| Performance | 44 |
| Human resource management practices | 43 |
| Human capital | 40 |

From the above Table 1.7 around 10 common keywords have been identified from the literature, which were used by the author such as 'Human Resource Management' that seek to be possible terminology in the field of Management. These are mostly used keyword with the occurrence of 679 and the 2nd most common key word used by the authors is 'Human Resource' which has been used by 164 times and followed by ' HRM' which has been used by authors as a keyword is 91 times during the span of time. These author keywords are listed in above table in the decreasing order of the frequency of their occurrence in the literature covered during the period of 2000-2015.

## 1.11 Most Relevant Sources

**Table 1.8**

| Sources | Articles |
|---|---|
| INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT | 222 |
| HUMAN RESOURCE MANAGEMENT REVIEW | 71 |
| HUMAN RESOURCE MANAGEMENT | 48 |
| INTERNATIONAL JOURNAL OF MANPOWER | 32 |
| PERSONNEL REVIEW | 31 |
| INTERNATIONAL JOURNAL OF HUMAN RESOURCES DEVELOPMENT AND MANAGEMENT | 30 |
| REVIEW OF PUBLIC PERSONNEL ADMINISTRATION | 25 |
| HUMAN RESOURCE MANAGEMENT INTERNATIONAL DIGEST | 24 |
| EMPLOYEE RELATIONS | 22 |
| HUMAN RESOURCE MANAGEMENT JOURNAL | 21 |
| ASIA PACIFIC JOURNAL OF HUMAN RESOURCES | 19 |

| | |
|---|---|
| 2010 INTERNATIONAL CONFERENCE ON MANAGEMENT AND SERVICE SCIENCE MASS 2010 | 18 |
| THE DEVELOPMENT OF HUMAN RESOURCE MANAGEMENT ACROSS NATIONS: UNITY AND DIVERSITY | 18 |
| HANDBOOK OF RESEARCH IN INTERNATIONAL HUMAN RESOURCE MANAGEMENT | 17 |
| PUBLIC PERSONNEL MANAGEMENT | 17 |
| ASIA PACIFIC BUSINESS REVIEW | 16 |
| ZEITSCHRIFT FUR PERSONALFORSCHUNG | 16 |
| ADVANCED MATERIALS RESEARCH | 15 |
| JOURNAL OF BUSINESS ETHICS | 15 |
| MANAGING HUMAN RESOURCES IN THE MIDDLE EAST | 15 |



Figure 1.6

From the above Table 1.8 the 'International Journal of Human Resource Management' acts as most widely used source title for research publications on HRM. The total articles published during the period is 222 documents and occupying first rank with the highest publications. Here the 2nd rank is occupied by 'Human Resource Management Review' with 71 articles and 3rd rank is occupied by 'Human Resource Management' with 48 documents. The further analysis can be visualised from the table above, which shows only the first top 20 source titles.

**Findings**

- The maximum number of contributions in the year 2013 and the minimum number of 65 papers were published in the year 2000.

- The highest country China has 312 articles with SCP (Single Country Publications) of 291 and MCP (Multiple Country Publications) of 21 followed by USA with 253 articles with SCP (Single Country Publications) of 215 and MCP (Multiple Country Publications) of 38.

- The top most author with highest citation is Jiang, K with the 769 citations published in Academy of Management Journal followed by Becker B E with 711 citations published in Journal of Management followed by Collins C J with 710 citations published in Academy of Management Journal.

- Research output of top 20 universities around the world. Monash University with 42 articles is ranked 1st followed by Islamic Azad University with (34) articles followed by Cornell University (27) articles.

- Rowley C has the highest h index of 14 and is among the top 20 most prolific authors worldwide.

- International Journal of Human Resource Management acts as the most widely used source title for research publications on HRM. The total articles published during the period is 222 documents and occupying the first rank with the highest publications. Here the 2nd rank is occupied by 'Human Resource Management Review' with 71 articles, and the 3rd rank is occupied by 'Human Resource Management' with 48 documents.

## References

1. Ahmed, Mueen K K, Gupta Ritu and Gupta Brijmohan (2014). 'Cataract research in India: 'A Scientometric study of publications output, 2002-2011'. International Journal of Medicine and Public Health, 4(4), pp. 311- 317.

2. Amsaveni, N and Manikandan, M (2014). 'Management Information System Research Output: A Scientometric Study'. Journal of Current Trends in Library and Information Science: International Refereed Journal, 1(1&2), pp. 51-55.

3. Aria, M. and Cuccurullo, C. (2017) 'bibliometrix: An R-tool for comprehensive science mapping analysis', Journal of Informetrics, 11(4), pp. 959–975. doi: 10.1016/j.joi.2017.08.007.

4. Bisaria, Garima, Gupta, Vibha and Rayini, Junaid (2017). 'Liber Quarterly Journal: A Bibliometric Study'. International Journal of Library Science, 15(2), pp. 61-77.

5. Chandrakanta Swain, Dillip K. Swain, Bijayalaxmi Rautaray. (2013) 'Bibliometric analysis of Library Review from 2007 to 2011'. Library Review, 62 (8/9), pp. 602-618.

6. Dhawan, S.M., Gupta, B.M., Gupta, R., Kumar, A. and Bansal, J. (2017). 'Digital libraries in India: A scientometric assessment of publications during 2007-16'. International Journal of Information Dissemination and Technology, 7(3), pp. 206-211.

7. Ghar, Vinod and Urkudkar Sunil (2016). 'Bibliometric Analysis of Journal of Biosciences during the Year 1979- 2015'. International Journal of Library Science, 14(3), pp. 18-24.

8. Hasan, Nabi, and Singh, Mukhtiar (2015). 'Library and Information Science Research Output: A study based on Web of Science'. Collnet Journal of Scientometrics and Information Management, 9(1), pp. 47-64.

9. Mingers, John and Leydesdorff Loet (2015) 'A Review of Theory and Practice in Scientometrics'. European Journal of Operational Research, 246(1), pp. 1-19.

10. N. Govinda Raju. (2017) 'A Scientometric Analysis of International Journal of Information Dissemination and Technology (IJIDT) During 2011-2015'. International Journal of Information Dissemination and Technology, 7(2), pp. 146-150.

11. Sahu, Harish. (2017) 'A Bibliometric Analysis of Research Contribution in Pearl: A Journal of Library and Information Science 2012-2016'. International Journal of Library & Information Science, 6(2), pp. 26-33.

12. Savitha, K. S. (2017) 'A Bibliometric study of Directory of Open Access Journals: Special reference to Microbiology'. International Journal of Information Dissemination and Technology, 7(1), pp. 63-70.

13. Sudarsana, D. and Sai Baba, M. (2019) 'Global nuclear fuel research during 2000 to 2017: A scientometric analysis', Annals of Library and Information Studies, 66(3), pp. 85–93.

14. Thompson, D. F. (2019) 'Bibliometric Analysis of Pharmacology Publications in the United States: A State-Level Evaluation', Journal of Scientometric Research, 7(3), pp. 167–172. doi: 10.5530/jscires.7.3.27.

15. Vellaichamy, A, and Jeyshankar R (2016). 'Growth of Literature on H1N1: Scientometric Study'. International Journal of Innovative Knowledge Concepts, 2(6), pp. 36-42.

16. Velmurugan, C and Radhakrishnan. N (2016). 'Malaysian Journal of Library and Information Science: A scientometric profile'. J Scientometric Res, 5(1), pp. 62-70

17. Verma, M. K, Devi, K. K, Brahma, K. (2017). 'Bibliometric study of DESIDOC journal of library and information technology (DJLIT) during 2005-2016'. International Journal of Information Dissemination and Technology, 7(3), pp. 162-169.

# SOLAR POWERED MULTIPURPOSE INCUBATIONSYSTEM USING ARDUINO

## N.N. Anjum[1] and K.V. Rithwik[2]

[1,2]Department of Electronics & Communication Engineering, Sri Sairam Engineering College Chennai, India
[1]nazeeyanjum.ece@sairam.edu.in , [2]e7ec209@sairamtap.edu.in

_____

## ABSTRACT

*Advancement in technology has made regular life more easy and convenient. With the growing demand, automated small-scale industries have become eminent that contributes enormously in economic growth. The Small- Scale industries like epi culture, sericulture and poultry provides employment to approximately 8.25 million persons in rural and semi-urban areas in India during 2018-2019.Smart incubators can help the farmers from getting rid of the t tedious procedures which are outdated and time consuming. The adaptability to environmental conditions in the small organisms like silkworms, honeybees are quite different from other insects. Temperature, Relative Humidity, Light force and Atmospheric air assumes an imperative part in the advancement of these organisms and necessary care should be taken in each stage. Unbalanced environmental factors may cause death of these silkworms and honey bees and damages the embryos in eggs. This project is a major achievement in giving automation in the artificial growing of these small organisms. This model facilitates and controls the natural variables like temperature, relative humidity, CO2, light power and gas levels and data storage through IoT is another major step of this work, which enables the users to monitor the conditions. This project also provides an automated control to the food feeders and medicine sprayers through IOT.*

_____

*Keywords: Smart Incubators, Temperature, Relative Humidity, Light Force, Atmospheric, IOT, Food Feeders, Medicinesprayers*

## Introduction

Developing countries like India, Philippines and Malaysia have farmers who are involved in small scale industries and adopt to grow small number of poultry (growing of eggs), epi culture (growing of honey-bees) and sericulture (growing of silkworms),but unable to tap into the more production and profitable market of artificial growing. Nowadays incubators have developed with the advent of temperature controlled thermostats and humidity controllers. However, poor designs and inaccuracy in circuitry precision has led to decline in profits and increase in maintenance costs. The work explained here aims at developing an embedded system based incubator to increase precision with error control and improving the design of present day incubators. An important concern is also the cost of development and maintenance. By employing these technologies even in the home or people at a distance are able to work independently for a longer period, helping to reduce costs and the need for additional resources involved in the process.

## Objective

The adaptability to environmental conditions in these small organisms is quite different from those of wild silkworm and other insects. Temperature, Relative Humidity, Light force and Atmospheric air assumes an imperative part in the advancement of silkworms and care should be taken at each stage. The seasonal differences in the environmental components considerably affect output of silkworm crop, production of honey and growth of eggs. As Sericulture is the significant occupation in countryside of India, the techniques utilized by the agriculturists are yet not functional. The main objective of this project is to provide better climatic conditions in raising these organisms artificially. This project also helps to increase the production of the silk, honey and number of eggs. This project reduces the temperature variations and maintains a constant temperature, which is suitable for raising of these organisms with the help of temperature sensor. The Humidity levels will be maintained thoroughly using humidity sensor. Arduino is programmed in such a way that it will have the threshold values and the capacity to monitor and control the system.

Hardware Components

Arduino (ATMEGA 2560),MQ2 Smoke Sensor, Humidity Sensor(DHT 11),Fire/Flame Sensor, Light Dependent Sen- sor, Pump Motors, Servo Motors, Relays.

### A.    Microcontroller- Arduino (Atmega 2560)

The Arduino Mega is a well-known microcontroller board based on the AT mega 2560 .It has 54 digital I/O pins, 16 analog inputs, a 16MHz oscillator, a USB connector, a power jack, an ICSP header, and comes with a reset button. Thus, it contains everything needed to support the microcontroller; can be directly connected to a computer with a USB cable or powered with an AC-to-DC adapter or connected to simple battery to get it started.



Figure 1. Arduino (ATMEGA 2560)

### B.    Mq2 Gas Sensor

The MQ2 has an electrochemical sensor, which changes its resistance for different concentrations of varied gasses. The sensor is connected in series with a potentiometer to form a voltage divider circuit, and thus the variable resistor is used to change the sensitivity of the gas sensor. When any gaseous elements meets the sensor, the sensor's resistance changes. The change in the resistance changes the voltage across the sensor, and a microcontroller can read this voltage. The voltage value can be used to find the resistance of the sensor by knowing the reference voltage and the other resistor's resistance. The sensor has different sensitivity for different types of gases.



Figure 2. MQ2 Gas Sensor

## C. Dht11 – Humidity & Temperature Sensor

This DHT11 Temperature & Humidity Sensor features a temperature & humidity sensor complex with a calibrated digital signal output. By using the exclusive digital- signal- acquisition technique and temperature & humidity sensing technology, it guarantees high reliability and excellent sustained stability. This sensor has a variable resistive type humidity measurement component and an NTC temperature measurement system. When connected to a high-performance 8-bit microcontroller, offers excellent quality, fast response, anti-interference ability and cost-effectiveness. Each DHT11 element is individually calibrated and hence the readings are extremely accurate on humidity calibration. The one wire serial interface makes system integration quick and simple.
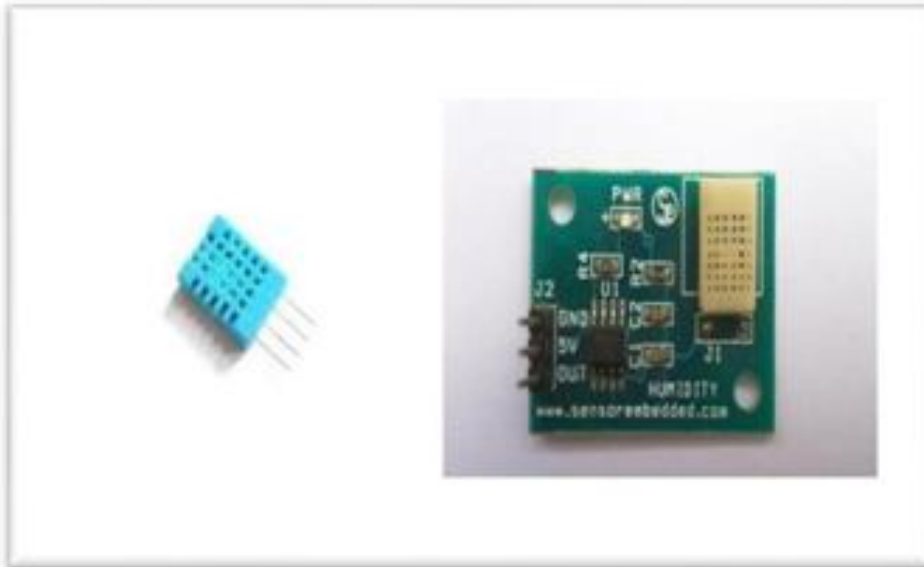


Figure 3. DHT11 -Humidity & Temperature Sensor

## D. Fire/Flame Sensor

A flame detector is a sensor designed to detect and respond to the presence of a flame or fire. It could show varied responses to a detected flame depending on the installation, but includes output units like sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system.
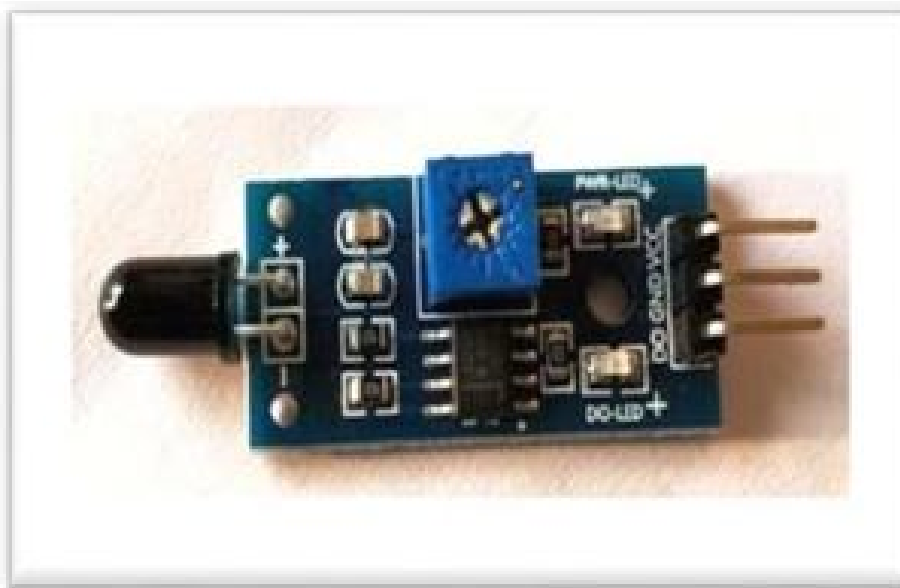


Figure 4. Fire/Flame Sensor

### E.    Light Dependent Sensor

A Light Dependent Resistor (aka LDR, photoconductor, or photocell) is a device, which has a resistance, which varies according to the amount of light falling on its surface. A typical light dependent resistor is pictured above together with (on the right hand side) its circuit diagram symbol. Different LDR's have different specifications, however the LDR's we sell in the REUK Shop are fairly standard and have a resistance in total darkness of 1 Mohm, and a resistance of a couple of Kohm in bright light (10-20kOhm @ 10 lux, 2-4kOhm @ 100 lux).
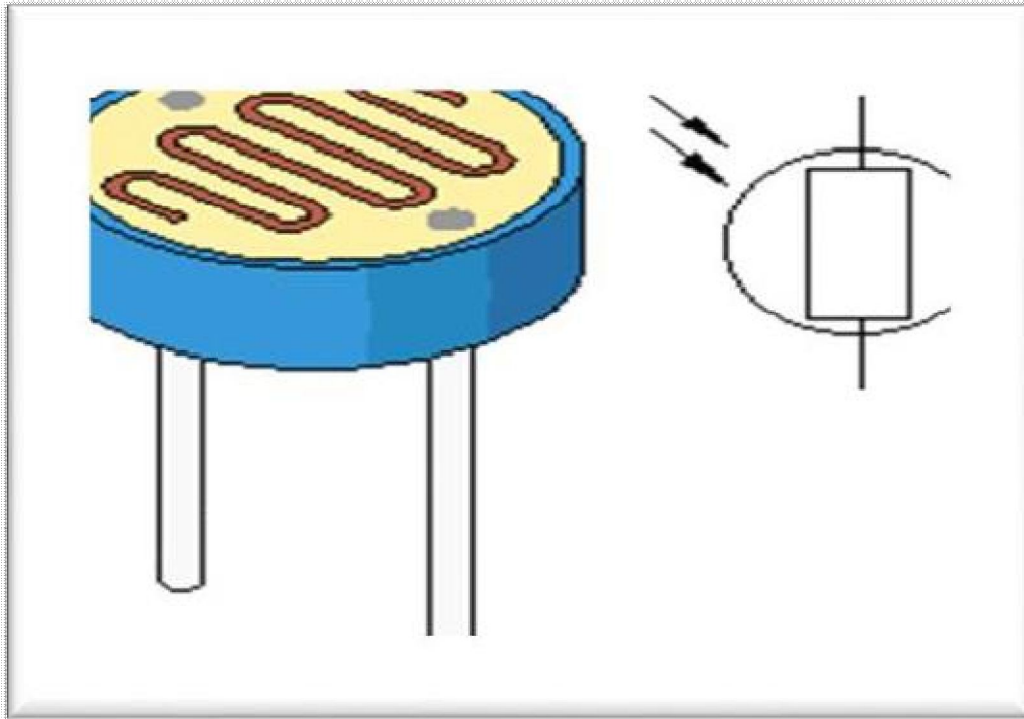


Figure 5. Block Diagram of LDR Software Componenets

### A.    Arduino IDE – Description

The Arduino integrated development environment (IDE) is a cross-platform application written using Java. It helps to write and upload programs to the Arduino board. The Arduino IDE supports programming languages C and C++. The Arduino IDE provides a software library from the Wiring project, which supplies many common input and output procedures. User-written code requires two basic functions, for starting the sketch and therefore the main program loop that are compiled and linked with a supervisory program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program argued to convert the executable code into a document containing the hexadecimal codes to be loaded into the Arduino board by the loader program residing in the board's firmware.

### B.    Internet of Things(IOT) – Description

The Internet of Things (IoT) is the network of physical devices, vehicles, buildings and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. In 2013, the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "the infrastructure of the information society. The IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer- based systems, and resulting in improved efficiency, accuracy and economic benefit.

IV Block Daigram

The MCU forms the heart of the proposed work. A Smart Incubation System is formed using the microcontroller interfaced with various sensors and the smart phones establishes communication with the server making use of IOT.
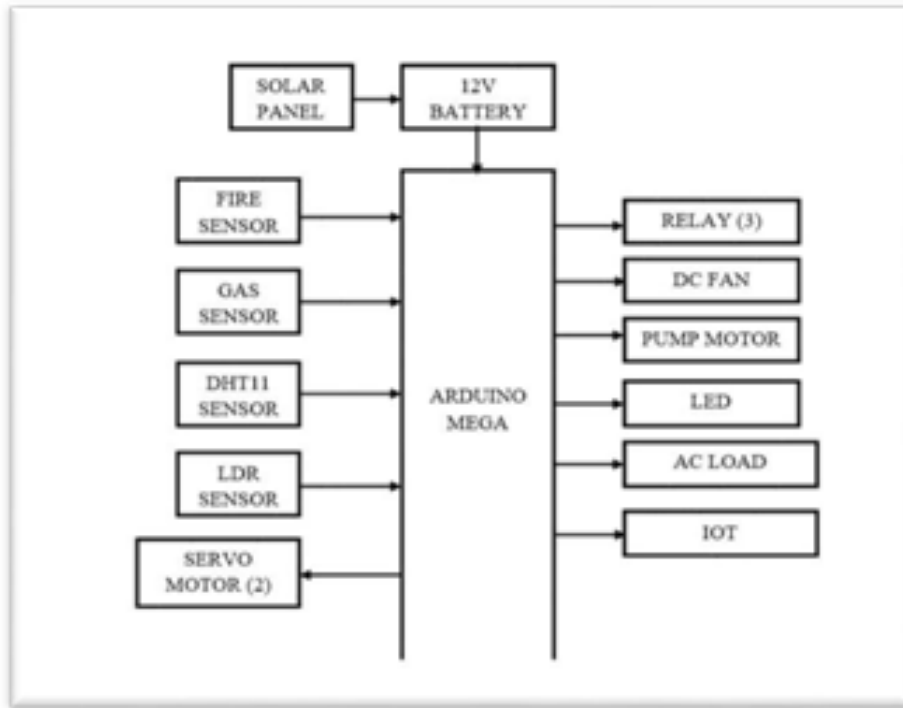
Figure 6. Block Diagram Working Methodology

### A.     IOT Module & IOT Portal.

The ESP8266 is the name of a micro controller designed by Espresso Systems and acts as IOT Module. The ESP8266 itself is a self-contained Wi-Fi networking solution offering as a bridge from existing micro controller to Wi-Fi and is capable of running self-contained applications. This module comes with a built in USB connector and a rich assortment of pin-outs. With a micro USB cable, you can connect Node MCU development kit to your laptop and flash it without any trouble, just like Arduino. It is also immediately breadboard friendly. On the other hand, IOT portal is divided into two sections namely, Monitoring Section and Control Section.



Figure 7. IOT Module

### B.        Monitoring Section

The Solar panel with 12 V battery is the main source of the power supply and delivers power to the incubation arrangement using solar energy. Adaptors are used to pass the solar power from the battery to other components and devices inside the box. Current driver component is used to regulate the   current flow through     a circuit and       to control other components     and     devices     inside the incubation arrangement. Relay device is used to control a high power or high voltage circuit with our low power circuit. Fire/Flame sensor is used to check the fire in the incubation box. If the fire is present, the pump motor turns ON automatically to stop the flame. Gas sensor is used to check the toxic gas or foul smell. If any toxic gas or foul smell detects inside the box, the 5V DC fan turn ON automatically and releases them outside the box. LDR sensor is used to check the light levels inside the box. If the light levels are low, the LED bulb turns ON automatically to indicate it. DHT11sensor is used to check the temperature levels inside the box. If the inner temperature is lower than the body temperature of the organisms, the AC load turns ON automatically to provide heating and increases the temperature inside the box. On the other hand, if the inner temperature is higher than the body temperature of the organisms, the AC load stops providing heating & turns OFF automatically.



Figure 8. IOT Monitoring Section

All the information and conditions inside the incubation box update in the monitoring section continuously to monitor, for the certain amount of time.

C.Controlling Section

The Servomotors are used to pass medicine and food into the incubation arrangement. This Controlling section has switches and status table in it. The switches are used to control these servomotors ON and OFF respectively

the status of switches can be seen in status table. Therefore, by using this section, the user can switch ON or OFF the food feeding (servomotor) and medical spraying (servo motor) respectively.
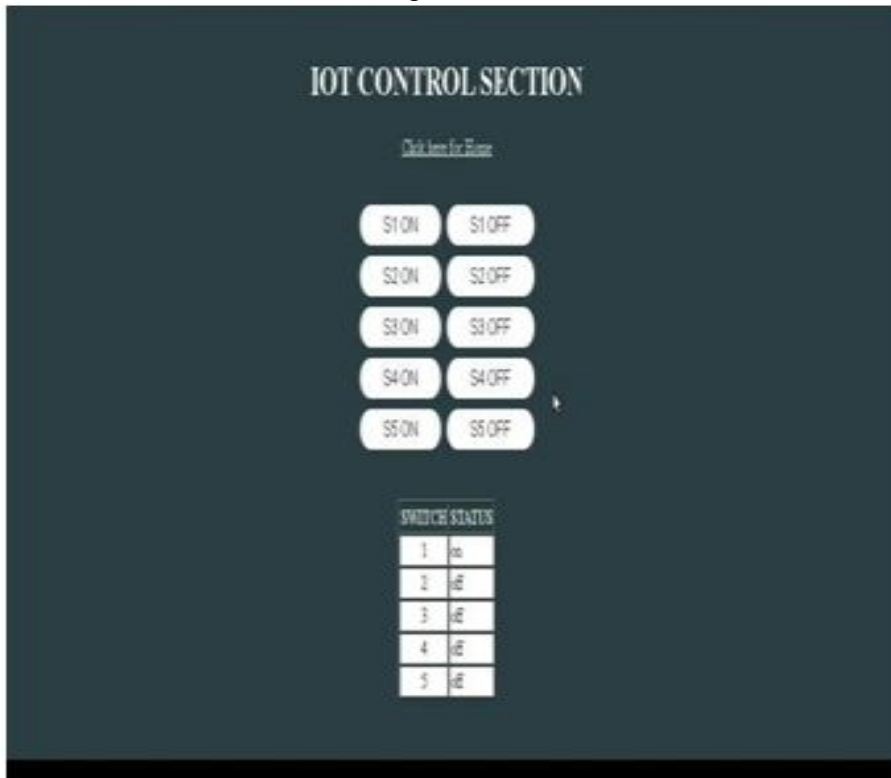


Figure 9. IOT Controlling Section

### Result

This project gives a thought regarding giving automation in the artificial growing of small organisms under balanced environmental factors. This model controls the natural variables like temperature, relative humidity, CO2 and light levels. This "Solar powered Cost Effective multipurpose incubation system for small organisms using Arduino" closely monitors and controls the environmental parameters of rearing house on regular basis using wireless sensors, microcontroller, GSM and solar cells. Precaution function is included like fire alarm and feeders to supply the food and medicine.



Figure 9. Inner Arrangement of Project

Figure 10. Solar Powered Multi-Purpose Incubation System Using Arduino

**Conclusion**

This project provides overall protection of the farm and minimizes the effects of environmental fluctuations. It ensures the health of the organisms in good conditions, by balancing the physiological parameters like temperature, humidity, light intensity in farm and are well monitored and controlled with least human intervention. Thus, this automated system can be very useful for farmers as they can easily access and control the system remotely using their handheld mobile devices.

The system also does reduce human intervention, saves time, and optimizes resource utilization and increases poultry and silk productions. Further, in the near future, using sensors that are more advanced and technological concepts, all the environmental output data can be collected in a more reliable state. This will enable anyone with minimum farming knowledge to start up a poultry business and sericulture business with high profits. Hence, the future and the economic growth of any nation will be benefited.

**References**

1. Archana, M P, Uma, S K, and Raghavendra Babu T M, (2018 Monitoring and Controlling Of Poultry Far Using IOT,"Proc IJIRC, Vol. 6, Issue 4, April, pp-2320-9798.
2. Shahzadi, R., Tausif, M., Ferzund, J. and Suryani, M. A (2016). Internet of Things based Expert System for Smart Agriculture,"Proc. IJACSA, Vol. 7, No. 9,.
3. Manjunatha and Mahesh B.Neelagar's "International Journal of Computer Science and Mobile Computing on Arduino Based Automated Sericulture System.
4. Journal on Sericulture" by Ministry of Textiles, India.
5. Trupti H. Nagrare's journal of "Embedded System Controlled Artificial Environment for Effective and Perfect Commercial Egg Incubation".
6. Kanjilal, D., Singh, D., Reddy, R. and

Mathew, J. (2014) Smart Farm: Extending Automation To The Farm Level," Proc IJSTR, Vol. 3, no. 7,pp. 2277-8616, July.

7. Joseph L. Purswell, William A. Dozier III, Hammed A. Olanrewaju, Jeremaiah D. Davis, Hongwei Xin and Richard S. Gates, 2012) Effect of Temperature-Humidity Index on Live Performance in Broiler Chickens Grown From 49 To 63 Days of Age," Proc. ASABE, July..

# THE EFFECT OF INFERTILITY TREATMENT UPON SELF-ESTEEM AND QUALITY OF LIFE OF COUPLES

**S. Mittal[1] and N. Sinha[2]**
[1]Pandit Deendayal Petroleum University, Raysan, Gandhinagar
[2]Dept. of Psychology, School of Liberal Studies, Pandit Deendayal Petroleum Uni., Raysan, Gandhinagar
[1]mittalsoni12@gmail.com, [2]neetasinha2@gmail.com

_____

## ABSTRACT

*Infertility has been recognized as a public health issue worldwide by World Health Organization. Infertility refers inability of a couple to achieve conception or to bring a pregnancy to a term after a year or more of regular unprotected intercourse. Infertility affects an estimated 15% of couples globally. In vitro fertilization (IVF) is a complex procedure used to help with fertility or genetic issues and assist with the conception of a child, in which a mature egg is fertilized by the sperm outside the body. Infertility harms women's self-esteem and quality of life. self-esteem refers to an individual overall positive evaluation of the self. Quality of life refers to individuals perception of their life in the context of the culture and the value systems in which they live and about their goals, expectations, standards, and concerns. The present research is to study the relationship between the infertile couple with IVF and self-esteem and quality of life. The objectives are the study of the infertile couple with the marital status (Love or Arrange) and number of years of marriage (Below 5 and Above 5) . The tool used is the self-esteem scale by Dr Santosh Dhar and Dr Upindar Dhar, which has 23 statement and the second tool is the world health organization quality of life, which has 26 statement. Results describe that the marital status and no. of years of marriage of infertile couples affect their self-esteem and quality of life. Couples who married by Love and those who completed more than 5 years had higher self-esteem and quality of life.*

_____

*Keywords: Infertility, IVF, Self-esteem, Quality of life.*

## Introduction

Health is a resource of everyday life. "good health is a state of complete physical, social and mental wellbeing and not merely the absence of disease or infirmity"(WHO 1948). Reproductive health is a crucial part of health and is very important for human development. It affects every human being, it involves an intimate and highly valued phase of life, it is not only a reflection of health in infancy, childhood and adolescence, it also stages for health beyond the reproductive years for both men and women and has effects from one generation to another (National Institute of Rural Development Report 2007).

Infertility is a very sensitive and complicated issue for married couples, especially those couples who have been married for a long time. Infertility refers to the failure to achieve a clinical pregnancy after a minimum of 12 months or longer of regular unprotected sexual intercourse. Available data indicate that at least 60-80 million couples worldwide experience infertility, probably between 15-20 million are in India. WHO described that one in every four couples in developing countries is affected by infertility (2019). Infertility is dependent on 40% of women, 40% of men, and 20% on a combination of men and women variables (Robinson & Stewart, 1996; Wright, Allard, Lecours, & Sabourin, 1989) although this ratio is hardly found in studies (Ulbrich P. M., Coyle, A. T., & Llabre, M. M. 1990).

In 2009, Tiitinen reported that there are many causes of infertility, including ovulation brokenness (20-30%), fallopian tube problems (10-15%), endometriosis (10-20%) and poor semen quality (10- 15). Javanainen pointed out that in terms of infertility, the age of women is very important, because women are most fertile from the age of 25, and the probability of pregnancy decreases with age.

## In-vitro fertilization

Nowadays, many couples choose to delay conception which has an increased infertility issue associated with ageing. Medical advances describe that most cases of infertility are treatable. All types of assisted reproductive technologies (ART) have been introduced to allay infertility problems. ART include intrauterine insemination (IUI), in-vitro fertilization (IVF), gamete intrafallopian transfer (GIFT), intracytoplasmic sperm injection (ICSI). IVF has been used effectively for more than two decades to assist blocked

fallopian tubes, genetic disease and severe abnormality in sperm parameters.

In-vitro fertilization (IVF) was a mysterious procedure that was previously called "test-tube babies. More than 8 million babies born from IVF procedure since the world's first in 1978. "Louise Brown was the first test-tube baby who was born on 25 July, 1978 England. During, IVF mature eggs are retrieved and fertilized by sperm in a lab then the fertilized embryos are inserted into a uterus. Multiple pregnancies are associated with an increased risk of preterm birth and low birth weight. IVF process can be physically, emotionally and financially draining also couple needs help from counsellors, own circle of relatives and friends. According to American Society for Reproductive Medicine (2005), whereas roughly 75% of couples will pursue some form of infertility treatment, only 3% of infertility couples are accounted by IVF and other assisted reproductive technologies (Sadler & Syrop, 1987).

## Self-esteem and Quality of life

Rosenberg (1965), Self-esteem refers to an individual overall positive appraisal of the self, high level of self-esteem consists of an individual respecting himself and considering himself worthy. Coppersmith refers to Infertile men and ladies perceive their selves as physically inadequate and have a destitute body image of them which takes off negative affect on their self-esteem (1967). According to the World Health Organization, quality of life is defined as "individuals' perception of their condition in life in the context of the value systems and culture in which they live and about their goals, expectations, standards and worry". Quality of life is a function of the variation between the desired situation and the actual situation, i.e. it is the subjective satisfaction which a person experiences and which that person plan onto all phase of their life (physical, psychological, social and spiritual). Infertile Male and female perceive them self as physically imperfect and have a poor body image of them which leaves a negative effect on their self-esteem. According to Friedman Managing infertility and infertility itself has an effect on a person's Quality of Life. Infertility reduces males self-esteem, self-

confidence, sexual fulfillment with their partner (Xin X, Pan BC, Du Q, et al. 2013).

## Research Studies

Study describe that infertility negatively influenced both self-esteem and quality of life for both sexual orientations, the life quality of the infertile male and female expanded as their education level increased and the work emphatically influenced self-esteem (Çavdar NK, Coşkun AM, 2018). Ladies in infertile couple feel more pressured and stigmatized by the society as compared to male which put her into emotionally troubling circumstance. Infertile male and female both reported strife, poor communication, which leads to poor self-esteem (Usman R, Khan MA, 2019). Women in infertile couples protect their spouses from the emotions of disappointment by taking much of the obligation for the treatment upon themselves (Domar and Seibel, 1997). The environmental factor, the quality of life of infertile ladies was more noteworthy than that of men (Bolsoy N, et al. 2010). Infertility negatively affect the relationship quality and sex lives of couples (Wischmann T, Schilling K, Toth B, et al. 2014). The quality of life is directly associated with self-esteem, sexual satisfaction, social support and marital fulfillment in infertile couples (Keramat A, Masoomi SZ, Mousavi SA, et al. 2014). In infertile couples females announced poor quality of life and marital adjustment compared with controls. Males may face less intercourse fulfilment, maybe because of mental pressure to try to baby conceive or since of the forced timing of intimate around the females ovulatory cycle (Monga M, Alexandrescu B, Katz SE, et al. 2004). Interference planning not only decrease anxiety and depression, but moreover to encourage progressing mental working, should be enforcement for couples at distinctive stage of IVF/ET treatment (Beaurepaire, J., Jones, M., Thiering, P., Saunders, D., & Tennant, C. 1994). Both partner experience infertility differently. Ladies suffer more issues like self-esteem, health care system, and occupation. There were no gender variation in rating of social support (Draye, M. A., Woods, N. F., & Mitchell, E. 1988). The young men and women (age 21-30) in IVF planning had higher social and emotional

short-term issues than the overall population in the same age range. There is a danger of a less optimum quality of life for those with high levels of irrational parental cognitions (Fekkes., et al. 2003). In cognition and marital communication, infertile individuals discovered bad married life, unhappiness, and sexual unrest with decreasing self-esteem with time. The results of this study suggest that the majority of infertile men and women experience poor self-esteem (Sillars A., et al. 2002). Similar research present quality of life on infertile women described that infertility affects physical health and quality of life (Aligeh G and Laya F. 2007)

## Methodology
### Aim:

The aim of present research is to study the relationship between an infertile couple with IVF treatment and self-esteem and quality of life.

### Methods and Materials

Through purposive sampling data was collected from 30 infertile couples with IVF (30 males; 30 females) from Gujarat. The selection criteria include married couples who, after being diagnosed with infertility, have begun treating IVF.

The participants had different marital status from love marriage (25%) and arrange marriage (75%) and different no. of years marriage from below 5 (60%) and above 5 (40%).

### Tools
#### 1. Self-esteem Scale (SES)

Self-esteem scale developed by Dr Santosh Dhar and Dr Upinder Dhar in 2015. The self-esteem includes 23-item, 5-point, Likert Type scaled, which comprise six sub-variables: Positivity, Openness, Competence, Humility, Self Worth, Learning Orientation. In this scale item no. 5, 8, 9, 13, 17, and 18 measure positivity; item 14, 15, 16, 20, and 21 measure openness, item 1, 2, and 3 measure competence; item 4, 6, 7, and 10 measure humility; item 19, 22, and 23 measure self-worth; and item 11 and 12 measure learning orientation. A higher score obtained from the scale signifies a higher self-esteem.

#### 2. WHO Quality of Life-BREF (WHOQOL-BREF)

WHOQOL-BREF developed by the world health organization in 1996. It includes 26 questions. This scale comprises four domain: physical health, psychological, social relationship, and environment. Item no. 3, 4, 10, 15, 16, 17, and 18 measure physical health domain; item 5, 6, 7, 11, 19, and 26 measure psychological; item 20, 21, and 22 measure social relationship and item no. 8, 9, 12, 13, 14, 23, 24, and 25 measure environment. The remaining 2 items are measure the overall quality of life. The higher score obtained from the scale signifies a higher level of quality of life.

### Data Analysis

Responses obtained on various measure and data subjected to various analyses such as Mean, Standard Deviation and t-ratio. Obtained results was interpreted and discussed in the light of available literature.

### Results

In the present research work data analysis has been done by statistical package for social sciences version 23 (SPSS-23). Results as per hypothesis are follows as:

### Hypothesis 1

There is a significant difference in the Self-esteem between Marital status.

**Table-1: Showing t-test was used to compare the mean score of Self-esteem obtained from marital status (Love and Arrange).**

| Variables | Marital status | | | | t-value | p-value |
|---|---|---|---|---|---|---|
| | Love (8 couples) | | Arrange (22 couples) | | | |
| | Mean | SD | Mean | SD | | |
| Positivity | 26.25 | 4.02 | 25.57 | 4.22 | .560 | .58 |
| Openness | 20.00 | 2.42 | 20.00 | 2.57 | .000 | 1.000 |
| Competence | 11.75 | 1.34 | 12.02 | 1.39 | -.68 | .50 |
| Huminity | 17.25 | 2.86 | 16.89 | 2.89 | .431 | .67 |
| Self-worth | 12.13 | 1.20 | 12.09 | 1.36 | .088 | .93 |
| Learning Orientation | 8.75 | 1.00 | 8.64 | .942 | .41 | .69 |

Results showed that the hypothesis 1 is rejected as the p-value of all the variables of self-esteem are greater than 0.05(p>0.05). This shows that there is no significant difference between marital status.
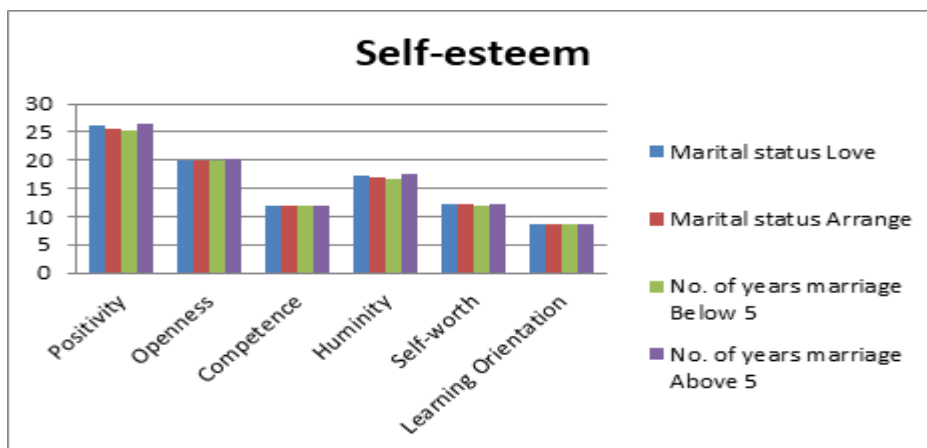
**Hypothesis 2**

There is a significant difference in the Self-esteem between No. of years of marriage.

**Table-2: Showing t-test was used to compare the mean score of Self-esteem obtained from No. of years of marriage (Below 5 and Above 5).**

| Variables | No. of years of Marriage | | | | t-value | p-value |
|---|---|---|---|---|---|---|
| | Below 5 (17 couples) | | Above 5 (13 couples) | | | |
| | Mean | SD | Mean | SD | | |
| Positivity | 25.24 | 4.19 | 26.42 | 4.1 | -1.102 | .28 |
| Openness | 19.82 | 2.54 | 20.23 | 2.50 | -.619 | .54 |
| Competence | 12.00 | 1.35 | 11.9 | 1.42 | .321 | .75 |
| Huminity | 16.7 | 2.9 | 17.42 | 2.86 | -1.040 | .30 |
| Self-worth | 12.03 | 1.34 | 12.2 | 1.297 | -.474 | .64 |
| Learning Orientation | 8.7 | .950 | 8.69 | .970 | -.181 | .86 |

Results showed that the hypothesis 2 is rejected as the p-value of all the variables of self-esteem are greater than 0.05 (p>0.05). This shows that there is no significant difference between no. of years of marriage.



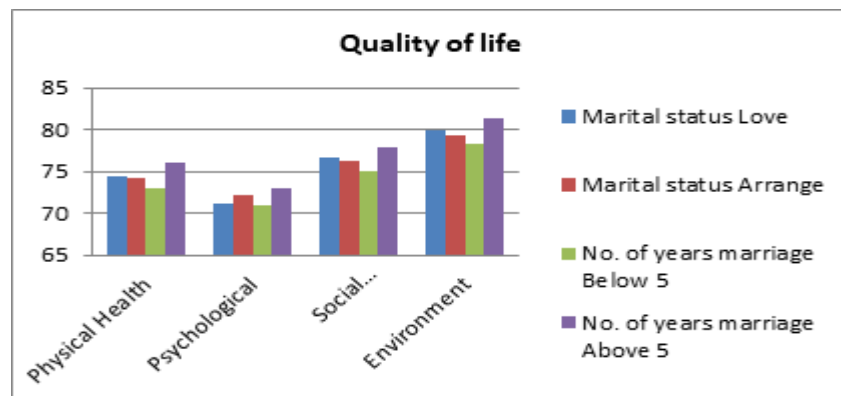**Figure:1** Graph depicting means of self-esteem among marital status and no. of years of marriage of infertile couples with IVF. There are no higher difference seen between means score of love and arranged marriage & below 5 years and above 5 years of marriage, It was nearly similar. Based on the results, a significant difference was observed in the relationship between demographic variables and self-esteem, means of marital status (p>0.05) and no. of years of marriage (p>0.05).

**Hypothesis 3**

There is a significant difference in the Quality of life between Marital status.

**Table-3: Showing t-test was used to compare the mean score of Quality of life obtained from marital status (Love and Arrange).**

| Variables | Marital status | | | | t-value | p-value |
|---|---|---|---|---|---|---|
| | Love (8 couples) | | Arrange (22 couples) | | | |
| | Mean | SD | Mean | SD | | |
| Physical Health | 74.50 | 15.82 | 74.20 | 14.99 | .067 | .947 |
| Psychological | 71.13 | 16.93 | 72.14 | 16.21 | -.211 | .833 |
| Social relationships | 76.63 | 15.89 | 76.23 | 13.66 | .096 | .924 |
| Environment | 80.00 | 14.62 | 79.41 | 13.63 | .146 | .885 |

Results showed that the hypothesis 3 is rejected as the p-value of all the variables of Quality of life are greater than 0.05 (p>0.05). This shows that there is no significant difference between marital status.

**Hypothesis 4**

There is a significant difference in the Quality of life between No. of years of marriage.

**Table-4: Showing t-test was used to compare the mean score of Quality of life obtained from No. of years of marriage (Below 5 and Above 5).**

| Variables | No. of years of Marriage | | | | t-value | p-value |
|---|---|---|---|---|---|---|
| | Below 5 (17 couples) | | Above 5 (13 couples) | | | |
| | Mean | SD | Mean | SD | | |
| Physical Health | 72.94 | 14.94 | 76.04 | 15.39 | -.79 | .44 |
| Psychological | 70.91 | 16.19 | 73.12 | 16.61 | -.52 | .61 |
| Social relationships | 75.09 | 13.59 | 77.96 | 14.94 | -.78 | .44 |
| Environment | 78.24 | 13.56 | 81.31 | 14.13 | -.86 | .397 |

Results showed that the hypothesis 4 is rejected as the p-value of all the variables of quality of life are greater than 0.05 (p>0.05). This shows that there is no significant difference between no. of years of marriage.



**Figure:2** Graph depicting means of quality of life among marital status and no. of years of marriage of infertile couples with IVF. There are not much difference seen between means score of love and arranged marriage & below 5 years and above 5 years of marriage, It seen nearly same. Based on the results, a significant difference was observed in the relationship between demographic variables and quality of life, means of marital status (p>0.05) and no. of years of marriage (p>0.05).

**Discussion**

The results of t-test showed that the mean score of marital status who married by love is higher than arranged marriage. According to table no. 1 p-value is greater than 0.05 (p>0.05), there is no significant difference seen in Self-esteem among marital status love and arranged marriage. Marital status is a vital component for couples who suffer from infertility. The present result has been supported by Çavdar NK and Coşkun AM(2018) on the effect of infertility upon quality of life and self-esteem. Another study supported by Erdem K. & Ejder Apay S.(2014) on a sectional study: the relationship between perceived social support and depression in Turkish infertile women.

The no. of years of marriage is also one of the most important factor that can affect the quality of life as well as self-esteem of infertile couples who taking IVF. Table no. 3 and 4 describe that the p-value of marital status and no. of years of marriage are greater than 0.05 (p>0.05), there is no significant difference in marital status and no. of years of marriage. Examining the Quality of life mean scores also showed that no significant difference between marital status (love and arranged marriage). The mean score of couples who completed

more than 5 years of marriage had both higher self-esteem and quality of life.

## Conclusion

We specified that the research study results evidenced the research objectives the marital status and no. of years of marriage of infertile couples affect their self-esteem and quality of life. We observed that infertility with IVF negatively affected both self-esteem and quality of life. We determined that the infertile couples who were married by love and those couples who completed above 5 years had higher self-esteem. We found that couples who married by Love and those who completed more than 5 years had higher quality of life.

## Implication and Recomondation

The finding of the present research study focuses the light on the mental health problem faced by couples who suffer from infertility treatment like IVF. The finding can also be helpful for researchers and mental health professionals to understand the problem of couples, suffers from infertility and infertility related treatment. Self-esteem emerged out as one of the important variable that can make individuals less vulnerable to infertility treatment. Thus, future studies can utilize perceived social support, depression, anxiety, and stress, self-efficacy as an effective intervention for infertility treatment. Further research in this area is needed with a larger sample size is taken and a comparison of different metropolitan cities different states is done the research would be more meaningful.

## Acknowledgment

Special thanks to the participants for their trust and kindness.

## References

1. Coopersmith S. (1967). "The antecedents of self-esteem". San Francisco: Freeman
2. Burns LH. (1999). "Psychology of infertility". New York: Parthenon
3. Hocaoglu C. (2018) "The Psychosocial Aspect of Infertility" DOI: http://dx.doi.org/10.5772/intechopen.80713
4. Jones S., et al. (1996): "The influence of context and discourse on infertility experience". Journal of Reproductive and Infant Psychology 14.2 93-111.
5. Manimekalal K, Poulpunitha S, Veeramani P. (2020) Infertility: An Alarming Situation In India. IJSTR.; 9(2): 2606-2609. ISSN 2277-8616
6. Abbey, A., Andrews, F. M., & Halman, J. (1991). Gender's role in response to infertility. Psychology of Women Quarterly, 15, 295-316.
7. Andrews, F. M., Abbey, A., & Halman, L. J. (1991). Stress from infertility, marriage factors, and subjective well-being of wives and husbands. Journal of Health and Social Behavior, 32, 238-253
8. American Society for Reproductive Medicine. (2005). Frequently asked questions about infertility. Available online at http://www.asrm.org/Patients/faqs.html
9. Azghdy HSB, Simbar M, & Vedadhir A. (2014) The emotional psychological consequences of infertility among infertile women seeking treatment: Results of a qualitative study. Iranian Journal of Reproductive Medicine.;12(2):131-138.PMCID:PMC4009564 PMID:24799871
10. Aligeh G and Laya F. (2007) "Quality of life and its correlates among a group of infertile Iranian women". Journal of Medical Science Monitory 13.7 CR313-CR317.
11. Balen V., et al(1996) "Perception of diagnosis and openness of patients about infertility". Patient Education and Counseling 28.3: 247-252.
12. Bolsoy N, Taşpınar A, Kavlak O, et al. (2010) Differences in quality of life between infertile women and men in Turkey. J Obstet Gynecol Neonatal Nurs.;39(2):191-198.
13. Beaurepaire, J., Jones, M., Thiering, P., Saunders, D., & Tennant, C. (1994). Psychological adjustment to infertility and its treatment: Male and female responses at different stages of IVF/ET treatment. Journal of Psychosomatic Research, 38, 229-240.

14. Çavdar NK, Coşkun AM. (2018) The effect of infertility upon quality of life and self-esteem. MOJ Womens Health.;7(3):89–94. DOI: 10.15406/mojwh.2018.07.00176

15. Domar A and Seible S. (1997). "Emotional aspects of infertility: A comprehensive text". CT: Appleton and Lange

16. Draye, M. A., Woods, N. F., & Mitchell, E. (1988). Coping with infertility in couples: Gender differences. Health Care for Women International, 9, 163-175.

17. Erdem, K., & Ejder Apay, S. (2014). A Sectional Study: The Relationship between Perceived Social Support and Depression in Turkish Infertile Women. International journal of fertility & sterility, 8(3), 303–314.

18. Fekkes., et al. (2003) "Health-related quality of life in relation to gender and age in couples planning IVF treatment". Human Reproduction 18.7: 1536-1543.

19. Jordan C and Revenson TA. (1999) "Gender differences in coping with infertility: A meta analysis". Journal of Behavioral Medicine 22.4: 341-358

20. Keramat A, Masoomi SZ, Mousavi SA, et al. (2014) Quality of Life And its Related Factors in Infertile Couples. J Res Health Sci.;14(1):57–63.

21. Monga M, Alexandrescu B, Katz SE, et al. (2004) Impact of Infertility on Quality of Life, Marital Adjustment and Sexual Function. Urology.; 63(1):126–130.

22. Peterson, B.D., Newton, C.R., Rosen, K.H., & Schulman, R.S. (2006). Coping processes of couples experiencing infertility. Family Relations, Interdisciplinary Journal of Applied Family Studies, 55, 227-239.

23. Robinson, G. E., & Stewart, D. E. (1996). The psychological impact of infertility and new reproductive technologies. Harvard Review of Psychiatry, 4, 168-172.

24. Sadler, A. G., & Syrop C. H. (1987). The stress of infertility: Recommendations for assessment and intervention. In D. Rosenthal (Ed.), Family stress: The

family therapy collections, 22, (pp. 1-17). Rockville, MD: Aspen.

25. Sillars A., et al. (2002) "Cognition and communication during marital conflict: How alcohol affects subjective coding of interaction in aggressive and nonaggressive couples". New York: Cambridge University Press.

26. Ulbrich P. M., Coyle, A. T., & Llabre, M. M. (1990). Involuntary childlessness and marital adjustment: His and hers. Journal of Sex & Marital Therapy, 16, 147-158.

27. Usman R, Khan MA. (2019) "Rejection Sensitivity, Depression, Self Esteem, Quality of life and Coping Styles among Infertile Females and Males Married Individuals". EC Psychology and Psychiatry 8.6: 528-537.

28. Wischmann T, Schilling K, Toth B, et al.( 2014) Sexuality, Self-Esteem and Partnership Quality in Infertile Women and Men. Geburtshilfe Frauenheilkd.;74(8):759–763.

29. Xin X, Pan BC, Du Q, et al. (2013) Impact of Male Infertility on Men's Self esteem and Satisfaction with Sexual Relationship. Zhonghua Nan KeXue;19(3): 223–227.

30. https://en.wikipedia.org/wiki/Quality_of_life

31. https://www.psychologytoday.com/us/basics/self-esteem

32. https://www.healthline.com/health/infertility

33. https://www.mayoclinic.org/diseases-conditions/infertility/symptoms-causes/syc-20354317

34. ivf#:~:text=In%20vitro%20fertilization%20(IVF)%20is,transferred%20to%20a%20woman's%20uterus.

35. https://pubmed.ncbi.nlm.nih.gov/2022528/

36. https://www.nhp.gov.in/disease/reproductive-system/infertility

37. https://www.who.int/reproductivehealth/topics/infertility/burden/en/

38. https://www.medicalnewstoday.com/articles/150999#:~:text=%E2%80%9CHealth%20is%20a%20state%20of,not%20the%20objective%20of%20living

# A CLUSTER BASED MODEL FOR DIVERSIFICATION OF CROPS IN INDIAN PUNJAB

**S.S. Cheema[1] and A. Singh[2]**

[1,2]Department of Computer Science & Engineering, Punjabi University, Patiala

[1]sikander@pbi.ac.in

_____

## ABSTRACT

*Cultivation areas are usually divided in acres, each one becoming a production unit. Every year farmers have to decide what to plant in these acres according to the site. This requires the analysis of tradeoffs between investments that have to be made, expected profits, and environmental effects of cultivation. Because of this many cropping system models and decision support tools are structured for this purpose. As the need grows for analyses on crop production and management at local, cropping system models are increasingly structured to provide the capability for area-wide simulation and analysis at a range of local scales in different zones (clusters). So it requires a development of a data management system for every zone available in that particular area so that it can provide access to the local data in all the zones which can give complete required information to all the farmers in all those zones. The objective of this paper is to present a methodology to develop different clusters according to Crop and Soil Data Management system for the Indian Punjab State to improve crop diversification. The Soil Data Management component is based on the soil survey done in the Punjab in the various zones. Study of different crops has been done based on the soil properties. A mapping of suitable crops for the particular zones depending on the soil components has been suggested for the development of cropping system applications.*

_____

*Keywords: Clusters, Crop, Database, Diversification, Soil.*

## Introduction

The state of Indian Punjab is located in the north-west part of country, is known as bread basket of India. It is the land of rivers which makes a major portion of Indian Punjab State's rural population depends upon agriculture, and it is an important part of Punjab's economy. As per observation, most of the areas of Punjab is not explored by the farmers, so it is the high time that those areas require efforts and attention both, so that these come under the farming sector. If these areas of Indian Punjab State comes under the agriculture sector then more employment can be generated and State Government can collect good revenue. The agriculture sector of Punjab is categorized as follows: The first one is commercial category, the farmers in this category cultivate areas of 20 hectares and above, most of the farmers use modern methods, machinery and advanced technology for farming. Under second category, those farmers come who cultivate areas between 5 and 20 hectares. But on the other hand it has been observed that on major portion of the land, farming is done by small farmers, who owned land less than 5 hectares, come under third category. It has been seen that farmers who come under this category use the traditional methods only for cultivation, and they can't get high yield from crops.

Usually, they are following mono-crop culture, which means they are growing only one particular crop every year, by which fertility of the soil goes down day by day. Due to this reason, farmers get less yield from the crops. Government of Punjab State has introduced the concept of crop diversification to improve the fertility of the soil and to increase the yield of the crops. Crop diversification means growing two or more crops on the land rotation-wise [1]. The crops which are included in the diversification programme includes tomato, groundnut, cotton, sunflower, soya-bean, sugarcane, potato, and maize instead of regular production of wheat and paddy. By adopting the concept of crop diversification, farmers can cultivate more than one crop on their land, and in this way, they can preserve the fertility of the soil as well as groundwater. On the other hand, food security will increase and farmers can get more output with fewer inputs. Kolawole Ogundari has proved in his research that various ways of cropping improved with the strengthening of crop diversification in the different seasons [2]. Crop diversification is also very important risk management strategy. To manage various risks like soil fertility decline, pests and diseases, and drought, crop diversification plays an important role [3]. Further, crop diversification has many known

benefits, including income enhancement and reducing income variance [4]. Moreover, there is a broad agreement that non-food crops do not compete with food production and intensify food insecurity.

Better production of crops require appropriate soil that can accomplish all the required nutrients for that particular crop. For this purpose, a crop-soil database is essential and an appropriate model should be developed through which one can select a particular crop based upon the given inputs of soil's attributes. In totality, there are main ten attributes of soil which are useful to predict the nature of the soil. Based on these attributes, soils can be distinguished. Day by day soil's contents are degrading and it is a major challenge [5]. This degradation affects the soil's physical and chemical properties which further reduce the crop yield. Physical properties of soil include clay, silt, and sand. Chemical properties of soil include Potential of Hydrogen (pH) value, Electrical Conductivity (EC) and Salinity Class (SC) [5]. Marco elements like potassium, nitrogen, and phosphorus are also important for the growth of plants. Soil provides the main source of extracting the nutrients for most of the living organisms. The management of soil ensures that the nutrients present in the soil do not become deficient and do not get toxic for plants which ultimately enter into the food chain. Thus management of soil is a very important aspect for the productivity of crop and for human health.

The management of soil is becoming very important for future due to higher demand for food. Thus, applied research is essential for avoiding further degradation of soil by any contamination to produce sufficient safe, and nutritious food for healthy diets. Soil plays a very important role in increasing the production of a particular crop. Suitable soil should be available to get high production of a crop. Thus, crop-soil database is required to develop a matrix between soil and plant for building the healthy crop policy and to develop a good model. Developed model will support to predict the suitable crop for a particular type of soil based on the given soil inputs. It is well evident from previous studies that managing soil through crop rotation, soil ploughing, and organic modifications have a very important role in improving soil fertility. Soil fertility is imperative for enriching the soil properties like stability in erosion, availability of nutrients, capacity for holding the water, etc. Microorganisms present in the soil also play a very important role in the quality of soil and its fertility as they are part of the nutrient rotation conversion practices. Thus, the topsoil bacterial group's actions and crop diversification play an important role in improving the fertility of the soil.

It is very difficult to handle increased demand for food using traditional agronomic research methods. To handle this situation more information about farming methods and new techniques is required. For processing information, new methods need to be developed. Moreover, traditional methods are time-consuming [6]. New models should be developed with modern technology to handle various management cropping practices. Based on the existing inputs, models should give suggestions to the farmers so that with available resources, they can get a high yield from the crop with fewer inputs. To maintain the fertility of the soil, rotation of the crops should be adopted by farmers. So to find out a solution for all the problems, crop diversification simulation model should be developed with modern techniques. By processing the existing information, that model should suggest a suitable crop for a particular type of soil so that farmers can get a high yield with less variable cost (cost incurred on chemical fertilizers, insecticides, and soil management). In this way, farmers will grow different crops instead of a single crop to get high yield with fewer inputs. This process will save the fertility of the soil as well as groundwater and add various new methods for local food production [7]. Crop diversification method was found to be very operative for all areas as well as dearth mitigation [8]. It also delivers a basic design for systematic co-operation from end to end investigation and helps for further research. In Indian Punjab, there are more than 30 crops that can be cultivated in different seasons. Crops are divided into two categories which are *Kharif* and *Rabi*. Crop selection depends on the good returns over variable costs. Further, the variable costs depend directly and indirectly on

the soil properties. To select an appropriate crop for the field, the first thing is to check the properties of the soil of the given field. This can be possible by checking the soil in the soil testing laboratory.

## Crop and Soil Dataset

For developing various clusters, a dataset of crops and soil properties is required. The crops are categorized into two main groups according to the seasons, i.e., *Kharif* and *Rabi*. To prepare a dataset of crops and soil properties, data of all the crops and data related to the chemical (like pH value, EC, Salinity Class etc.) and physical properties (like Texture etc.) of soil need to be observed. By giving weightage to the various attributes of the soil according to their importance, one will be able to find a sequence of the crops to be selected for the high yield for a particular type of soil for a given cluster. It will further improves fertility of soil. In this way to get the high yield of a crop, one has to select the field (soil) according to the best suitability of crop. Every crop needs a different type of soil according to its requirements, so crop-soil dataset is basic requirement to implement crop diversification.

### Effect of Location nn The Attributes of Soil

Study has conducted in Indian Punjab State to check the effect of location on the values of the different attributes of the soil. In this research, the data from all over the Indian Punjab has been collected under different conditions The soil samples have been analyzed to determine the texture level, percentage of sand, silt, and clay, pH, EC, available nitrogen, available phosphorus, available potassium, and in this way, one can find out the effect of growing a particular crop in a particular soil. The results will not only provide information on the soil's major nutrient status, but also the effect of removing major plant nutrients due to intensive crop removal in the rainfed mono-crop situation of major plant nutrients. So in this way properties of soil varies from place to place. Based on the different clusters will help to select a particular crop to get high yield.

## Development of Clusters

Nutrients available for plants are present in the soil in the labile pool i.e. the nutrients are present in such a state or held by the soil with such energy that plant can take up those nutrients from soil under favourable conditions. Capacity to replenish the nutrients in the labile pool is not important only from the plant growth, development, and production point of view but also from the point of nutrient supplying power of soil and maintenance of soil fertility. Appreciable changes in physicochemical and biological properties of soil due to intensive cultivation under paddy-based cropping system were expected particularly in coarse-textured soils. So in this way depending the fertility of the soil one can grow the suitable crop. Depending upon the properties of the soil and fertility, Punjab region has divided into different clusters. Farmers of a cluster having good soil fertility and good water resources can go for a paddy crop, a cluster having less available water resources can go for crops which need less water. In this way farmers can get good yield of a crop with less input. Recommendations of crops for a particular cluster can be achieved by comparing the soil properties with the crop database. So based on that data, farmers can take decision to grow different crops in these different clusters depending on the soil suitability to promote the diversification in the state because through diversification production of various crops can be increased. A complete map of Indian Punjab with different clusters has shown in figure 1[10]. In this way when framers of the state will produce different types of crops and they will get good price also [9]. Wheat Paddy circle can be break if farmers will go for other crops by checking the feasibility of other crops from the database.

The concept of diversification conveys different meaning to different people at different levels. For example, in research related to marketing, diversification implies a measure of market concentration. Within the agricultural enterprise, diversification may be viewed as a process with three stages (Chaplin, 2000). The first stage is considered as the cropping level which involves a shift away from monoculture. At the second stage, the farms have more than one enterprise and produce many crops that they could potentially sell at different times of the year. The final stage is understood as mixed farming where there is a shift of resources from one crop to a larger mix of crops mix of crop and livestock. Develop a web-based application by using crop-soil dataset so that farmers can see the required information anywhere in all clusters in Punjab for a single crop or any combinations of crops. All these mentioned clusters have different kinds of soil, so production of different types of crops will possible due to the variation in the soil components.

## Data Organization

The Crop-Soil Data Management component is built through an integration of various types of crops and soil components databases. First information about all the required optimal crops will be collected, after that according to these crops data of soil will be collected. Then a mapping will be designed of all crops and soil for each cluster. According to the available components of the soil, rank wise suitable crops will be suggested to the farmers from the given database. To allow flexibility in distributing data storage to multiple disks and servers and to maximize data access load and speed, crop-soil data for each cluster is designed to be stored in a separate database

## Conclusion

Although considerable progress has been made toward integrating cropping system applications with large volumes of crop-soil database, much work remains to be done to streamline the process of crop diversification by getting the data from various sources In this paper, we have shown how different locations are suitable for different crops depending upon soil properties. So Crop-Soil Database Management system is capable of providing dynamic access to the integrated data by cropping system applications to implement crop diversification.

## References

1. Coelli, T. J., Fleming, E. (2004) "Diversification economies and specialization efficiencies in a mixed food and coffee smallholder farming system in Papua New Guinea", Agricultural Economics, Vol. 31, Issue 2-3, pp. 229–239

2. Ogundari, K. (2013), "Crop diversification and technical efficiency in food crop production: A study of peasant farmers in Nigeria", International Journal of Social Economics, Vol. 40(3), pp. 267–288.

3. Mesfin, W. M., Fufa, B. and Haji, J. ( 2011) "Pattern, Trend and Determinants of Crop Diversification: Empirical Evidence from Smallholders in Eastern Ethiopia," Journal of Economics and Sustainable Development, Vol. 4(8), pp. 78–89.

4. Komarek, A. M. (2010 )"Crop diversification decisions: the case of vanilla in Uganda," Quarterly Journal of International Agriculture, Vol. 49(49), pp. 227–242.

5. Arshad, M. A. and Coen, G. M. (1992 ) "Chracterization of soil quality: Physical and chemical criteria", American Journal of Alternative Agriculture, Vol. 7, pp. 25-31.

6. Royce, F. S., Jones, J. W., Hansen, J. W. (2001) "Model-Based Optimization of Crop Management for Climate Forecast Applications", Transactions of the ASAE, Vol. 44, Issue 5, pp. 1319-1327.

7. Thornton, P. K., Bowen, W. T. , Ravelo, A. C. , Wilkens, P. W. , Farmer, G. , Brock, J. and Brink, J. E.( 1997) "Estimating millet production for famine early warning: an application of crop simulation modelling using satellite and ground-based data in Burkina Faso", Agricultural and Forest Meteorology, Vol. 83, Issues 1-2, pp. 95-112.

8. Kar, G. , Singh, R., Verma, H. N.(2004) "Alternative cropping strategies for assured and efficient crop production in upland rainfed rice areas of Eastern India based on rain fall analysis", Agricultural Water Management, vol. 67(1), pp. 47-62.

9. Wilkens, P.W., Hoogenboom, G., Singh, U., Koo, J., (2009) Regional crop modeling: integrating CSM model in a GIS. In: The 39th Biological Systems Simulation Conference, Griffin, Georgia, pp. 44–45.

10. https://punjabiduniyea.wordpress.com/salute-punjab/differnt-regions-of-punjab/

# A STUDY OF THE IMPACT OF THE MEDIUM OF INSTRUCTION AT SCHOOL LEVEL ON THE PERFORMANCE OF STUDENTS PURSUING TEACHER EDUCATION COURSES

**A. Yadav[1] and D. Saxena[2]**

[1]Institute of Education and Research, Mangalayatan University, Aligarh
[2]IER, Mangalayatan University, Aligarh
[1]anuradha.yadav@mangalayatan.edu.in, [2]deepshikha.saxena@mangalayatan.edu.in

_____

## ABSTRACT

*This study relates to the effect of medium of instruction at school level on the academic achievement of teacher trainees. The main objective of the study is to compare the performance of teacher trainees who had Hindi as their medium of instruction at school level with other students of the same class who had English as their medium of instruction at school level. To find out the opinions of teachers and parents of English and Hindi medium school students. The result of the study showed that students of English medium had difficulty in comprehending science concepts. Parents and teachers also agreed on the importance of English for the success in professional world.*

_____

## Introduction

The chief aims of Education are to produce ideal citizens for fully embedded with strong national and social feelings so that they shoulder their civic responsibilities and duties as ideal citizens of India. To enable the students so that they possess productive capacity to render their services to country. To ensure physical, mental and social and emotional development in their personality. To develop a sense of discipline, ethics and quality of leadership in them.

Achievement refers to the scholastic or academic achievement of the student at the end of an educational program. It is to this concept that the term achievement is referred to as final score of the student in summative terminal year end Examination. Therefore, it is the goal of every teacher or an educational administrator to take appropriate initiatives to ensure maximum achievement of students in such Examinations. It has been thus indicated that a good number of variables, such as personality characteristics of the learners, the socio-economic status from which a pupil hails, the organizational climate of the school, curriculum planning, etc., to mention a few, influence achievement in different degree. These variables are generally referred to as correlates of achievement. Heads of institutions, curriculum planners, teachers, and others who are involved in the task of helping students to achieve better would like to have knowledge of the influence these correlates exert on achievement. One of the important factor is the medium of Instruction.

The medium of instruction is the language used by the teacher to teach. Teaching the language, or educational content, through the target language increases the amount of exposure the learner gets to it, and the opportunities they have to communicate in it, and therefore to develop their control of it. In U.P. there are two mediums of instruction, English and Hindi the same is being followed in higher education also. This study relates to the effect of medium of instruction at school level on the academic achievement of teacher trainees.

## Objectives of the study

1. To compare the performance of teacher trainees who had Hindi as their medium of instruction at school level with other students of the same class who had English as their medium of instruction at school level.

2. To find out the opinions of teachers and parents of English and Hindi medium school students.

## Plan and Procedure

The present study aimed at study of the impact of the medium of instruction at school level on the performance of students pursuing teacher education courses, is a descriptive research and has used survey method for collection of data.

**Sampling Design**: Purposive sampling was used for the selection of students. Random sampling was used for the selection of parents.

**Description of sample:** In this study 70 students of B.El.Ed. course comprising of both English and Hindi medium of Mangalayatan University were selected. 50 parents were selected randomly.

**Data Collection tools**: Questionnaire and Interview schedule prepared by the investigator and validated by the experts is used for the study.

a) Questionnaire for the students
b) Interview schedule for teachers and parents
c) End Semester Examination result of students
   Questions related to their experience of teaching learning were asked to the students.

## Findings

1. 75% of students who are pursuing Science stream and they are from Hindi medium submitted that they have difficulty in comprehending Science concepts as they are being taught in English and since till intermediate they studied science in Hindi so they had difficulty in understanding science which was a reason for their low achievement in Science.

2. 32% of students who are pursuing Humanities stream and they are from Hindi medium submitted that they have difficulty in comprehension of concepts of various subjects.

3. 80% of Girl students' pursuing science stream agreed that they faced no difficulty in understanding science subject and showed higher achievement as well.

4. 90% of final year students agreed that they face less difficulty in understanding concepts of Science in English and their grades also showed improvement.

5. Out of 70 respondents 58.2% had multiple effect of difficulties in understanding the lecture delivered in English. Majority of the Hindi medium students (61.8% of 41) were affected by this multiple factor. Even English medium students were affected by these difficulties. When factors of various combinations were studied in detail it was observed that 28respondents i.e. about 40% of 70 respondents had to suffer due to problem of interaction in class, this was followed by the respondents spending more time in referring to the dictionary searching for meaning of the words followed by the respondents worried about fluency in speaking and speed in writing. In short, it reveals that difficulty in understanding lecturers delivered in English further resulted in limitations on interaction with others in the subject, lack of confidence in presenting cases and seminar papers, wastage of time and lack of fluency in speaking and writing. Hindi medium students had severe effect of these things.

6. 91% of all the teacher participants of the study agreed that students like Hindi very much and have high proficiency levels of Hindi Language. Most of the teachers of the university have mentioned that Hindi has good impacts on the students' grades but use of Hindi as a medium of instruction is an obstacle in way of getting good jobs. Most of the latest academic resources like books and journals are not in Hindi language, which is also a drawback of Hindi Medium Instruction.

7. 78% of all the Parents interviewed in this study agreed that students like Hindi very much and have high proficiency levels of Hindi Language. But 65% parents agreed with the fact that English is the international language of world and hence one could not neglect its importance. Participants of the survey are also well aware of its importance but they also have few concerns related to it.

8. According to all the teachers of science agreed that students find English hard and thus do not like to use English in their exams. 11 of them has mentioned that students don't like to use English because they find it hard to understand in science classes, especially in exams. Teachers have reported that the use of English has bad impacts on students' scores and overall performance. All the Teachers stated that use of English medium instruction lowers the performance of students in exams and lower the previous good grades.

9. It has been stated by teachers that students perform very badly in first year and then their results show improvement in second and third year.

10. Almost all of the participants including students, parents and teachers agreed that to interact with the world and get benefits one has to be proficient in English. According to participants, knowing English is an asset for all those who want to excel in their professional carriers. It has been reported that if students have graduated and studied in English the future is open for them all over the world and they would also have good opportunities for good job in both India and abroad.

11. According to teachers English's Language proficiency is low for all the students for all the courses. Despite this interviewed teachers agreed that students developed interest in learning through English which was evident in the improvements of the grades.

## Conclusions and Suggestions

Among the parent respondents, it was found majority of the fathers and mothers of children studying in English Medium School are educationally well or highly qualified and the father were occupationally well placed, whereas majority of the mothers are housewives. In selection of English MI for their ward, they assigned reasons such as English is an International language and useful for professional education. Most of the parents taught their children themselves and a very few engaged private tutors. Surprisingly, about 25% of parents felt that their child could have progressed better if they had opted for Marathi MI. This could be attributed to the fact that proper environment for learning English is not available at home. In fact in more than 25% of the families, nobody could converse with their wards in English.

A lot of debate has been taking place on the effect of the medium of instruction on the individuals' performance later in their lives. India is a multicultural and multi-lingual country. In India there is no common language for the purpose of education and administration. Still, India remains united and is flourishing in the field of science and education.

## References

1. Verma, S. K.(1990), Radhakrishnan's Philosophy of Education, University News, Vol..XXVIII, No. 19, 1990, AIU, New Delhi.

2. S.K. Verma (Ed.), Language in Education: Problems and Principles (1995). Madras : T.R. Publications, Pvt. Ltd.

3. Verma, S.K. (1985), My Mother Tongue is not My Mother's Tongue. In S.K. Verma (Ed.), Language in Education: Problems

4. and Principles (1995). Madras : T.R. Publications Pvt. Ltd., pp. 25- 40.

5. Verma, S.K. (1991), Your Mother Tongue is Your Best Tongue: . Tagore's Perception of the Mother Tongue in Education, University News, Vol XXIX, No. 36, In S.K. Verma (Ed.), Language in Education: Problerhs and Principles (1995). Madras : T.R. Publications Pvt. Ltd., pp. 41-51.

6. Verma, S.K. (1995), Language in Education: Problems and Principles, (JELL, No. 5, 1990, CIEFL, Hyderabad). Madras : T.R. Publications Pvt. Ltd., pp. 86-88.

7. Verma, S.K. (1995), Language Ordering in a Multilingual Society. In S.K. Verma (Ed.), Language in Education: Problems and Principles, (1995). Madras : T.R. Publications Pvt. Ltd., pp. 74- 85. 428

8. Wadekar, V. (2000), Help of Research in Foreign Countries Should be Taken While Implementing Decision of English From First Standard. Loksatta, Daily, Mumbai, 2000, 30-1.

9. Wiliam, Me Fum. (1996), English Has Again Become a Priority in the Philippines. The Times of India, Daily, Mumbai, 1996, 27-3.

10. Kothari, C. R., (2009). Research Methodology Methods and Techniques.

2nd ed. New Delhi: New Age International (P) Limited, Publishers.

11. Koul, L., (2014). Methodology of Educational Research. 4th ed. Noida: Vikas Publishing House Pvt Ltd.

12. Mittal, M., (2007). Education in Emerging Indian Society. 1st ed. Meerut: International Publishing House.

13. Pathak, R., (2007). Education in the Emerging India. 1st ed. New Delhi: Atlantic Publishers & Distributors Ltd.

14. Pandey,R.S., (2009). Teacher in Developing Indian Society. 6th ed. Agra: Agrawal Publications.

15. Pandey,R.S., (2014). Principles of Education. 15th ed. Agra: B.P. Printers.

# A STUDY OF THE RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND PROFITABILITY OF SELECTED IT COMPANIES IN INDIA

**D. Harwani[1] and A. Joshi[2]**

[1, 2]Pandit Deendayal Energy University

[1]divyaharwani92@gmail.com, [2]ashish.joshi@rediffmail.com

---

## ABSTRACT

*This study aims to discover the relationship between capital structure and profitability of selected five IT Companies namely, Tata Consultancy Ltd, Infosys Ltd, Wipro Ltd, HCL Technologies Ltd, and Tech Mahindra Ltd. The study is based on secondary source of data and has been obtained from PROWESS database maintained by Centre for Monitoring Indian Economy (CMIE) for the period of five financial year from 2015-16 to 2019-20. The result of ratio analysis and rank correlation shows that out of these five selected companies, HCL Technologies Ltd, Wipro Ltd and Tata Consultancy Ltd have performed better.*

---

*Keywords: Capital Structure, Profitability, IT Companies*

## Introduction

Role of IT Companies in Software Development India is remarkable for its growth. Both national and international companies are playing crucial roles in the rapid growth of the country to become the leading destination globally for Software Outsourcing Services. India is also considered to be the world-wide hub for Information Technology services as no. of local as well as overseas IT companies have their remarkable presence in the country. Indian IT industry has grown rapidly with an exponential growth rate after the economic reform of 1991-92. Indian IT companies have set up thousands of centres within India and around 80 countries across the world.

Software development companies in India has decades of experience in Technological know – how and has consistently been the first choice for a myriad of software projects. With its mass experience, high numbers of professionals in millions and still counting with several tens of thousands of more added to the industry annually and very affordable rates compared across the globe due to demand and supply and healthy competition amongst Indian companies, India will continue to dominate the software industry in the world.

Profitability and growth go hand-in-hand when it comes to success in business. Profit is key to basic financial survival as a corporate entity, while growth is key to profit and long-term success. When the growth potential is high, it is obvious that IT Companies will have opportunities to earn higher profits and grow large. But profitability of the business is affected by number of factors, one of them is the capital structure of firm.

Capital structure can be described as the arrangement of capital by using different sources of long-term funds which consists of two broad types: equity and debt. The different types of funds that are raised by a firm include preference shares, equity shares, retained earnings, long-term loans etc. These funds are raised for running the business. The present study aims to find out relationship between capital structure and profitability of IT Companies in India

## Literature Review

M. A. Suresh Kumar, M. Dhanasekaram, S. Sandhya, R. Saravanan (2012) conducted a research on, with the aim to investigate the impact of financial ratios, capital market variables, tax rate and interest rate on capital structure of fifteen Indian insurance companies. The study had made use of multiple regression and simple regression model to test hypothesis. The hypothesis of the study states that there was significant relationship between firm size and fixed assets on capital structure. It also implies that there was positive relationship between profitability ratios and growth rate of profits on capital structure. The study suggested that insurance sector companies had to consider the financial indicators of capital market because it reduces the cost of capital

which in turn leads to an increase in the market value of companies.

Mr. N. Suresh Babu and Prof. G.V Chalam (2014), conducted a research with the aim to analyse the factors determining capital structure of textile industry. The study was based on secondary source of data covering a period of 14 years from 1997-1998 to 2010-2011. The study used leverage, profitability, firm size, tangibility, growth, business risk, non-debt tax shield, liquidity as their variables and observing pecking order theory. The study had made use of various statistical tools like summary statistics, correlation analysis, multiple regression analysis, 'T' test, 'F' test and ANOVA. The research conducted hypothesis also, which shows size, growth, risk, non-debt tax shield and liquidity were negatively related with leverage while profitability and tangibility were positively related with leverage.

Mihir Ranjan Bardhan, Prof. Nikhil Bhusan Dey, & Dr. Kingshuk Adhikari (2015) conducted a research with the aim to explore the solvency position of 10 Indian life insurance companies in exchange for a study period of seven years from 2006-07 to 2012-13. The study was based on secondary data collected from the annual report of IRDA. They had taken nine private life insurance companies namely, Bajaj Allianz, Birla Sunlife, HDFC standard, ICICI Prudential, ING VYSYA, Kotak Mahindra, SBI Life, Tata AIA, Max NY Life on the basis of their date of registration and one nationalized life insurance company LIC. The study had made use of various statistical tools like, ratios, ANOVA and ranking analysis. The study found that selected insurance companies were more dependent on outsider's fund as compared to their own capital which indicate risky business practices.

Dr. K. K. Ramachandran, M. Madhumathy (2016), conducted a study with the purpose to analyse textile companies. The study consists a sample of 10 textile companies for the period of ten financial years from 2004-05 to 2013-14. The required data and information for the study has been collected from published annual reports and financial statements. Percentage analysis and Multiple regression analysis were used to examine the impact of capital structure

(Earning per Share) on firm's financial performance (Debt equity ratio, net profit margin, return on capital employed, return on equity, return on assets). The study concluded that Indian textile industry should use more internal source of finance to meet their long-term investment decision.

Dr. P. Hanumantha Rao (2018) studied the association between capital structure and profitability of 8 real estate companies in India for five financial years during the study period from 2011-12 to 2015-16. To measure profitability, net profit ratio, return on capital employed, and return on equity had taken as dependent variable while to measure capital structure two independent variables (debt to equity ratio and debt to total fund ratio) were used. The study had made use of correlation analysis to test hypothesis. The hypothesis of the study revealed that there were no significant association between debt-to-equity ratio and net profit ratio, return on capital employed ratio, as well as return on equity ratio whereas there were significant association between debt to total funds and profitability ratios.

Reema Monga (2018), conducted a research with the purpose to analyse the impact of capital structure on profitability of telecom sector. Nine companies from telecom sector were taken for the study using secondary source of data, covering a period of five years. Debt to capital ratio was used as independent variable whereas gross profit ratio, operating profit ratio, net profit ratio, return on assets, return on capital employed and return on equity were used as dependent variables. The study had made use of various statistical tools like regression and correlation. The research conducted hypothesis also which states that there were significant association of debt to capital and gross profit ratio, operating profit ratio, return on assets ratio and return on capital employed ratio whereas there were no significant association of debt to capital ratio and net profit ratio & return on equity ratio.

Dr. Yajnya Dutta Nayak, Aditya Prasad Sahoo (2020), conducted a research with the aim to analyse the determinants of capital structure of multinational firms in Indian FMCG market for the period of five years from 2013-14 to 2018-19. The required data and information for the

study were gathered from published annual reports and used trade off theory to test the hypothesis. They had taken tax, profitability, liquidity and size as independent variables whereas total leverage, short term leverage and long-term leverage were used as dependent variable. The result indicated that liquidity and profitability had favourable association with total and long-term leverage whereas liquidity had negative association with short leverage.

## Research Objective

To ascertain the relationship between capital structure and profitability of selected IT Companies over the period of study.

## Research Methodology

The research conducted in order to determine the relationship between capital structure and profitability of selected IT companies in India. The study is based on secondary data obtained from PROWESS database maintained by Centre for Monitoring Indian Economy (CMIE). The sample consists top 5 IT companies listed on BSE as well as NSE which are selected on the basis of sales revenue in year 2019-20. The sample companies are, Tata Consultancy Ltd, Infosys Ltd, Wipro Ltd, HCL Technologies Ltd, and Tech Mahindra Ltd respectively. The data for the study have been collected for the period of 5 years from 2015-16 to 2019-20. For data analysis, the methods that has been applied are ratio analysis and rank correlation.

The following ratios have been calculated for the purpose of the study.

## Debt Equity Ratio

The Debt Equity ratio (also called the "debt to equity ratio", "risk ratio", or "gearing"), is a leverage ratio that calculates the weight of total debt and financial liabilities against total shareholders' equity. This ratio highlights how a company's capital structure is tilted either toward debt or equity financing. A higher debt-equity ratio indicates a levered firm, which is quite preferable for a company that is stable with significant cash flow generation, but not preferable when a company is in decline. Conversely, a lower ratio indicates a firm less levered and closer to being fully equity

financed. The appropriate debt to equity ratio varies by industry.

## Interest Coverage Ratio

The interest coverage ratio is a debt and profitability ratio. It is used to measure how well a firm can pay the interest due on outstanding debt. The interest coverage ratio is calculated by dividing a company's earnings before interest and taxes (EBIT) by the company's interest expenses for the same period. The lower the interest coverage ratio, the higher the company's debt burden and the greater the possibility of bankruptcy or default. A higher ratio indicates a better financial health as it means that the company is more capable to meeting its interest obligations from operating earnings.

## Operating Profit Ratio

The operating profit is an income from operations and shows the margin left after paying the overhead expenses, manufacturing expenses, selling and distribution expenses, administrative expenses, etc. The operating profit margin ratio act as a key indicator for the creditors and the investors because it helps them to evaluate the effectiveness of company's operations. To calculate the operating margin, the operating income (earnings) is divided by sales (revenues). The higher value of the operating profit margin ratio shows that the company is making enough profits from its operations to pay for the variable as well the fixed expenses.

## Net Profit Ratio

Net profit ratio is one of the most important indicators of a company's overall financial health. It measures how much net income is generated as a percentage of revenues received. Net profit ratio helps to determine the overall efficiency of the business' operations, furthermore, it is an indicator of how well a company's trading activities are performing.

## Return on Capital Employed

Return on capital employed (ROCE) is a financial ratio that can be used in assessing a company's capital efficiency and profitability. It measures how efficiently a company is using its capital to generate profits and used by

investors to determine whether a company is suitable to invest in or not. A higher ROCE is always more favourable, as it indicates that more profits are generated on capital employed.

*Return on Total Assets*

Return on total assets (ROTA) is a ratio that measures a company's earnings before interest and taxes (EBIT) to its total net assets. The ratio is considered to be an indicator of how effectively a company is using its assets to generate earnings. The greater a company's earnings in proportion to its assets, the more effectively that company is said to be using its assets

## Results and Discussions

### Table 1

| TCS Ltd | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | Average | R1 |
|---|---|---|---|---|---|---|---|
| Debt Equity Ratio | 0.003 | 0.003 | 0.003 | 0 | 0.083 | 0.018 | 1 |
| Interest Coverage Ratio | 2257.46 | 1879.75 | 1064.50 | 239.94 | 57.44 | 1099.82 | 6 |
| Operating Profit Ratio (%) | 31.6 | 29.3 | 28.7 | 28.5 | 28.5 | 29.3 | 3 |
| Net Profit Ratio (%) | 25.8 | 24.2 | 24.3 | 23.9 | 23.2 | 24.2 | 2 |
| Return on Capital Employed (%) | 41.7 | 32.9 | 32.7 | 40.4 | 40.9 | 37.7 | 5 |
| Return on Total Assets (%) | 32.7 | 28.0 | 27.6 | 32.5 | 31.6 | 30.4 | 4 |
| **Infosys Ltd** | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | Average | R2 |
| Debt Equity Ratio | 0 | 0 | 0 | 0 | 0.051 | 0.010 | 1 |
| Interest Coverage Ratio | 0 | 0 | 0 | 0 | 178.43 | 35.68 | 6 |
| Operating Profit Ratio (%) | 29.4 | 29.3 | 29.0 | 26.9 | 25.6 | 28.0 | 5 |
| Net Profit Ratio (%) | 21.9 | 21.7 | 25.0 | 20.3 | 18.6 | 21.5 | 3 |
| Return on Capital Employed (%) | 22.9 | 21.2 | 25.2 | 24.5 | 24.0 | 23.5 | 4 |
| Return on Total Assets (%) | 18.4 | 17.8 | 21.1 | 19.9 | 19.1 | 19.2 | 2 |
| **Wipro Ltd** | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | Average | R3 |
| Debt Equity Ratio | 0.168 | 0.136 | 0.138 | 0.104 | 0.128 | 0.134 | 1 |
| Interest Coverage Ratio | 109.215 | 64.568 | 65.364 | 34.495 | 35.485 | 61.825 | 6 |
| Operating Profit Ratio (%) | 21.7 | 20.5 | 21.1 | 21.0 | 20.4 | 20.9 | 5 |
| Net Profit Ratio (%) | 17.0 | 15.8 | 16.3 | 17.5 | 16.3 | 16.5 | 4 |
| Return on Capital Employed (%) | 18.3 | 15.4 | 15.3 | 17.3 | 16.2 | 16.5 | 3 |
| Return on Total Assets (%) | 14.3 | 12.6 | 12.6 | 14.1 | 13 | 13.2 | 2 |
| **HCL Technologies Ltd** | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | Average | R4 |
| Debt Equity Ratio | 0.030 | 0.019 | 0.016 | 0.015 | 0.037 | 0.023 | 1 |
| Interest Coverage Ratio | 106.698 | 166.480 | 457.050 | 764.385 | 48.557 | 308.634 | 6 |
| Operating Profit Ratio (%) | 38.6 | 40.7 | 42.4 | 40.1 | 39.8 | 40.3 | 5 |
| Net Profit Ratio (%) | 32.1 | 33.9 | 32.3 | 30.5 | 27.0 | 31.1 | 4 |
| Return on Capital Employed (%) | 22.2 | 28.7 | 27.3 | 28.1 | 26.2 | 26.5 | 3 |
| Return on Total Assets (%) | 16.1 | 23.4 | 22.6 | 23.3 | 19.6 | 21 | 2 |
| **Tech Mahindra Ltd** | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 | Average | R5 |

| Debt Equity Ratio | 0.015 | 0.016 | 0.013 | 0.001 | 0.022 | 0.013 | 1 |
|---|---|---|---|---|---|---|---|
| Interest Coverage Ratio | 474.97 | 207.59 | 66.29 | 126.56 | 81.60 | 191.40 | 6 |
| Operating Profit Ratio (%) | 16.5 | 16.2 | 16.7 | 20.0 | 15.7 | 17.0 | 4 |
| Net Profit Ratio (%) | 13.0 | 11.6 | 14.7 | 15.5 | 14.5 | 13.8 | 2 |
| Return on Capital Employed (%) | 21.5 | 17.2 | 20.1 | 21.6 | 21.1 | 20.3 | 5 |
| Return on Total Assets (%) | 14.40 | 12.00 | 14.20 | 14.90 | 14.70 | 14.04 | 3 |

In the above table, the debt equity ratio shows Wipro Ltd has highest debt equity as compared to other four companies which indicates that Wipro Ltd is more levered firm as compared to other selected four companies in the study.

Tata Consultancy Ltd has higher interest coverage ratio than other four companies which shows that Tata Consultancy Ltd has better financial health and is capable to fulfil their interest obligations from operating earnings. which provide positive signal to investors. After TCS, HCL Technologies Ltd also shows good financial health as its interest coverage ratio is higher than other three companies.

The operating profit ratio is higher in case of HCL Technologies Ltd, indicating that the company is making enough amount of profit from its operations and shows that it is profitable for investment purpose. As compared to other four companies, Tech Mahindra has lowest interest coverage ratio which shows inefficiency in operations as compare to other four companies.

HCL Technologies Ltd has highest net profit ratio as compared to other four companies which indicate that HCL Technologies Ltd are performing their trading activities in very well manner as compared to other four companies. The result also shows that from other four companies, Tech Mahindra has lowest net profit ratio suggesting that Tech Mahindra has to focus on their trading activities.

Return on capital employed is highest in Tata Consultancy Ltd among five companies which shows that TCS used their capital very efficiently and effectively for generating profit. And this result also motivates investors for investment purpose.

In case of return on total assets, Tata Consultancy Ltd again stands first as compare to other four companies indicating that not only capital but the company also uses their assets very efficiently for the purpose of profit generation.

**Table 2**

| R1 | R2 | $D_1^2 = (R1-R2)^2$ | R3 | $D_2^2 = (R2-R3)^2$ | R4 | $D_3^2 = (R3-R4)^2$ | R5 | $D_4^2 = (R4-R5)^2$ | $D_5^2 = (R5-R1)^2$ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 6 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 0 |
| 3 | 5 | 4 | 5 | 0 | 5 | 0 | 4 | 1 | 1 |
| 2 | 3 | 1 | 4 | 1 | 4 | 0 | 2 | 4 | 0 |
| 5 | 4 | 1 | 3 | 1 | 3 | 0 | 5 | 4 | 0 |
| 4 | 2 | 4 | 2 | 0 | 2 | 0 | 3 | 1 | 1 |
|  |  | 10 |  | 2 |  | 0 |  | 10 | 2 |

**Table 3**

| Company Wise Rank | Formula | Value |
|---|---|---|
| $R_{1,2}$ | $1-\dfrac{6\sum d_1{}^2}{N(N^2-1)}$ | 0.7143 |
| $R_{2,3}$ | $1-\dfrac{6\sum d_2{}^2}{N(N^2-1)}$ | 0.9423 |
| $R_{3,4}$ | $1-\dfrac{6\sum d_3{}^2}{N(N^2-1)}$ | 1 |
| $R_{4,5}$ | $1-\dfrac{6\sum d_4{}^2}{N(N^2-1)}$ | 0.7143 |
| $R_{5,1}$ | $1-\dfrac{6\sum d_5{}^2}{N(N^2-1)}$ | 0.9423 |

The above table indicates that Wipro Ltd and HCL Technologies Ltd are following the approach perfectively while Tata Consultancy Ltd and Infosys Ltd are very nearest to approach.

## Conclusion

To discover the relationship between capital structure and profitability of top five IT Companies based on their sales revenue in 2019-20, Ratio analysis and Rank correlation is used for the research and the time horizon selected is a period of five years from 2015-16 to 2019-20. In this research Debt equity ratio, Interest coverage ratio, Operating profit ratio, Net profit ratio, return on capital employed ratio and return on total assets ratio are used to find out relationship between capital structure and profitability. The study found that HCL Technologies Ltd, Wipro Ltd and Tata Consultancy Ltd perform well amongst all companies.

## Future Research Direction

This study is confined to top 5 IT Companies only and not represents the whole IT Industry. Further research can take place by considering more IT Companies.

## References

1. M.A.Suresh Kumar, M. D. (2012). Determination of financial capital structure on the insurance sector firms in India. European Journal of Social Sciences, 29(02), 288-294.
2. Mr. N. Suresh Babu, P. G. (2014, February). Determinants of capital structure of Indian Textile Industry - An Empirical Analysis. International Journal of Advance Research, 2(2), 1-11.
3. Mihir Ranjan Bardhan, P. N. (2015, March). Capital Structure of Life Insurance companies in India - An Analytical study. EPRA International Journal of Economic and Business Review, 3(3), 58-65.
4. Dr. K.K.Ramachandran, M. M. (2016, March-April). A Study on capital structure and financial performanace of Indian Textile Industry. International Journal of Management (IJM), 7(3), 313-322.
5. Rao, D. P. (2018, February). Association between capital structure & Profitability : A study of Real Estate companies in India. Pacific Business Review International, 10(08), 49-53.
6. Monga, R. (2018, April). Impact of Capital Structure on profitability with special reference to Telecom sector in India. International Journal of Creative Research Thoughts (IJCRT), 6(2), 394-400.
7. Dr. Yajnya Dutta Nayak, A. P. (2020, June). Impact of capital structure in selected FMCG Multinational Corporation in India. Dogo Rangsang Research Journal, 10(06), 232-244.

# IMPACT OF VARIOUS SOURCES OF INFORMATION UPON CONSUMERS' PERCEPTION REGARDING GREEN MARKETING PRACTICES IN INDIAN FMCG SECTOR

## A. Manglani

Department of Business Administration and Commerce, School of Liberal Studies, Pandit Deendayal Energy University, Raisan, Gandhinagar, Gujarat, India

manglanianjali133@gmail.com

_____

## ABSTRACT

*In today's era, Green marketing practices are one of those measures which leads towards reducing or eradicating pollution from environment caused due to various practices in Indian market. Consumers should accept this initiative and co-operate with Indian market to save environment. Many consumers have adopted green products as their part of life. But many consumers are still remaining to do so. This study is an attempt to know the strong source of information through which a consumer can get knowledge regarding green marketing practices prevailing in Indian FMCG sector. This study is an attempt to explore the sources through which consumers can gain more trust and can proceed towards purchasing of a green FMCG product. This study is conducted in Ahmedabad district of Gujarat state. The sample size for the study is 54 FMCG consumers. A primary survey was conducted with the help of a structured questionnaire. One way ANOVA, Frequency Distribution and Multi Response techniques were used for analyzing the data collected. The study tried to evaluate various sources of spreading awareness and their impact upon trust among consumers and their purchase decisions. The findings of the study disclosed that national television network and search engines contributed maximum for spreading awareness. There are nearly 87% of consumers who are aware about green marketing practices. National newspapers and periodical magazines are found to be most trusted source among consumers for green information. Periodical magazines are helpful in promoting sales of green FMCG sector. The study concluded that various sources if used properly can help in gaining consumers' trust, increasing awareness and can also help in increasing sales of a green FMCG product. The need is to communicate properly using appropriate mode of communication from the side of marketers as well as Indian FMCG companies. Consumers are likely to adopt the transformation which is necessary to save our environment but the companies and marketers are required to contribute significantly in order to spread awareness regarding green practices as well as its benefits right from individual to society as a whole.*

_____

**Keywords:** *Various Sources of Information, Awareness, Consumers' Perception, Green Products, Indian FMCG Sector*

## Introduction

Environment has suffered a lot due to pollution produced by manufacturing companies. Green marketing practices were introduced in 1975 in a seminar organized by American Marketing Association (AMA) (Dr.C.K.Tiwari, Namita, 2016). The motivation behind initiating green marketing practices was to eradicate pollution and get a cleaner environment. Many researches are done till date related to consumer behaviour associated with green marketing practices. Many consumers are aware about green products. Consumers have trust in green products and have adopted green life style. But, not all consumers are aware about these products. People in daily life style come across information provided by various sources like local newspapers, national newspapers, local television networks, national television networks, periodicals/magazines, journals, e-commerce portals, search engines, social media platform, at sales counter of shop, reference group, through some event, brochure of respective brand, websites of respective brand, various educational campaign, from children, etc. These sources are playing vital role in spreading awareness. This study is an attempt to explore the source of information which is contributing maximum in spreading awareness regarding green marketing practices in Indian FMCG sector. Also, to identify the source which can play vital role of maintaining authenticity and can lead consumers with trustworthiness towards green products and its adoption in their life style. This study is important to consumers as well as marketers which will help them in knowing the salient sources that are significant with regard to green information.

## Literature Review

Bhimrao Ghodeshwar, Prashant Kumar (2014) has tried to explore green marketing practices and its orientation for a company in India. This study was undertaken with the help of a Questionnaire. A survey was conducted for 220 Indian companies. The data collected and generated hypothesis were analyzed using exploratory and confirmatory factor analyses and structural equation modeling. The findings of the study disclosed that "product design innovation, responsible convincing regarding practices, building green product creditability and consumer engagement practices, price setting behavior, ethical standards, responsible advertising and green communication practices" which help in generating green marketing orientation. This study concluded that marketing with environmental orientation was the need of green marketers at present time to achieve desired level of profit and expansion in the market. Sumita Kukreja, Anupama Sharma, (2014) has focused upon the adaptability of green practices by Indian business firms. Also, they tried to evaluate ways and consumers' satisfaction with least impact upon environment and with maximum competitive gain. For this researcher tried to comprehend the green marketing approach strategies philosophy, importance and limitations. This study was completely based upon secondary data along with newspapers, websites, books and journals. Study disclosed that "Amul, Dabur India Ltd., Infosys, Taj Hotels, Hindustan Unilever Ltd., Wipro Technologies Ltd. Maruti Udyog Ltd., Godrej consumer products" were the ten most eco-friendly Indian companies. Green marketing was at most initial stage in India. Study concluded that each Indian citizen is equally responsible for spreading awareness, adoption and success of green marketing for making our society sustainable.

Shweta singh, Deepak Singh, K.S. Thakur (2014) has analyzed the consumer behavior towards eco-friendly products. They had also tried to evaluate the impact of "satisfaction, word of mouth (WOM) and for traditional marketing mix elements upon attitude and purchase intentions of consumer towards eco-friendly products both FMCG and durable products. This study has applied descriptive and exploratory type of research. For collecting data from sample questionnaire was used as an instrument. Study had 175 respondents as its using pearson coefficient, independent T-test and ANOVA. The findings of study disclosed that satisfaction and purchase intention were positively related. WOM and Advertisements, leads consumers' towards positive attitude for green products but this positive attitude not always resulted consumers towards purchasing a green product.

Wong FuiYeng, Rashad Yazdanifard, (2015) has aimed at determining the concept of green marketing, sustainable tools of green marketing and its marketing mix. This study tried to evaluate sustainability on companies and environment both. Throughout this study they observed the consumer's behavior and means to attract the consumers through branding. The findings of the study disclosed that to encourage green marketing practice there is no universal strategy. Green marketing practices are beneficial but company with have to make efforts to put their green practices under lime light and get recognized in market. Study concluded that company in order to adopt sustainability have to introduce its own green strategy and relatable marketing mix to target right audience at right time and get maximum competitive advantage.

Dr. Sanjay Keshaara Katait (2016) has tried to examine the impact of gender on their attitude towards eco-friendly products consumers' attitude and perception regarding green FMCG products under 7 P's. and also what impact consumers' purchase decision. This study was done the basis of primary survey from 3 districts of Vidarbha of Maharashtra i.e. Nagpur, Amravati and Akola. The sample of the study was taken on the basis of simple random sampling method and sample size was of 300 respondents. The data analysis was done with the help of percentage deviation and Rank order method. Questionnaire, personal interview and observations were the instruments used by researcher for collecting data. The study major factors having impact upon consumers' purchase decision i.e. price, eco-friendly product, place, promotion, performance, package, process, quality, brand, convenience. The study concluded with

importance and need of green marketing practicing. At last researcher made a call for all marketers to contribute in adopting environmental marketing.

Dr.C.K.Tiwari, Namita (2016) has aimed at identifying the factors having impact on consumers' preferences and opinion for green products. Researcher tried to identify if consumers were aware about green FMCG products and lastly, to examine their level of satisfaction towards green FMCG products. This study was done in Kanpur Region. A primary survey was conducted by using structured questionnaire. Data was collected from 100 respondents on basis of convenient sampling design and intercept method. This study was exploratory type of research as it tried to explore factors affecting green FMCG consumers. Analysis was done with the help of Kruskal-Wallis. MS Excel was used to analyze the data. The study concluded that respondents were aware about green FMCG products and were used by majority of them. Factors such as status symbol, price of a product and availability its harmful effects on health and society were discussed by researcher having impact on consumers' perception for green FMCG products. Dr. M. Anbakarasi, Ms. N. Dheivanai (2017) has tried to identify level of awareness among consumers of Coimbatore district regarding green FMCG. The main aim of study was to describe difference in level of awareness due to gender. The study was done on primary basis for 384 respondents with the help of purposive sampling technique, percentage analysis; One way ANOVA and independent sample t-test were used as analytical tools for the study. Researcher collected data by using interview method along with a structured questionnaire. The findings of the study were 62.2% consumers were aware about various issues regarding environment and 53.4% of consumers were aware about eco-certifications. Researcher found that male consumers were more aware than female consumers' regarding green FMCG products. Study concluded by suggesting that advertisement should be used as effective mode of creating awareness by merchants of Indian FMCG brand. Md. Zillur Rahman Siddique, Afzal Hossain (2018) has tried to identify the influence of different sources of awareness for green products upon consumers' purchase decision. This study was based on primary survey with 300 sample size in Bangladesh. The sampling method researchers adopted were convenience and judgmental sampling method. The instrument used for collecting sample data was a structured questionnaire. "Frequency analysis, mean, standard deviation and regression analysis" were used as statistical analysis tools. Study considered "environmental concern, knowledge, eco-friendly products, social media, promotional activities on eco-friendly products and reference groups as different sources of awareness. The findings of study disclosed that "promotional activities on eco-friendly and reference groups" were found having positive impact on awareness of green consumers. Mohd Amir, Atul Dayal, (2018) has investigated the influence of green marketing practices upon competitive advantage among "73 companies out of 100 ensured and enlisted FMCG companies" of Delhi and NCR region. To evaluate the relationship among green marketing practice as an independent variable and competitive advantage as a dependent variable, Structural Equation Model (SEM) was applied. This evaluation was done along with the marketing mix components. The study disclosed that out of four components of marketing mix only promotion was found significant tool for gaining competitive advantage from green marketing practices. Other three components i.e. product, price and place were found inactive for gaining competitive advantage.

Swaroopa Moses, Charles Ambrose, (2018) has evaluated the measures undertaken for enhancing marketing strategies by FMCG companies in India. Also they tried to identify hoe marketing strategies influence consumer behavior and related factors of Indian FMCG market with regard to Nestle India Ltd. and Britannia Industries Ltd. this study was done on both primary as well as secondary basis. Primary survey was done with the help of a questionnaire among 60 dealers of FMCG companies by adopting convenience sampling method. The study concluded that companies should focus more on quality of product rather than innovations.

N. Divyapriyadharshini et al. (2019) has analyzed the customers' awareness level towards Green products and how consumers shift to green products and helping environments in the population of Chennai. Primary and Secondary data was collected for the study. Structured Questionnaire was designed to know the awareness level of consumer for green products. Sample sizes of 30 respondents were selected on the basis of convenience sampling technique. One way ANOVA, Independent sample t-test and Cronbach alpha test were used. Factors like "social media, promotional activities, eco-friendly products, knowledge and environmental concern" were considered to assess the environment. Statistically, there was no significance between age and awareness of green products, between education and knowledge, gender and satisfaction. It proves that consumer satisfaction is based on the need of consumer. The study found that major awareness is created through television. Knowledge, satisfaction, motive and awareness are the key factors which influences the customers to buy the products.

K. Vijaykumar, R. Nijanthan, (2019) has tried to figure out different factors which affect the purchase decision of consumer towards FMCG product. This study also emphasized the consumer behavior and attitude regarding FMCG brands. The main aim of the study was to list out FMCG brands to evaluate brand awareness and preference level among consumers. This study was based on primary as well as secondary data in Karur district. The data was collected on the basis of convenience sampling method. The analysis was done by adopting "frequency table and Friedman Rank test" statistical methods. The study concluded that companies had to work upon quality of products, price of products and about its availability in maximum number of stores.

Brand loyalty was found the most effective tool for successful stand up of the brand in the competitive market.

## Research Objectives

1. To examine the impact of various sources of information in spreading awareness regarding green marketing practices in Indian FMCG sector.
2. To identify if various sources of information can help in boosting trust among consumers regarding green products.
3. To identify the source of information that encourages consumers most for making a purchase decision for a green FMCG product.

## Research Methodology

This study is conducted on the basis of primary survey. The sample size for this study is 54 green FMCG consumers from Ahmedabad district in Gujarat state. The sample for the study is selected on the basis of convenience sampling method. This study aims at examining how various sources of information affects consumers' level of awareness, trust upon green practices and purchase decision regarding green products. For analyzing primary data One Way ANOVA, Frequency Distribution and Multi response techniques are adopted.

## Data Analysis of Study

According to primary survey 87% of consumers are aware of green marketing practices among those maximum consumers are green consumers. That means they are using green FMCG product. The awareness has many sources to reach upto consumers. Which source has maximum potential to make a consumer aware of green practices is described in Table No.1:

**Table No. 1: Various Sources of Information Contributing in Awareness of Green FMCG Product**

| Various Sources of Information | No. of Responses | Percentage of cases |
|---|---|---|
| **Local Newspapers** | **27** | **50.0%** |
| National Newspapers | 21 | 38.9% |
| Local Television | 14 | 25.9% |
| **Network** | **22** | **40.7%** |
| Periodicals Magazines | 13 | 24.1% |
| Journals | 12 | 22.2% |

| | | |
|---|---|---|
| E-commerce Portals | 20 | 37.0% |
| Search Engines | 19 | 35.2% |
| **Social Media Platform** | **24** | **44.4%** |
| At Sales Counter of Shops | 9 | 16.7% |
| **Reference Group** | **22** | **40.7%** |
| Through Some Event | 11 | 20.4% |
| Broucher of Respective Brand | 14 | 25.9% |
| Websites of Respective Brands | 15 | 27.8% |
| Educational Campaign | 15 | 27.8% |
| From Children | 2 | 3.7% |

Among all the sources of information the best source contributing is local newspapers. Social media, national television network and reference groups can contribute maximum after local newspapers for spreading green information associated with FMCG products. These sources are accessed by people at maximum, therefore marketers should think towards the best usage they can make of these sources.

For observing the significant impact of various sources of information upon awareness, One-way ANOVA is applied here. And the results disclosed that only two sources from all mentioned above has obtained desired level of significance i.e. national television network obtained its significance at 0.018 and Search Engines obtained its significance at 0.037. That means these are having significant relationship with generating awareness.

Study analyzed the trust for green FMCG products among consumers and the results obtained are 75.9% of respondents are having trust in green FMCG products. 14.8% are not having trust and 9.3% of respondents think that there is no difference in between green or non-green products. National newspapers and periodical magazines are found most reliable for getting green information among consumers. One-way ANOVA test results disclosed that trust has a significant relationship with only two sources of information among all the sources of information undertaken for study i.e. National newspapers has having 0.029 as value of significance and Periodicals having 0.031 as its value of significance.

This study also tried to analyze that if these sources of information are having significant impact upon consumers' purchase decision and the results are disclosed in Chart No.1:

**Chart No. 1**



PURCHASE DECISION OF CONSUMERS FOR GREEN FMCG PRODUCTS
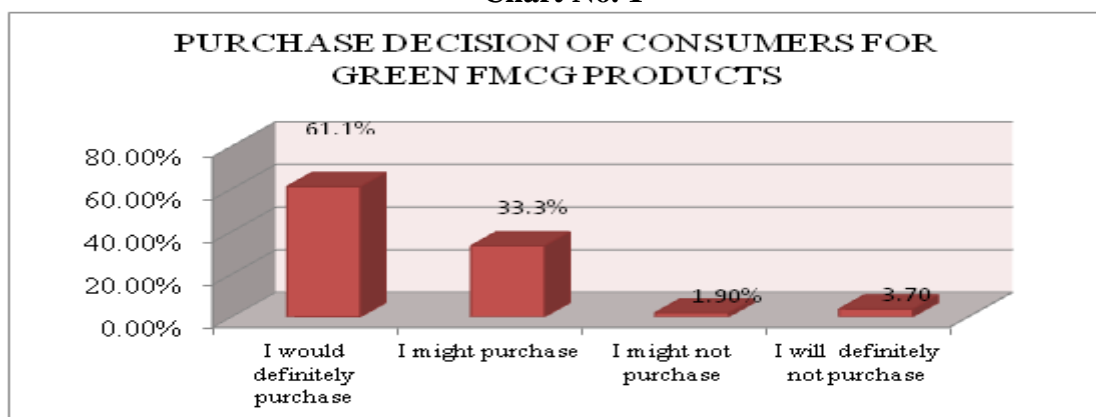
Here, only periodicals among all the sources are having significant impact upon purchase decision of consumers as the result obtained by applying One-way ANOVA is significant for periodicals i.e. 0.019.

**Findings of the Study**

Marketers should select appropriate source of information according to the product and past marketing strategies to get maximum sales out of consumers for green FMCG products. Major

marketing can be done through local & national newspapers, national television network and social media. Maximum numbers of responses are in easy access of these sources of media. Also, word of mouth strategy can contribute most as a source of spreading information. More the people will know about green product; more they will talk about it and its advantages. Transparency should be maintained by marketers while marketing green FMCG product. This will help in boosting trust among consumers regarding green brand and its product. Awareness and trust in green product as well as green brand can help consumers in making positive purchase decision for green FMCG product.

## Limitations and Scope of the Study

This study is limited upto Ahmedabad district of Gujarat state. Only consumers' opinion are been disclosed with the help of this study. Company's perception towards various sources of information should be studied to find out the major loophole between awareness and consumers regarding green FMCG product. Also, a study exploring various strategies opted by marketers in order to get maximum output by spreading awareness among consumers.

## Conclusion

Degradation in environment will lead degradation among human kind as well. To have a healthier life, clean environment is necessary. This study made an attempt to identify ways how consumers could be encouraged more with the help of various sources of information towards green marketing practices in India. The study concluded that true and transparent information with right source can make right consumers optimistic for adopting green FMCG products. Consumers need to trust brands for adopting green FMCG products and make a strong purchase decision because only awareness can never make a consumer take decision of purchasing a green product. It necessary to make them realize how green marketing practices can contribute in saving environment and make them having healthier life style. Also, how saving environment can impact human life style positively; a marketer along with Indian FMCG companies need to explain this correlation to consumers for expanding adoption of green marketing practices and consumers acceptability.

## References

1. Bhimrao M Ghodeswar, P. K. (2014). A Study of Green Marketing Practices in Indian Companies. International Journal of Applied Management Sciences and Engineering, 1(2), 51-69.

2. Tiwari,C.K. (2016). A Study on The Factors Which Influence Consumers Towards Green Fast Moving Consumer Goods (FMCG). IJIRMPS, 4(6), 1-11.

3. Anbukarasi, M. N. (2017). An Analytical Study on Consumers' Awareness Towards Green Fast Moving Consumer Goods In Coimbatore District. International Journal of Management Studies, IV(Spesial Issue 4), 44-55.

4. Vijayakumar, R. (2019). A Study on Consumers Buying Behaviour Towards Fmcg Products With Reference To Karur District. International Journal of Research and Analytical Reviews (IJRAR), 6(1), 265-270.

5. Hossain, M. Z. (2018). Sources of Consumers Awareness toward Green Products and Its Impact on Purchasing Decision in Bangladesh. Journal of Sustainable Development, 11(3), 9-22.

6. Katait, D. S. (2016). Consumer behaviour towards green products of FMCG. International Journal of Commerce and Management Research, 2(8), 43-46.

7. Mohd Amir, P. A. (2018). Sustainable Green Marketing Practices Enhance Competitive Advantage in Indian FMCG Sector. International Journal of

8. Management, Technology And Engineering, 8(XI), 2003-2015.

9. N. Divyapriyadharshini, S. V. (2019). Consumer Awareness towards Green Products and Its Impact. International Journal of Research and Innovation in Social Science (IJRISS), III(X), 170-174.

10. Sharma*, S. K. (2014). Green Marketing – A Blessing For Future Generation. International Journal of Advanced Research in Management and Social Sciences, 3(6), 244-256.

11. Shweta Singh, D. S. (2014). Consumer's Attitude and Purchase Intention towards Green Products in the FMCG Sector. Pacific Business Review International, 7(6), 27-46.

12. Swaroopa Moses *, C. A. (2018). A Study on Impact of Marketing Strategies on Consumer Behaviour towards FMCG sector with reference to Nestle India Ltd and Britannia Industries Ltd. SUMEDHA Journal of Management, 7(2), 190-198.

13. Yazdanifard, W. F. (2015). Green Marketing: A Study of Consumers' Buying Behavior in Relation to Green Products. Global Journal of Management and Business Research: E Marketing, XV(V) Version I), 16-23.

# AN ANALYTICAL STUDY ON THE IMPLICATION OF DIGITAL LITERACY ON E-COMMERCE FOR NAVIGATING THE FUTURE WITH RESPECT TO NAVI MUMBAI AREA

## S. P. Birje

Department of Accountancy, SIES (Nerul) College of Arts, Science and Commerce
drsnehalpatil.2206@gmail.com

_____

## ABSTRACT

*Science and technology is very rapidly growing in the current era of globalization. With the ease of disseminating information both print media and the internet, knowledge and technology development is increasingly fast. The development of science and technology is advanced and allows humans to live in an industrial climate by maximizing the functions of technology to replace the humans' roles. When science and technology increasingly allows humans to produce advanced technologies, digital technology progresses to allow humans to live in information society. Therefore, the advancement of information technology can affect a person's life in tracking information. Based on the previous elaborations, the writer concerns the current study entitled "The Impression of Digital literacy on E-Commerce for navigating the future". Based on the results, it was found that the digital literacy of students in E-Commerce study is influencing entrepreneurship, especially on entrepreneurial behaviours and E-Commerce. Therefore, the goal of entrepreneurship is proven by the impact of digital literacy towards E-Commerce. Therefore, the researcher suggested that learning is more effective and can be more meaningful for students, mainly focused on both practical and theoretical towards the inclination on Digital literacy. Based on the personal interview results, the proportion of practical learning activities is only around 30% and the theory is 70% of learning. These conditions should be reversed, precisely 30% of theory and 70% practice especially the practice of entrepreneurship with digital media, for example e-commerce, including the practice of marketing strategies in the various market area, market-space, social multimedia and others.*

_____

*Keywords: Digital Literacy, Globalization, E- Commerce*

## Introduction

**Globalization:** Globalization is becoming difficult nowadays, to ignore its developments such as automation, artificial intelligence, biotechnology, mobile, cloud technology and the Internet of things therefore, the impact of globalization on Digital literacy on E-Commerce for navigating the future. Thus, little attention has been paid to the implementation of e-commerce and the impact of this has been shifted on education and the educational infrastructure required to support e-commerce growth.

The speedy changes narrated above are foremost to skills disruption; a change in the nature of jobs available, and the work that people can undertake. This develops a need for driving a demand for new and adaptable skill sets. Besides this, the nature of studying is also changing, no longer are students necessary to learn mechanically instead they need to be able to find out, assess and use information. Education needs to change to hold up the present landscape. These swaps in education can be divided into three areas: Firstly, those who study professional courses and traditional science courses: the science graduates and professionals who are essential to evolve and maintain e-commerce. Secondly e-commerce pedagogy itself: entrepreneurs and businessmen and women who need to understand how e- commerce and the online environment works effectively and Thirdly, the users who will require adequate levels of digital literacy to be able to utilize the online programme and faith in e-commerce and services become progressively obtainable online.

**Digital Literacy:** Digital literacy is a mastery set that is more advanced than certification. Being adequately digitally literate to interact with an online world is beyond the ability to use computer programmes such as Word for Windows. It includes the skills to approach and conclude the value of information.

Digital literacy also includes the expertise to interconnect with others in an overall world using devices for concurrent and asynchronous communication. Digital users are also required to have developed their social emotional skills in this new era.

Lastly, digitally literate users need various skills like photo visual skills, the ability to navigate and read sources such as websites and to have learnt basic motor skills to connect and navigate an ever growing variety of interchange devices.

**E-Commerce Education:** The area which needs to focus for digital literacy to know the implications for e-commerce education. The short term courses and workshops which will be delivered by the commercial providers will help the professional courses to gain digital literacy. By providing formal education and extra-curricular activity will develop to meet student demand. These extra courses will furnish the students and attendees with adequate knowledge to be able to make informed technical and marketing decisions relating to E-Commerce.

## Objective

1) To study the impact of Digital literacy on E-Commerce
2) To identify the factors influencing digital literacy on E-Commerce for navigating the future.
3) To explore the implications of globalization on E-commerce

## Literature Review

The achievement with the website is decided by information quantity, design, transmission speed, user-friendliness of search arrangement and revised pace. It suggests that website characteristics are likely to influence consumer information search through the internet as shown by The KNP Report on the Internet User (1999), published by IM Research.

Patrick Barwise, Anita Elberse and Kathy Hammond (2002) reviewed that the research on how the Internet is impacting marketing decisions. It covers internet adoption and consumption; online buying behaviour; internet handling skills; internet quality and pricing; channels and intermediaries and online marketing strategy. As per the said paper the Internet does not change the basic principles of marketing. Nor has its impact on consumer buying behaviour and globalisation but yes its impact will increase greatly over the next one to two decades

According to Pearce-Moses (2005), Digitization is the procedure of affecting analog material into binary electronic (digital) form, especially for storage and use in a computer. In the study of D.K. Gangeshwer (2013), the hypothetical learning of search engines of online-commerce, review of literature, present and future aspects of e-commerce in Indian context. This paper also discussed the top motivator factors of shopping online. The Internet economy will then become more expressive in India.

Online shopping now-a-days is more popular with the rapidly increasing the usage of the World Wide Web. The research paper concluded that the most effectual and interesting factor among four factors is website design, convenience, time saving and security with the security concerns being important while shopping online. The process of converting, creating, and maintaining books, art works, historical documents, photos, journal, are important in electronic representation so they can be viewed via computers and other devices shown by Qinghe; Chen Wenyuan; Liu Kaiming (2014)

## Hypothesis

**The following hypotheses are tested in the research paper**

H01: There is a relationship between Digital literacy and E-Commerce

H02: There is a relationship between Income level and E-commerce

H03: There is no a relationship between Traditional selling and E-Commerce

## Research Methodology

**Random Sampling:** In this sample design, we have selected random students from various classes and streams to answer the questionnaire independently.

**Research Analysis Tools:** The data collected through the questionnaire is further converted in pie/graphs via statistical treatment i.e. MS-EXCEL. The research and statistical tools used in this study are ANOVA, T test, Chi Square. ANOVA & T test, Chi Square was carried out to find the variance in the responses and to test the hypothesis.

**Data Analysis:** The primary data analysis was done using various parameters for the

analytical study of Self-Reliant India: A Role of MSME and its impact on Employment Generation in making India. The following is the list of various parameters:

### Table No. 1: Parameters

| Sr. No. | Parameters |
|---------|------------|
| 1 | Income |
| 2 | Gender |
| 3 | Experience |
| 4 | Qualification |
| 5 | Digital Literacy |
| 6 | Usage of E-Commerce |
| 7 | Implementation of E-Commerce |
| 8 | Comparison of Traditional sale vs. E-Commerce |
| 9 | Challenges of E-Commerce |
| 10 | Measures to be taken |

### Data Collection
### Primary Data

Primary data was collected in the form of questionnaires from various stakeholders. 100 respondents filled the questionnaires from Navi-Mumbai area.

### Secondary Data

Secondary data collected from various sources like journals, research papers, websites, newspapers and magazines etc.

### Hypothesis Testing

i) **Percentage Analysis:** Percentage analysis is used to find out the percentage value of all the entire different questions used in finding comparison between two or more series of data. PA= (Number of Respondents ÷ Total Number of Respondents) ×100

ii) **Bar Charts:** A bar chart or bar graph is a chart with rectangular bars with lengths proportional to the values that they represent. The chart bars can be shown vertically or horizontally. Bar charts are used for marking clear data which has discrete values.

iii) **ANOVA Test:** An ANOVA table is often used to record the sums of squares and to organize the rest of the calculations.

iv) **T-Test:** A t-test is a difference between the means of two groups which may be related to the certain features of hypothesis testing in statistics.

### Findings
### Table No. 2: Anova: Single Factor Income

| Anova: Single Factor | | | | | | |
|---|---|---|---|---|---|---|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 11334.98 | 3 | 3778.328 | 10.28261 | 0.000153 | 3.008787 |
| Within Groups | 8818.762 | 24 | 367.4484 | | | |

Source: M-S Excel tool- Anova

### Fig. No. 1: Income
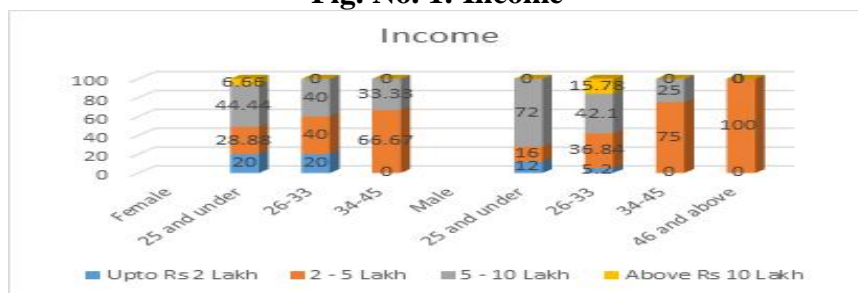


The cross table shows that the Income level of the value is **.000** is less than alpha; therefore the hypothesis test is **significant h**ence the hypothesis that there is a relationship between Income level and E-commerce is accepted.

### Table No. 3: ANOVA -Experience

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 16436.5 | 3 | 5478.834 | 10.05061 | 0.000116 | 2.946685 |
| Within Groups | 15263.49 | 28 | 545.1247 | | | |

Source: M-S Excel tool- Anova

**Fig No. 2: Experience**



The cross table shows that the Experience level of the value is **.000** is less than alpha; therefore the hypothesis test is **significant h**ence the hypothesis that there is a relationship between Experience level and E-commerce is accepted.

**Table No. 4: ANOVA- Usage of E-Commerce**

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 6496.53 | 5 | 1299.307 | 4.042053 | 0.005161 | 2.477169 |
| Within Groups | 11572.1 | 36 | 321.4473 | | | |

Source: M-S Excel tool- Anova

**Fig No. 3: Usage of E-Commerce**
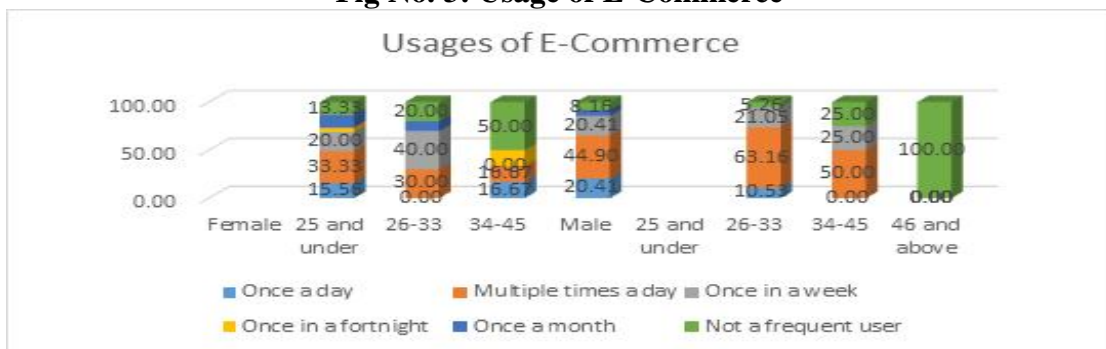


The cross table shows that the usage of E-Commerce level of the value is **.000** is less than alpha; therefore the hypothesis test is **significant h**ence the hypothesis that there is a relationship between literacy level and E-commerce is accepted.

**Table No. 5: ANOVA- Is E-Commerce is useful?**

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 24958.02 | 1 | 24958.02 | 164.3577 | 2.31E-08 | 4.747225 |
| Within Groups | 1822.222 | 12 | 151.8519 | | | |

Source: M-S Excel tool- Anova

**Fig No. 4: Is E-Commerce is useful?**
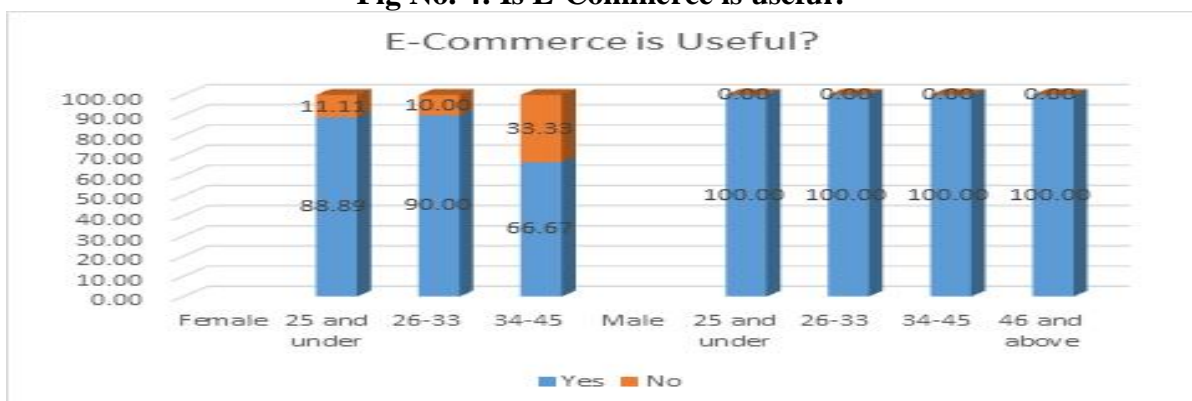
The cross table shows that the usage of E-Commerce level of the value is **2.31** is more than alpha; therefore the hypothesis test is **non-significant** hence the hypothesis that there is a relationship between usage level and E-commerce is rejected.

**Fig 5: E-Commerce vs Traditional sale**
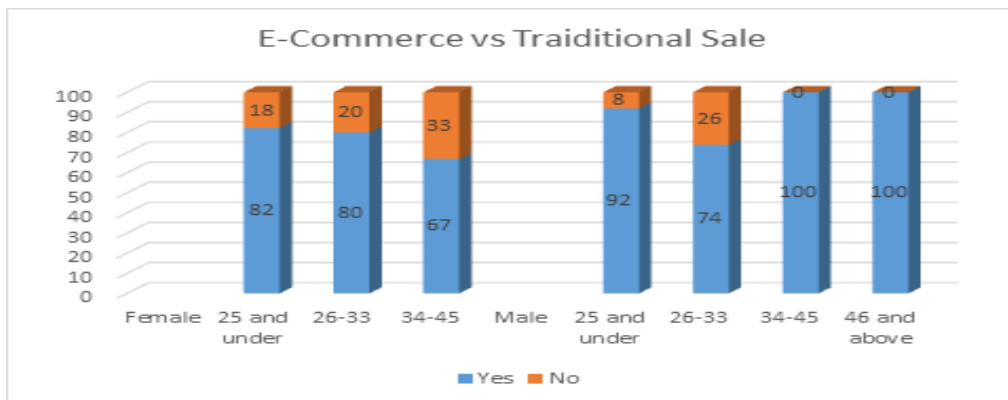


**Table No. 6: ANOVA- E-Commerce vs Traditional sale**

| Source of Variation | SS | df | MS | F | P-value | F crit |
|---|---|---|---|---|---|---|
| Between Groups | 17090.29 | 1 | 17090.29 | 102.9692 | 0.006 | 4.747225 |
| Within Groups | 1991.696 | 12 | 165.9747 | | | |

Source: M-S Excel tool- Anova

The cross table shows that the comparison of E-Commerce level of the value is **0.006** is less than alpha; therefore the hypothesis test is **significant** hence the hypothesis that there is a relationship between Traditional sale and E-commerce is accepted.

**Fig 6: Implementation of E-Commerce**
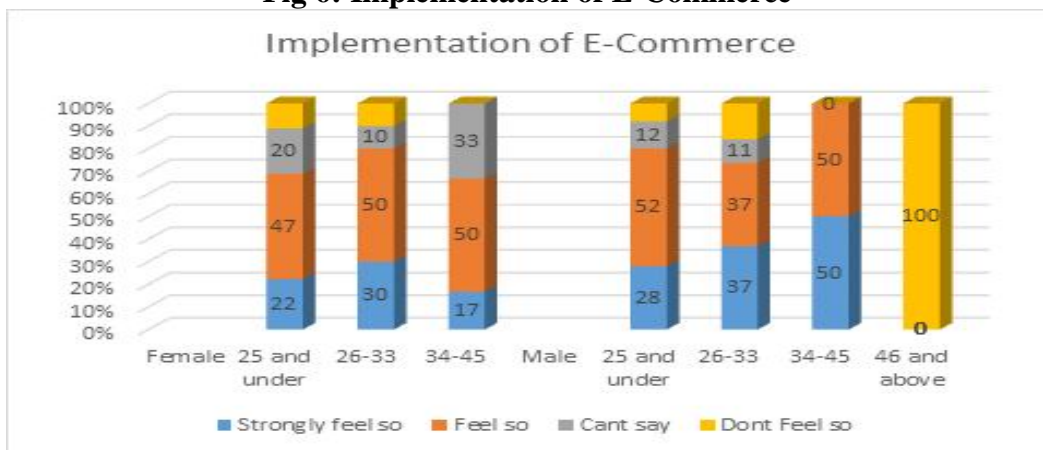


**Table No. 7: ANOVA- Implementation of E-Commerce**

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 3020.057 | 3 | 1006.686 | 2.024389 | 0.137289 | 3.008787 |
| Within Groups | 11934.69 | 24 | 497.2786 | | | |

Source: M-S Excel tool- Anova

The cross table shows that the Implementation of E-Commerce level of the value is **0.13** is more than alpha; therefore the hypothesis test is **non-significant** hence the hypothesis that there is a relationship between implementation of E-commerce is rejected.

**Fig 7: Challenges of E-Commerce- security**
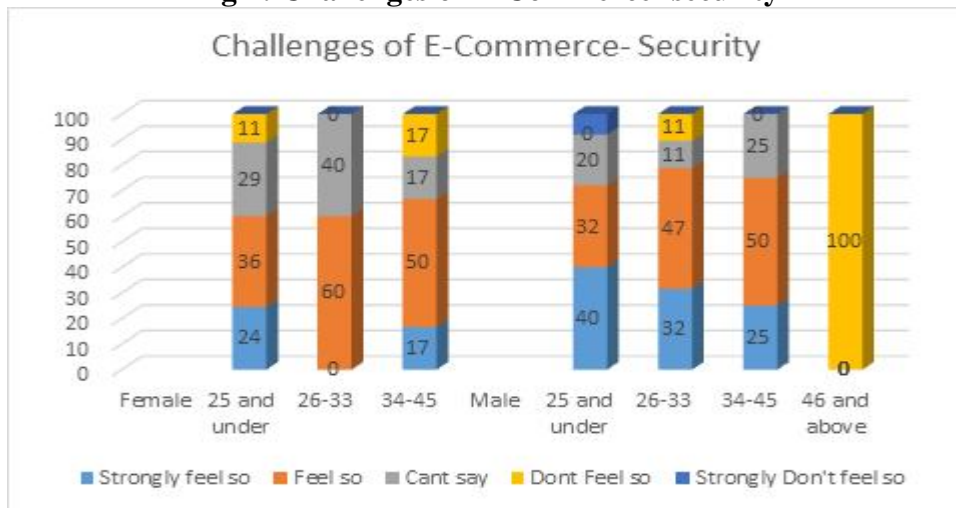


**Table No. 8: ANOVA- Challenges of E-Commerce- security**

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 1979.695 | 3 | 659.8982 | 1.266224 | 0.00308305 | 3.008787 |
| Within Groups | 12507.71 | 24 | 521.1546 | | | |

Source: M-S Excel tool- Anova

The cross table shows that the Challenges of E-Commerce level of the value is **0.003** is less than alpha; therefore the hypothesis test is **significant** hence the hypothesis that there is a relationship between usage level and E-commerce is accepted.

**Fig 8: Challenges of E-Commerce: Internet Speed**
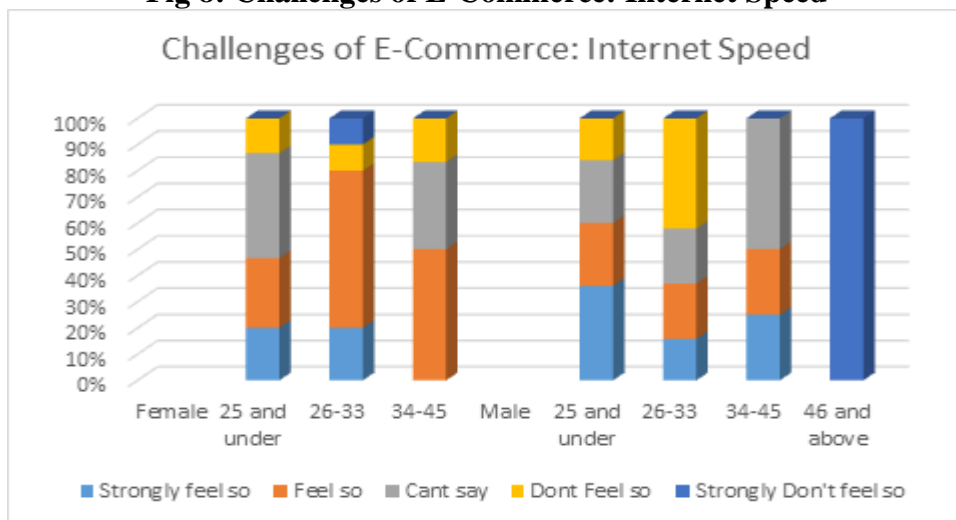


**Table No. 9: ANOVA- Challenges of E-Commerce: Internet Speed**

| ANOVA | | | | | | |
|---|---|---|---|---|---|---|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 1207.304 | 4 | 301.8259 | 0.598344 | 0.00666656 | 2.689628 |
| Within Groups | 15133.06 | 30 | 504.4354 | | | |

Source: M-S Excel tool- Anova

The cross table shows that the Challenges of E-Commerce level of the value is **0.006** is less than alpha; therefore the hypothesis test is **significant** hence the hypothesis that there is a relationship between usage level(Challenges) and E-commerce is accepted.

**Table No. 10: T-Test (Group Statistics)**

| Parameters | Gender | N | Mean | Std. Deviation | t-value | df | Sig. (2-tailed) | Remark |
|---|---|---|---|---|---|---|---|---|
| Income | Male | 48 | 15.25 | 105 | 0.25 | 6 | 0.0059 | Significant |
| | Female | 61 | 12.25 | 126 | | | | |
| Experience | Male | 48 | 20.16 | 137 | 0.28 | 4 | 0.0049 | Highly significant |
| | Female | 61 | 66.33 | 186 | | | | |
| Internet usages | Male | 48 | 15.25 | 774 | 0.37 | 2 | 0.00075 | Highly significant |
| | Female | 61 | 25.5 | 1104 | | | | |
| Amount Spent on e-Commerce | Male | 48 | 20.66 | 905 | 0.15 | 3 | 0.88 | Non-significant |
| | Female | 61 | 16.33 | 233 | | | | |
| E-Commerce vs Traditional sale | Male | 48 | 30.5 | 684 | 0.19 | 2 | 0.0086 | Significant |
| | Female | 61 | 24.5 | 612 | | | | |

## Suggestions

There is a need to examine the implications of a shift to e-commerce to digital literacy education. Learners have to have to be able to adopt and comprehend mobile devices and the online surroundings. This could be fulfilled through formal education and informal learning through modelling inventors and early adopters. The caution is required when we think of younger generations, considered by their age or social demographic to be naturally immersed in the online world. The current research paper shows that these assumptions may be false, and whereas technologically familiar with devices and old generation struggles to ascertain and determine the validity of data.

It is also worth emphasis to those who will be left behind and the need to maintain a minimum level of service for those unable due to poor education , area bandwidth and depends on limited income/funds who will not able to cope up with digital revolution. Therefore, in this context the following commendation can be made for future development. The growth of a Computing Education Plan to enter in the technical needs, an E-commerce Education plan to run into the needs of innovators and entrepreneurs who will be in the front-line of this change, and a digital literacy scheme that raises users skills.

The learning computer education will be providing the technological brace and expertise that will support domestic economic growth via IT advancement, software, infrastructure and devices. They require a rapid and responsive curriculum which focuses on underpinning knowledge as well current and potential future programming skills. There is

success of key that will be development of digital skills which will allow for new development and acceptation that will support future empowerment of digital literacy.

## Limitations

1) The main constraint related to the research is a 'TIME' limitation.
2) Stronger evidence of limiting factors is population.
3) Gender and income based factors can be positively deduced with additional characteristic analysis.

## Conclusion

Digital literacy will involve the evolution of invention; educational methods are bound to change. The impact of the digital literacy on the way we study in internal and external environment of school will also highlight the new light on the concept of digital literacy. Digital literacy has become one of the most prevalent subjects in educational research. Alliance among these two groups and other stakeholders like teachers, parents, students will expectantly result in action plans founded in scientific inquiry. In order to map out the present and future digital literacy needs of our society, digital literacy development requires data on skills development and analyses of user trends. Creating and expressing the information are skills of growing benefits as digital tools develop and make high-quality innovative and valuable experiences. Collective applications improve the importance of social skills in the learning procedure at all levels: young learners, adult learners, and teachers. In the new era of digital literacy the communication and the innovation in the digital multi-media will take new front foot.

## References

1. Wagner, D.A. (2010): What happened to literacy? Historical and conceptual perspectives on literacy in UNESCO. International Journal of Educational Development. Vol. 31, Issue 3, May, 319–323

2. ETS, Educational Testing Service (2008): National ICT Literacy Policy Council ICT Literacy Skills.

3. UNESCO (2009), Information Society Policies. Annual world report.

4. Nagar, H., Chetna D., and Gupta, J. P. "Navie Bayes and K-Means Hybrid Analysis for Extracting Extremist weets", ACM Conference, pp 27-32.

5. William, S. (2012) "Network Security and Communication", IEEE Transaction, Vol.31, Issue.4, pp.123-141.

6. Shahjahan, A.T.M, Chisty, K.( 2014). "Social Media research and its effecton our society" International journal of Information 7communication Engineering , Vol:8, No:6

7. Tariq, W., Mehboob, M., Khan, M.A., Ullah ,F.( 2012) "The Impact of social Media and Social Networking on education and Students of Pakistan" international Journal of Computer sciences issues, Vol:9,No:3,July

8. 21st Century Skills Partnership (2010a): ICT Literacy Resources

9. http://www.ijirst.org/articles/IJIRSTV3I5041.pdf

10. https://iopscience.iop.org/article/10.1088/1755-1315/243/1/012084/pdf

11. https://link.springer.com/article/10.1007/s12525-019-00372-9

# A STUDY OF COVID-19 IMPACT ON THE SALES ACCELERATION OF UNIFIED COMMUNICATION AS A SERVICE IN INDIA

## R.K. Sharma[1] and S. Jain[2]

[1,2]Faculty of Management and Commerce, Mangalayatan University, Aligarh
20181093_raj@mangalayatanuniversity@edu.in[1], Sidharth.jain@mangalayatanuniversity.edu.in[2]

_____

## ABSTRACT

*Sales acceleration is not always through the technology upgradation but can be impacted by the environmental conditions as well. We have seen the forced adoption of Unifiewd Communications as a Service in India due to the sudden lock down conditions due to Covid-19 in India. The success of a product or service is also accelerated by the enhancement of features that the product or service is offering. The possibility of sales acceleration through proper implementation of various strategies pertaining to marketing, technological improvement, creation of proper channels for sales acceleration and so on bears importance within the highly competitive market. In the case of Indian business sector, it is evident that technological prosperity achieved by contemporary trading enterprises to conduct business conferences in a significant manner. Utilisation of **UCaaS** is significant in this regard to facilitate modern business units to conduct virtual meetings in a smooth way even amid the Covid-19 pandemic. In this study a comprehensive discussion regarding the impact of technological growth in the features of UCaaS has been conducted through factual data and information gathered from authentic resources. A secondary method of data collection has been adopted in this study to acquire relevant information from scholarly articles, peer reviewed journals and relevant websites available in the online platform. It is found that there is a significant growth in technical features of UCaaS such as integration of audio-visual and text data. Along with that several technological advancements, instant messaging, workflow integration and video conferencing have resulted in increasing the utilisation of UCaaS in India. An inadequate security issues are also identified in UCaaS during the web-based conferences among business units. Hence, suitable technological adaptation and technical growth such as improving artificial intelligence is recommended in this study. Hence, through these measures adopted by UCaaS, it has been successful in achieving sales acceleration by creating a clear channel of communication between the organisation and its clients in a virtual space.*

_____

*Keywords: UCaaS, IT, web-based conference, Covid-19, UCaaS features, Video Conference*

## Introduction

UCaaS or Unified Communication as a Service is a digital platform that provides some applications and services for collaboration and communication. During Covid19 pandemic the percentage of work from home has increased to a high level as all the companies and business organizations were closed for a long time in India. According to a survey, nearly **77%** employees work from home during the Covid19 pandemic in India (Trak, 2020). Thus, the usage of the UCaaS has increased to a high level in India during Covid19 pandemic. In this situation, most of the companies and business organizations use the UCaaS digital services for communication. The market growth rate of UCaaS is nearly **29%** and this growth rate is higher than ever (Uctoday, 2020). There are so many applications such as **Zoom video communication, Cisco, Dialpad, Voxbone, RingCentral and Twilio** that help in conferencing and collaboration. Now, the privacy of the information that is provided

during any video conference is the issue for any company and business organization. Thus, there are so many advantages and features of using UCaaS for communication and collaboration.

## Literature Review

### Relation between UCaaS and Business Communication

UCaaS is a communication service that provides applications for communication digitally. Usually, the business communication process is used for providing proper information and data from the manager to the employees and the UCaaS service is used for this purpose. Communication also helps to provide ideas among the employees that will help them to work properly. Business communications improves the productivity of any company and incorporates innovation in developing products (Guffey, 2021). Therefore, the usage of UCaaS has also increased in India and according to a survey, the business of

UCaaS will reach nearly **140 billion** by the year 2025 (Nextiva 2020).

### Features of UCaaS in Business Operation

UCaaS is a useful and important service for online communication and there are many features or advantages of UCaaS. The features of UCaaS are **video conferencing, team collaboration, call recording, instant message, centralized management, presence technology, email and VoIP technology** (Smith, 2019)**.**



Figure 1: Features of UCaaS

(Source: Smith, 2019)

### Impact of UCaaS to Enhance Sales In Post Covid19

The pandemic has made the situation more difficult for the companies, business organizations to communicate with others. There are mainly three important factors such as VoIP, video conferencing and chatting or instant messaging. The UCaaS helps in communication and collaboration through these three platforms. Usually, most of the companies and business organizations use face to face interaction for communication processes. Hence, during Covid19 pandemic while all the companies and business organizations were closed then it was difficult for the managers to communicate with the employees. In that situation, video calling, messaging, and conference meetings through digital application has increased to continue the work from home (Alias, 2018). The UCaaS and digital applications have significantly impacted the sales of products. During the long-term lockdown, the usage of digital platforms and applications for fulfilling all the needs increased in India.

### Literature Gap

In the previous research studies, of UCaaS, the features of UCaaS that impact adoption in India were not properly described. Thus, in this research article, all the information about the research topic has been provided and described rom Indian Context. The increasing usage of UCaaS during Covid19 pandemic and the advantages of UCaaS in post Covid19 have also been described in this research article. The impact of UCaaS on the business communication process is properly described in this research article. Along with that, the relation between the business communication and UCaaS and the disadvantages of the usage of UCaaS is also described in this research study. In addition to that, how will the UCaaS and the features of UCaaS support to enhance the sales of the companies and organizations in the post Covid19 situation is also described in this research article.

### Aim and Objective

The aim of this research article is to understand the features of UCaaS that will increase its sales during and post Covid19 in India.

Objectives:

- To understand the relation between UCaaS and business communication in a working environment

- To analyse the features of UCaaS and its supports in enhancing business operation

- To highlight supportive feature of UCaaS to enhance sales in post COVID

### Methodology

### Research Methodology

This research has followed a **positivism research philosophy** to gather factual data from authentic sources regarding features of **UCAAS** that results in enhancing its performance level. As mentioned by Chirkov and Anderson (2018), inclusion of a positivism philosophy is beneficial for a researcher to acquire relevant information from suitable

articles taken under observation. As this study is focused to determine the impact of technological advancements in features of UCAAS adoption of this philosophy is beneficial in collecting evidence in this regard. Apart from that the researcher has included a **descriptive design** to conduct a systematic discussion regarding different features of UCAAS. It has resulted in assessing its contribution to enhance its sales volume in Indian society before, during and in the post pandemic situation.

An **inductive approach** is adopted to analyse qualitative data in a systematic manner based on certain research objectives configured by the researcher. In the words of Williams and Moser (2019), this approach is well suited for a qualitative data analysis in respect of conducting an analysis based on observed theories. These observed data are significant to incorporate relevant facts regarding enhancements in UCAAS. A **secondary research method** is adopted to collect evidence reading the technological advancement in UCAAS from credible sources available on the online platform .
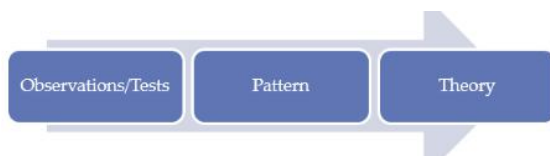


Figure 2: Inductive research approach
(Source: Nadia et al 2018)

## Data Collection Method

There are so many methods for data collection for collecting more information about the research topic. In this research article the *secondary data collection method* has been used for collecting proper data about UCaaS. Through the collection of data from various secondary resources of study is able to identify the underlying issues and implications of a certain topic (Johnston, 2017). Secondary data collection method helps to collect the proper data about any research topic and along with that there are so many advantages of the secondary data collection method. The first advantage is that this data collection method is low cost and sometimes researchers can collect data through secondary data collection for free. Therefore, the second advantage of this data

collection method is that this method is time saving.
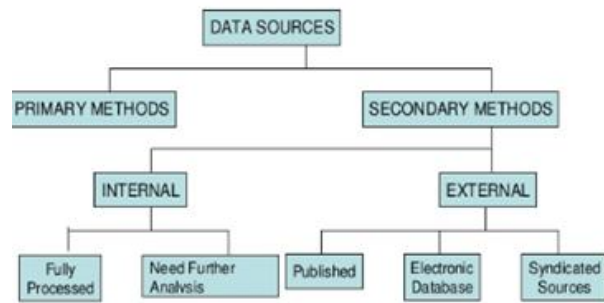


Figure 3: source of data collection
(Source: Han and Yang, 2017)

While collecting data for this research topic, the researcher used so many sources to collect the proper data about the topic. There are several sources in secondary data collection methods such as **open access sources, and published sources** (Johhson, 2018). The researcher used these sources in the secondary data collection method in this research article. Social media, several web sites, and the internet and books, newspapers, journals are in secondary data collection method published sources.

### Data Analysis

A thematic analysis is performed in this study to evaluate product advancements in UCAAS that results in imparting a significant consequence in its sales volume as follows:

### Technical Characteristics of UCAAS

UCAAS is an effective video conferencing tool between team members associated with a business activity. As mentioned by Dziembek and Turek (2018), in contemporary era business units prefer to utilize web-based conferencing platforms rather than the conventional one for several benefits. Such as, this internet-based platform facilitates business units to arrange a group meeting overseas. Several technological features are associated with this communication service provider app such as **video conferencing, calling, instant messaging** and **chat.** By means of this integrated communication tool a collaborative meeting can be held between several business members. Along with that, an inactive session can also be performed with customers through this integrated video conferencing platform. In accordance with Plechero et al. (2020), **Indian**

**IT professionals** are also associated with developing advanced features of UCAAS. These factors include enhancing the quality of **unified interface, workflow integration** and facilitate **AI powered assistants.**

Several platforms that are associated with UCAAS are identified as **Zoom, Microsoft Teams, Google Hangouts, Cisco Webex** and others. These apps contribute to enhanced activities such as **VoIP, screen sharing, identifying location of a device** and **recording calls** through a centralized management system.

Hence, it can be stated that these technological developments have resulted in increasing the amount of sale of these web-based conferencing services in the contemporary society amid the recent pandemic.

### Significance of UCAAS India

It is evident that during the Covid-19 pandemic business units have been compelled to close operational activities in practical fields. However, they have been capable of conducting business activities in the virtual world by means of digital technologies. In the views of Attaran et al. (2017), cloud-based technologies are also effective for small and medium business units in respect of storing business data. As there are a large group of companies associated with the SME sector in India, implementation of cloud-based technologies is significant to maintain an appropriate backup of company information.
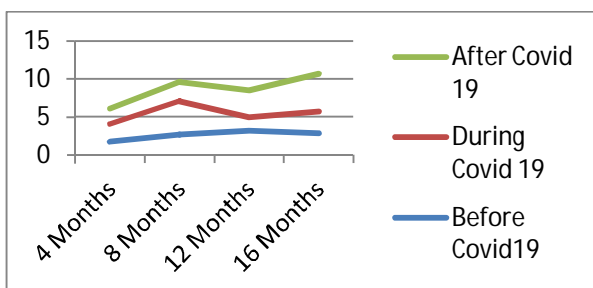


Figure 5: UCaaS Business growth at various stages
(Source: Global News wire, 2021)

It can be clearly observed from the above figure that before the scenario of the pandemic,

the unified communications services were growing at a steady pace. For a time period of almost 16 months, it can be noticed that the before Covid scenario graph indicator was unable to go past point 4. This is mainly because of the absence of awareness on the related topic or about the unified communication services.

The inclusion of Covid 19 in this scenario has displayed that there are massive chances of growth for the businesses present in this. In the earlier stages of the pandemic, it can be clearly observed that the system was not prepared for this massive change. As a result, technologies or services associated with UCaaS grew rapidly. However, as the system recovered slightly, same happened with the rapid growth. The graph indicates that the market system normalized itself as it went below 6. On the other hand, it is still climbing and that indicates a potential growth. It can be clearly mentioned that once the pandemic scenario is over, the demand will skyrocket once again. As the Covid threat and the pandemic resulted by it is still ongoing, the after Covid scenario can only be predicted as of now. However, the massive growth in the graph clearly indicates that demand will surely increase once things start getting back to normal. The sectors where the needs of unified communications are not observed before will be enhanced. Because of that, the demand will surely increase.

### Key Findings

Based on the above analysis it is clearly understood that modern business units prefer cloud-based platforms than the conventional one to conduct business meetings in the virtual world. This has been enhanced during the recent outbreak of coronavirus pandemic as business units have become unable to conduct face to face meetings amid the pandemic. As a result, global IT companies along with the Indian technological units have implemented advanced technologies to improve the service related to web conferencing.
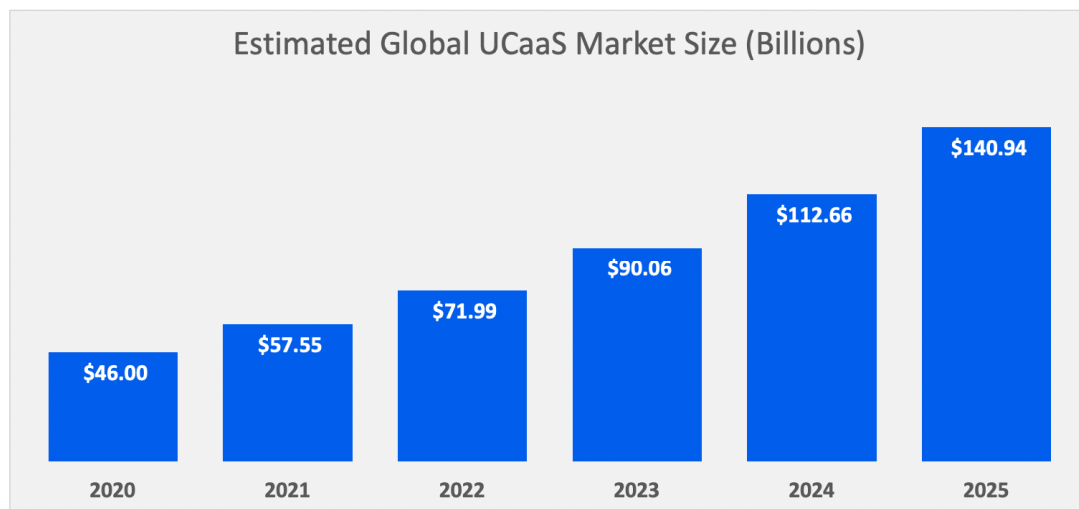
Figure 6: UCaaS Predicted Market Growth
(Source: Nextiva, 2020)

Moreover, this technology-based platform also contributes to deliver an **agile, flexible** and **scalable** service to business units that ensure customer satisfaction in a significant manner. In the case of business enterprises, a flexible interacting environment is essential for fostering business performances in an optimum manner.

## Conclusion

The above analysis has shown that web-based meeting is significant in contemporary times for supporting fast business activities by enterprises. Especially amid the recent pandemic situation, business units are compelled to maintain an appropriate social distancing to avoid further spread of the contagious disease among its employees. Despite that these units have been able to conduct meetings, performing information sharing and interacting with their customers through virtual apps. However, certain issues regarding data leakage during the web-based conferencing have also been highlighted in this study. Business units are also found to implement suitable strategies to overcome such issues. It is also found that modern business units prefer cloud-based techniques of data sharing that the conventional methods due to its wide variety of advantages as mentioned in the above study.

Hence, it can be concluded that both technological growth demands for video conferencing have led to the increasing utilisation of UCaaS in the contemporary business world, health sector and education segments in India.

## Reference List

1. Abenojar, E.C., Nittayacharn, P., de Leon, A.C., Perera, R., Wang, Y., Bederman, I. and Exner, A.A. (2019). Effect of Bubble Concentration on the in Vitro and in Vivo Performance of Highly Stable Lipid Shell-Stabilized Micro-and Nanoscale Ultrasound Contrast Agents. Langmuir, 35(31), pp.10192-10202.

2. Attaran, M., Attaran, S. and Celik, B.G. (2017). Promises and challenges of cloud computing in higher education: a practical guide for implementation. Journal of Higher Education Theory and Practice, 17(6), pp.20-38.

3. Baktyan, A.A. and Zahary, A.T., (2018). A review on cloud and fog computing integration for IoT: Platforms perspective. EAI Endorsed Transactions on Internet of Things, 4(14), p.156084.

4. Bishop, L. and Kuula-Luumi, A., (2017). Revisiting qualitative data reuse: A decade on. Sage Open, 7(1), p.2158244016685136.

5. Chakraborty, T., Misra, I.S. and Prasad, R., (2019). Overview of VoIP Technology. In VoIP Technology: Applications and Challenges (pp. 1-24). Springer, Cham.

6. Chirkov, V. and Anderson, J., (2018). Statistical positivism versus critical

scientific realism. A comparison of two paradigms for motivation research: Part 1. A philosophical and empirical analysis of statistical positivism. Theory & Psychology, 28(6), pp.712-736.

7. Dziembek, D. and Turek, T., (2018). Characteristics and application of Unified Communications as a Service (UCaaS) in enterprises. Informatyka Ekonomiczna, (4 (50)), pp.47-65.

8. Guffey, M.E. and Loewy, D., (2021). Business communication: Process & product. Cengage Learning.

9. Hacker, J., vom Brocke, J., Handali, J., Otto, M. and Schneider, J., (2020). Virtually in this together–how web-conferencing systems enabled a new virtual togetherness during the COVID-19 crisis. European Journal of Information Systems, 29(5), pp.563-584.

10. Hart, T., Bird, D. and Farmer, R., (2019). Using blackboard collaborate, a digital web conference tool, to support nursing students placement learning: A pilot study exploring its impact. Nurse education in practice, 38, pp.72-78.

11. Ignatowicz, A., Atherton, H., Bernstein, C.J., Bryce, C., Court, R., Sturt, J. and Griffiths, F., (2019). Internet videoconferencing for patient–clinician consultations in long-term conditions: A review of reviews and applications in line with guidelines and recommendations. Digital health, 5, p.2055207619845831.

12. Jansen, S., (2020). A focus area maturity model for software ecosystem governance. Information and Software Technology, 118, p.106219.

13. Johhson, E. and Sylvia, M.L., (2018). Secondary Data Collection. Critical Analytics and Data Management for the DNP, p.61.

14. Karatzas, S. and Chassiakos, A., (2020). System-Theoretic Process Analysis (STPA) for Hazard Analysis in Complex Systems: The Case of "Demand-Side Management in a Smart Grid". Systems, 8(3), p.33.

15. Methqal AlFawwaz, B., (2017). Impact of Security Issues in Cloud Computing Towards Businesses. World of Computer Science & Information Technology Journal, 7(1).

16. Mlitz, K., (2021). Global unified communications and collaboration market share from 2nd quarter 2020 to 4th quarter 2020, by vendor. [Online]. Available at: https://www.statista.com/statistics/1179543/unified-communications-and-collaboration-market-share/ [Accessed on: 15th April, 2021]

17. O'Connell, D., Elliot, B. and Benitez, R.A., (2018). Magic Quadrant for Unified Communications as a Service, Worldwide. Abgerufen von https://www.gartner.com/document/3891484.

18. Parmar, N. and Ranga, V., (2019). Performance analysis of WebRTC and SIP for video conferencing. Int. J. Innov. Technol. Explor. Eng.(IJITEE), 8(9S), pp.679-686.

19. Plechero, M., Kulkarni, M., Chaminade, C. and Parthasarathy, B., (2020). Explaining the past, predicting the future: the influence of regional trajectories on innovation networks of new industries in emerging economies. Industry and Innovation, pp.1-23.

20. Rahi, S., (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. International Journal of Economics & Management Sciences, 6(2), pp.1-5.

21. Smith, A., (2019). 7 Ways Unified Communications Increase Operational Efficiency.

# BAMA'S KARUKKU—A JOURNEY AND SEARCH WITH A HOPE FOR INTEGRITY AND HUMILITY

**U. Satyan**

School of Liberal Studies, Pandit Deendayal Energy University, Raisan, Gandhinagar, Gujarat

_____

## ABSTRACT

*Literature humanizes us as there is an intimate connection between literature and life. It is, in fact, life which is the subject-matter of literature. Literature is the communication of the experience of life. Thus, literature is the product as well as the mirror of/to the society. This age is preoccupied with the adjustments and readjustments of its most vital economic, political and social issues and needs and so is the literature of today. May it be Postcolonial, Commonwealth or Diaspora literature, it has always made honest attempt to bridging over the gaps between the common code of ethical value and the set norms of socio-cultural as well as political functions. Dalit Literature, is not an exception. This literature holds the mirror upto the society and compels the latter to reinvestigate its cultural values and the cause of discrimination, if there is any. The Dalit writer Bama's testimonial book Karukku should be read in the same light. This book narrates how helpless she had been confronting the cast discriminations and what drove her to be the Voice of the Voiceless. This paper would be an attempt to study her journey and search with a hope for integrity and humility.*

_____

*Keywords: Literature, Society, Karukku, Cast Discriminations*

## Introduction

Originally written in Tamil in 1992, Bama's *Karukku* is her autobiography as a Dalit woman who fights against all odds and sets a bench mark not only in her own region but also on national and international platforms. Once rejected by Tamil Publishing Industry finding its language unacceptable, the book receives the Crossword Award for its translation into English and the Iyam Award from the Tamil Literary Garden, Canada (2008), for the original text in Tamil. The reason behind this success is that Bama's narration does not require the language sophistication as it comes from the heart and reaches the hearts of its readers. Bama's poignant usage of the metaphoric expression of the saw-edged Palmyra leaf—Karukku—for her own life speaks volumes about the pain and suffering that she has been through all throughout her life. Bama writes in the preface:

The driving forces that shaped this book are many: events that occurred during many stages of my life, cutting me like karukku and making me bleed; unjust social structures that plunged me into ignorance and left me trapped and suffocating, my own desperate urge to break, throw away, and destroy these bonds; and when the chains were shattered into fragments, the blood that was spilt—all this taken together. (Bama ii)

The central theme of this autobiography is the story of Bama's life as a low-caste Christian. Weaving the backcloth for her biography with the threads of social issues like status of Dalits, poverty, child labour, class and caste differences, untouchability, need for education etc, Bama focuses mainly on bringing forth the true face of the Church and its activities. She enters into the convent with a view to work for her community but the politics that she finds inside the church, shatters her.

Karukku focuses on the major issues like cast discriminations and untouchability. Bama experiences these disgraceful social blemishes personally, when she is a young child, studying in third standard. Her first response to this demoralizing act is to laugh away as she is innocent and ignorant about the crudity behind the act. It fills her with amazement to see how an elder of Paraya community holds a packet of vadais (an eatable) with a string and how he drops it into the cupped palms of a Naicker, an upper caste. The elder takes care of not touching the Naicker. When she narrates this incident to her brother, he explains the severity of the differences between the castes. This knowledge makes her feel "terribly sad" (15). She writes "I felt so provoked and angry that I wanted to go and touch those wretched vadais myself, straight away. Why we should have to fetch and carry for these people, I wondered". (15) But she has to toss down all her rage

within herself as she is a small helpless Dalit child. She narrates one more bitter experience of her life when she is humiliated only for her low-caste. It is when Bama and a few of her friends are playing and climbing on the steeped coconut tree in the school campus. It so happens that an unripe coconut falls from the tree when it is Bama's turn to climb up. All the children get frightened and start scattering. The next day, Bama is called out in an assembly and insulted by the school headmaster for stealing the coconut. When she tries to speak the truth, she is silenced by the headmaster and is left to bear the brunt, quietly.

This incident reminds one of the stories titled as *The Silver Bangles* by Mulk Raj Ananda. The caste system is the target of attack in the story. The story unveils the pathetic state of Sajani, who is ill treated by a high caste woman, Srimathi Gopi Goel. Sajani, an untouchable sweeper girl who wears silver bangles presented to her on the occasion of her betrothal, is accused by Srimati Goel for stealing the same. She abuses her by saying, "Bag of dirt you are!" She offends her by saying "Low people wearing silver bangles…. Don't you know that untouchables in the south are not supposed to wear silver at all….You go posing like a cheap film star….go die."(235) These words make transparent the subservient and menial state of the low caste in those days. The ending of the story makes clear that the high caste lady of the house is actually jealous of the attraction of her husband towards the young sweeper girl and so seeks refuge in her caste superiority by humiliating the low-caste girl.

But as far as Bama is concerned, in spite of the physical and psychic struggle involved in being humiliated as a low-caste woman, she stays focused and completes her studies. She listens to her brother very carefully who tells her that only education can bring change to their lives. Her brother says: "…If we study and make progress we can throw away indignities. …If you are always ahead in your lessons, people will come to you of their own accord and attach themselves to you. Work hard and learn" (18). This motivation creates a lasting impression on her mind and despite all odds, she completes her B.Ed. But the stigma of

belonging to a low caste remains with her, even after becoming a teacher in the convent. She finds that the Sisters do not treat her equally. She observes that the nuns belonging to the Paraiya caste are not given any respect in the convent. Dalit children are also treated badly. She works in such smothering atmosphere for a few years but then she decides to resign from this job and to be a nun for the betterment of her community. Her father is not ready to allow her to do so but she does not listen to anyone and enters into the religious order. But this makes the picture more clear that the caste discriminations are very much there in the society and convent is also not an exception. She observes that the convent people are playing with the emotions of the poor. Her first impression for convent is noteworthy. She says, "once inside the convent, it was like coming from the backwoods into a big metropolis. My first thought was that I had arrived at a place which had no connection at all with me"(i.g to her caste). (23) But to her hard luck, it is not the reality. People inside convent are found more heartless towards the Dalit community.

Despite such crucial circumstances, Bama continues to stay in the convent because of her strong determination to serve the oppressed children. Those who are taking training with Bama to become nuns are anxious to find out which caste Bama belongs to. She never hides her caste identity to anyone. It is to her great shock when, during a lecture session, one of the nuns tells her that the religious order itself has some special reservation policies for the Harijan women who want to become nuns. A Sister says: "…they would not accept Harijian women as prospective nuns and that there was even a separate order for them somewhere". (25) Helpless against them, Bama again keeps mum and pockets the insult meekly. After a couple of years, she is admitted in the religious order only after she gets confirmation from the convent. She feels as if now she would be able to serve her people immensely. But the in-house scenario of the convent depresses her. She is tortured and tormented day and night for one or the other reason. She writes about the Sisters that

"They spoke as if they didn't even consider low-caste people as human beings. They did

not know that I was a low-caste nun. I was filled with anger towards them, yet I did not have the courage to retort sharply that I too was a low caste woman. I swallowed the very words that came into my mouth; never said anything out aloud but battled within myself."(25)

She does not retort as she has faith in Christianity. But she is proved wrong. Her stay at Convent for seven years and her helplessness of not feeling free to serve the poor disappoints her. Moreover she is dejected to see that all the menial jobs were done only by the Dalits. She observes that the Sisters live luxurious lives and Dalits are abused and treated in shameful and degrading ways. Her heart cries for the downtrodden

"… tiny, crab-like children…[who]work at sticking on matchbox labels; they make firecrackers and use chemicals; and they return home exhausted, at seven in the evening. At an age when they should be going to school, studying like everyone else and playing about in the evenings, they are shut up inside the factories instead. There are two or three schools available for the children nowadays. But this little ones' fate is the smell of matchbox solution, not the smell of knowledge or learning. How can they afford to study, when it is such a struggle even to fill their bellies?" (55)

This question by Bama is addressed to the moral principles of the Convent. The principles of Christianity are all about the moral philosophy that aims at guiding people to leading a virtuous social life. Aristotle, the most influential philosopher of the western tradition, opines: Moral virtues result from habit. Morality is not based on an individual's birth, but he possesses the potentiality of being moral. Since practice makes a person perfect, continuous practice of moral values rewards moral virtue. Does it mean that a practice of any immoral act, if followed for longer period, would become the set norm of the society? Egoism, as an ethical standard, misunderstands the essence of social morality. Ethics is not an isolated individual enterprise. The issues of ethics are the issues of life in human society. The basic aim of social morality is to prescribe certain moral rules and norms for the people

for harmonious social living. The Convent Sisters in *Karukku* also need to remember the moral ethics of Christianity that is purely visible in the life of Mother Teresa who has rendered her life time services towards the poor and underprivileged.

For three years Bama lives in the convent swallowing down all the insults incurred to her community. She observes, "There is a great deal of difference between this [inside Convent] Jesus and the Jesus who is made known through daily pieties". (104). She also writes about the convent people:

"In the name of God they actually rob from the poor who struggle for their very livelihood. They teach them to shut their eyes when they pray, with the deliberate intention that they should not open their eyes and see. They teach them to shackle their arms together and to prostrate themselves in prayer at full length on the ground so that they should never stand tall. What kind of piety can this be? They make themselves into gods so that they can exploit others. So where has God gone, I wonder? The so-called gods walking about here are the priests and the nuns and their relations, no other" (108)

These differences lead her to leave the self-selected religious orders and to return to the world of her own. She says, "How long can one play-act in this way? Anyway, it wasn't possible for me. I could only leave the order and return into the world". (107) After seven years of her life as a nun, Bama returns to the world with a view to liberate her community people from any kind of repression or stigma. Working for her community fills her with the feelings of freedom where she can breathe "independently and at ease, like a fish that has at last returned to the water, after having flung outside and suffered distress." (121)

Bama's journey and Search for truth is full of ebbs and tides. She had to flow with the time. But her firm determination and rock-high decisions won her attainment and the feeling of fulfillment. I remember a quote by Franz Kafka "A book must be the axe for the frozen sea within us." Bama's Karukku would definitely help axe the sea of love if it is frozen deep inside the hearts of humanity.

## Work cited

1. Anand, Mulk Raj. (2001) Tales Told by an Idiot (Selected Short Stories). Abe Books.
2. Bama. (2012) Karukku New Delhi: Oxford University Press
3. Festino, Cielo Griselda. (2015 ) "Dalit Women Life-Narratives and Literature as Experience." Acta Scientiarum. Language and Culture, vol. 37, no. 1, p. 25., doi:10.4025/actascilangcult.v37i1.23930.
4. Kafka, Franz. (1979) Letters to Friends, Family, and Editors. Schocken.
5. Sarukkai, Sundar. (2007) "Dalit Experience and Theory." Economic and Political Weekly, vol. 42, no. 40, pp. 4043–4048. JSTOR, www.jstor.org/stable/4027 6647. Accessed 25 June 2021.
6. Satyanarayan, Y.V (2010) Ethics theory and Practice New Delhi: Pearson.

# EVALUATION OF DRINKING WATER WITH REFERENCE TO MICROBIOLOGICAL CONTAMINATION IN GROUND WATER SOURCES AT OLPAD REGION, SURAT, GUJARAT

## M. Patel and K. Manoj

Department of Aquatic Biology, Veer Narmad South Gujarat University, Surat

_____

## ABSTRACT

*The present study was undertaken to evaluate the water quality of different ground water sources in Olpad region with respect to microbiological contamination. For study purpose four villages have been selected with different ground water sources such as hand pump, open well, tube well and bore well. Total bacterial (viable) count was carried out from collected water for initial investigation. The studies proceed for further investigation for the harmful bacterial load. Different identification tests were carried out to identify the various bacteria with reference to selective and differential media. The study reveals that the water was contaminated with harmful bacterial species. The major abundance of the species was found E.coli. The species was responsible for various water borne diseases which is harmful for humans.*

_____

*Keywords: water pollution, pathogens, ground water, Olpad*

## Introduction

Water can be defined as potable; it has to obey the chemical, physical and microbiological standards which warrant that the water is suitable for drinking purpose (Raju *et al*., 2011). Ground water has an assumption that it is harmless and clean than surface water. Above 70% of Indian population relay on ground water for their daily needs (Prajapati & Raol, 2007). The burden of water borne diseases is highest in developing countries where diarrhoea is the leading cause for child deaths (Bain *et al*., 2014). Water borne diseases arise due to consumption of water containing faecal matter especially humans and animal faeces which contain harmful bacterial load (Nabeela *et al.*, 2014). Disease causing organisms were transmitted from surface water to ground water aquifers through seepage. Open discharges of waste materials and garbage, lack of sanitisation, unhygienic practices, inappropriate management of water sources, open discharges of animal and human faeces are responsible for addition of disease causing bacteria in ground water sources. The faecal coliforms are generally used as a biological indicator for particular water body.

## Aim and Objectives

The major aim of the present study was to express the prominence of ground water suitability for human consumption with respect to biological contamination.

In respect to that investigation of the water quality of different ground water sources of Olpad taluka, Surat, Gujarat with reference to microbiological parameters was carried out. Improper disposal of wastes, faecal materials of humans and animals which discharged outsides increases risk of contamination in drinking water sources. The sources continuously investigated for water quality parameters because the water is used for daily purposes by villagers.

## Study Area

Olpad is one of the major developing taluka of Surat Dist. It is especially known for a major shrimp exporter area. It contains more than hundreds villages having population around 2 lakhs. Village people mostly affixed with agricultural activities and their water demands are fulfilled by ground water sources. From which four villages were selected with various ground water sources such as Jothan (hand pump), Talad (open well), Atodara (tube well) and Sithan (bore well) with two sampling sites except open well.

## Materials and Methods

Water samples were collected in sterile screw capped glass bottles from selected sources. The sampling was done from February 2015 to July 2015 during morning hours on monthly basis. Sterile condition and temperature was maintained during sampling and travelling situations. From the sterile samples qualitative

and quantitative microbiological estimation was done. Quantitative estimation counts total viable count which growing at sampling sites. Water was used as a direct aliquot for bacteriological analysis. Qualitative identification of bacteria includes morphological and biochemical investigation. The identification method comprises isolation, culture in microbiological laboratory and taxonomic characterisation of individual bacterial species. For qualitative estimation the methods includes, some basic cultural characteristics such as, colour, size, margin, form, elevation and texture of colony, motility test, gram's staining and biochemical tests. Bacterial species were cultured on their selective and differential media for better conformation.

## Results and Discussion

### Table No-1 Monthly variations in total viable count

| Month | Jothan | | Talad | Atodara | | Sithan | |
|---|---|---|---|---|---|---|---|
| | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 | Site-6 | Site-7 |
| Feb-15 | $1.24 \times 10^3$ | $3.0 \times 10^3$ | $3.3 \times 10^3$ | $4.2 \times 10^2$ | $3.2 \times 10^3$ | $4.5 \times 10^2$ | $3.6 \times 10^2$ |
| Mar-15 | $1.65 \times 10^3$ | $2.7 \times 10^3$ | $4.1 \times 10^3$ | $5.0 \times 10^2$ | $2.9 \times 10^3$ | $3.9 \times 10^2$ | $4.65 \times 10^2$ |
| Apr-15 | $2.7 \times 10^3$ | $4.25 \times 10^3$ | $1.2 \times 10^4$ | $2.18 \times 10^3$ | $5.7 \times 10^3$ | $1.1 \times 10^3$ | $3.3 \times 10^2$ |
| May-15 | $1.6 \times 10^3$ | $1.1 \times 10^4$ | $4.8 \times 10^3$ | $1.41 \times 10^3$ | $3.63 \times 10^3$ | $5.0 \times 10^2$ | $3.1 \times 10^2$ |
| Jun-15 | $2.34 \times 10^3$ | $3.4 \times 10^3$ | $2.1 \times 10^3$ | $1.34 \times 10^3$ | $3.8 \times 10^3$ | $4.3 \times 10^2$ | $4.1 \times 10^2$ |
| Jul-15 | $3.3 \times 10^3$ | $1.02 \times 10^4$ | $5.5 \times 10^3$ | $1.43 \times 10^3$ | $2.85 \times 10^3$ | $3.81 \times 10^2$ | $6.6 \times 10^2$ |

Total bacterial count from all selected locations is denoted in Table no-1. Microbial load from water samples in terms of CFU/ml was tending to be great and wide-ranging throughout the study period. The values were ranged from $3.1 \times 10^2$ to $1.2 \times 10^4$ from all sampling locations. Domestic discharges as well as anthropogenic activities may be the possible reasons behind it. The study reveals that sampling sites such as hand pump, open well and tube well were found with higher bacterial load than bore well. From which open well water was found in worst condition for drinking purpose as a microbiological point of view. The agricultural activities increases high amount of ammonia, nitrates and phosphates in soil which directly increases nutrient load in fresh water. Higher nutrient concentration is directly related to great abundance of bacteria in that water (Sangani & Manoj, 2018).

Bacterial isolates were also identified from water samples belonging to different genera such as Escherichia, Vibrio, and Staphylococcus etc. The most abundance species which found in water was Escherichia coli at all sampling sites throughout the study period. Identification of these disease causing organisms during study time is depicted in Table no-2. E.coli used as an indicator organism and its presence indicates unacceptable level of faecal contamination. E.coli increases high risk of other bacteria and viruses of faecal origin from which many of them were found pathogenic (Carrillo-Gomez, Duran-Acevedo, & Garcia-Rico, 2019). The presence of pathogenic bacteria deteriorates the quality of water and makes it unsuitable for drinking purpose. Salmonella sp. was found absent throughout study period. Presence of Vibrio cholerae was also a result of human faeces contamination near water sources. Staphylococcus aureus acts as opportunistic pathogens and found mostly during rainy seasons. Vibrio parahaemolyticus a food borne pathogen was found at site-4. It may be the result of accidental entrance in water channel. Animal manure which is used as a fertilizer in agricultural lands are the major sources of ground water contamination (Conboy, 1998).

**Table-2 Bacterial isolates observed during study time at all sampling sites**

| Sampling locations | | Microorganisms | Months | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Feb-15 | Mar-15 | Apr-15 | May-15 | Jun-15 | Jul-15 |
| Jothan | site-1 | Escherichia coli | + | + | + | + | + | - |
| | | Salmonella sp. | - | - | - | - | - | - |
| | | Vibrio cholerae | - | - | - | - | - | - |
| | | Vibrio parahaemolyticus | - | - | - | - | - | - |
| | | Staphylococcus aureus | - | - | - | + | + | + |
| | site-2 | Escherichia coli | + | + | + | + | + | - |
| | | Salmonella sp. | - | - | - | - | - | - |
| | | Vibrio cholerae | - | - | - | - | - | + |
| | | Vibrio parahaemolyticus | - | - | - | - | - | - |
| | | Staphylococcus aureus | - | - | - | - | + | + |
| Talad | site-3 | Escherichia coli | + | + | + | + | + | + |
| | | Salmonella sp. | - | - | - | - | - | - |
| | | Vibrio cholerae | - | - | - | - | + | - |
| | | Vibrio parahaemolyticus | - | - | - | - | - | - |
| | | Staphylococcus aureus | + | - | + | + | + | + |
| Atodara | site-4 | Escherichia coli | + | + | + | + | + | + |
| | | Salmonella sp. | - | - | - | - | - | - |
| | | Vibrio cholerae | - | - | - | - | - | - |
| | | Vibrio parahaemolyticus | - | - | - | + | - | - |
| | | Staphylococcus aureus | - | - | - | - | - | + |
| | site-5 | Escherichia coli | - | + | + | + | + | + |
| | | Salmonella sp. | - | - | - | - | - | - |
| | | Vibrio cholerae | - | - | - | - | + | - |
| | | Vibrio parahaemolyticus | - | - | - | - | - | - |
| | | Staphylococcus aureus | - | - | - | - | + | - |
| Sithan | site-6 | Escherichia coli | - | - | + | + | - | - |
| | | Salmonella sp. | - | - | - | - | - | - |
| | | Vibrio cholerae | - | - | - | - | - | - |
| | | Vibrio parahaemolyticus | - | - | - | - | - | - |
| | | Staphylococcus aureus | - | - | - | - | - | - |
| | site-7 | Escherichia coli | - | - | + | + | + | + |
| | | Salmonella sp. | - | - | - | - | - | - |
| | | Vibrio cholerae | - | - | - | - | - | - |
| | | Vibrio parahaemolyticus | - | - | - | - | - | - |
| | | Staphylococcus aureus | - | - | - | - | - | - |

**Table-3 Pathogenic effects of bacterial species on human health**

| Bacterial isolates | Pathogenic Impact on human health |
|---|---|
| E.coli | Causative agent of diarrhoea from mild to severe stage, some strains causes bloody diarrhoea, nausea, vomiting, stomach cramping, bloody urine, pale skin, fatigue and dehydration. |
| Salmonella sp. | It is responsible for typhoid fever, abdominal pain and cramps, fever, diarrhoea |
| Vibrio cholerae | Causative agent of cholera. Symptoms such as watery diarrhoea, vomiting, muscle cramps, dehydration, electrolyte imbalance |
| Vibrio parahaemolyticus | A food poisoning bacteria causes infection such as gastrointestinal, wound and blood. It followed nausea, vomiting, abdominal cramps and fever. |
| Staphylococcus aureus | Known for skin infection, food poisoning, bone and joint infections, bacteraemia, |

Impact of pathogenic bacterial strain mainly understood with reference to human health. It is mainly harmful to the rural community which is totally depending on these water sources for their daily needs without any treatment. The pathogenic impact of bacteria on human health has been discoursed in Table no-3. Consumption of the contaminated drinking water is responsible for water borne diseases.

**Conclusion**

Overall, it can be concluded that the water from the ground water sources of Olpad region was found with high bacterial load which represent the water pollution with human anthropogenic activities. Furthermore, it required new technology for the treatment of water which decreases the risk of other opportunistic pathogens. The villagers were also become aware about quality of the water that they used for domestic purpose.

**References**

1. Bain, R., Cronk, R., Wright, J., Yang, H., Slaymaker, T., & Bartram, J. (2014). Fecal Contamination of Drinking-Water in Low- and Middle-Income Countries: A Systematic Review and Meta-Analysis. PLoS Medicine, 11(5). https://doi.org/10.1371/journal.pmed.1001644

2. Carrillo-Gomez, J., Duran-Acevedo, C., & Garcia-Rico, R. (2019). Concentration Detection of the E . coli Bacteria in Drinking Water Treatment Plants through an E-Nose. Water, 11(774), 1–15.

3. Conboy, M. J. (1998). Bacterlal contamination of rural drinking water wells. The University of Guelph.

4. Nabeela, F., Azizullah, A., Shakir, S. K., Ullah, W., & Qasim, M. (2014). Microbial contamination of drinking water in Pakistan-a review, (July). https://doi.org/10.1007/s11356-014-3348-z

5. Prajapati, J. R., & Raol, B. V. (2007). Studies on the Ground Water Quality of Kalol City, Gujarat, India. Nature Environment and Pollution Technology, 6(2), 197–201.

6. Raju, N. S., Roopavathi, C., Kini, K. R., & Niranjana, S. R. (2011). Assessment of Coliform Contamination in Drinking Water from Source to Point of use in Mysore City of Karnataka, India. In 35th WEDC International Conference , Loughborough , UK , 2011 . The Future of Water, Sanitation and Hygeine: Innovation, Adaptation and Engagement in a Changing World (pp. 1–6). Loughborough, UK.

7. Sangani, K., & Manoj, K. (2018). Appraisal of Water Quality of Tapi River in Reference To Bacteriological and Physico-Chemical Properties. International Journal of Applied and Natural Sciences (IJANS), 7(3), 57–64. Retrieved from www.iaset.us.

8. Bureau of Indian Standard IS 5402 (2012). Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of microorganisms -colony count techniques at $30^{o}$. Manak Bhavan, New Delhi 110002.

9. Vos, P. De, Garrity, G. M., Jones, D., Krieg, N. R., Ludwig, W., Rainey, F. A., Whitman, W. B. (Eds.). (2009). Bergey's mannual of systematic bacteriology (2nd ed.). USA: Springer Berlin Heidelberg.

10. https://www.healthline.com/health/e-coli-infection

# THE IMPACT OF COVID- 19 ON HUMAN RESOURCE MANAGEMENT PRACTICES IN INDIA

**A.M. Francina**

Department of Business Management, St. Ann's College for Women, Hyderabad, Telangana State, India
_____

## ABSTRACT

*The present study tries to gain an insight, describing the shift in Human Resource Management practices resulting from the current pandemic and analyzing the changing perspectives for the future. World as a whole had a greater change to embrace but with a tough learning experiences. Companies indulged in abrupt and revolutionary changes and made employees as an integral part of change through bringing on the platform numerous HR Practices that gave priority to employee safety and well being. The study is descriptive and based on extensive review of literature. Major research finding revolves around usage of high technology and telework, as well as change in the pattern of organisation of work.*

_____

*Keywords: HRM, Change, pandemic, revolutionary, high technology*

## Introduction

COVID-19 has turned the world's functioning upside down due to its drastic impact on the humankind. This outbreak has posed great challenge to the functioning of the organisations too. There is a great workplace transformation in the 21$^{st}$ century. Companies have changed the way they performed their functional activities from acquisition of resources to delivery of goods and services to the customers. Almost everything in the value chain has seen a radical change. Human resource is no exemption to this but has a greater impact as it deals with people aspect. Human assets are considered as a backbone of the organisation as it is considered as a central support structure and connects different parts of the organisation into a single entity. It is the duty of the HR Department of all the organisations to be proactive and act smartly before the crisis and problem has caused damaged the organisation. Employees feel anxious about their well being, safety, job security and the impact the crisis has on the overall functioning of the organisation.

**HR Practices:** Human resource practices include selecting human resource needs, screening, recruiting, training, rewarding, appraising as well as attending to labor relations, safety and health, and fairness concerns (Dessler, 2007).

**COVID-19:** On 31 December 2019, WHO was informed of cases of pneumonia of unknown cause in Wuhan City, China. A novel

Coronavirus was identified as the cause by Chinese authorities on 7 January 2020 and was temporarily named "2019-nCoV". Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases. The new virus was subsequently named the "COVID-19 virus". India reported its 1st case of COVID-19 on 30$^{th}$ January, 2020.

## I. Objectives and Methodology of the Study

The study aims to review the transformation in Human Resource Practices in several companies in India. The study also highlights the issues and challenges in the transformation process. Study is descriptive in nature and based on review of literature, research articles, blogs, online newspapers and reports of Ministry of Health and World health organisation. The study draws the changes in the HR practices followed by different manufacturing and service sectors.

## II. Literature Review

- Implementing the policies defined by the political power, namely assuring social distance (Koirala & Acharaya, 2020).
- Defining strategies to implement telework (using IT) and emotional support (Elsafty & Ragheb; Koirala & Acharaya, 2020).
- Recently, the Covid-19 pandemic has shaped extraordinary demanding conditions for human resource management. HR managers have to help their employees to

- handle with the rapid changes in both the workplace and the society (Carnevale & Hatak, 2020).
- Based on the study, Parry and Battista (2019) demonstrated that human resource management should help employees to use the advanced technologies in organization.
- Since employees alone cannot cope all the challenges the recent pandemic crisis brought, HR professionals should help them to upgrade their digital skills, and to arrange their wellbeing (Parry & Battista, 2019).
- It is also noteworthy that business continuity, employee wellbeing, and customer orientation are considered to be the main challenges (Singer-Velush, Sherman, & Anderson, 2020).
- The pandemic has centered the physiological and mental health of people in the organization as priorities (Spence, 2020).

- Given that some employees prefer to keep working from home while others strive to return to offices, the new HR policy should allow the workforce to choose the work mode. HR managers are therefore encouraged to develop strategies accordingly. Iza Gigauri. (2020).

## III. Traditional Human Resource Practices



## V. Transformation in Human Resource Practices

| S.NO | HR PRACTICE | THE TRANSITION |
|------|-------------|----------------|
| 1 | Recruitment | • Not much of hiring has happened except in the pharmaceutical and ITES. Due to shortage of medical personnel there was a huge demand for these professionals.<br>• Other sectors companies have postponed their recruitment plans.<br>• Companies are investing in technology for talent acquisition. |
| 2 | Compensation and benefits | • Pay cuts to certain extent by most of the companies<br>• Upward revision in insurance benefits i.e COVID getting covered in the insurance.<br>• Increments were freezed<br>• Short term and long term incentive plans remain unchanged.<br>• Leave entitlement is reduced |
| 3 | Learning and Development | • Most of the learning and training programs were conducted through online<br>• Employees are trained to various online platforms to use video conferencing, collaboration, screen sharing etc.,<br>• Virtual learning, e learning, video learning, webinars are modes of learning. |
| 4 | Employee Engagement | • Work from home is a challenge for employees with small children and aged parents as they find it difficult to work effectively, therefore companies provided them with flexible work timing, change in schedules, alternate shifts and giving offs if necessary.<br>• Virtual team meetings and teleconferencing are widely used by the organisations.<br>• To engage and retain talented work force organisations are designing the interventions to engage employees.<br>• Work from home is getting changes to work happy and healthy from home<br>• Organisations are sensitising to reduce employee anxiety by understanding the employees feeling and Thinking. |

| 5 | Organising Work | • Work from home and Remote working<br>• Providing laptops and desktops with secured internet connection to support remote working<br>• For employees working in the office various precautions were taken like, sanitisation of the office, providing sanitizers, pick and drop facility in the personal vehicles of the office and discouraging employees to use public mode of transport, providing health supplements to the employees to boast their immune system.<br>• Usage of thermal screening and temperature checks. |
| 6 | Special Initiatives | • Covid Vaccination Drives were organised for the employees and their spouse.<br>• Covid Kit comprising of medicines, vitamin supplements, mask, sanitizers etc., was provided to the employees affected with Coronavirus.<br>• Leader connect-Team Leaders and heads of the departments making personal calls to the employees to know about their well being<br>• Online wellness programs like zumba, yoga, breathing exercises etc were conducted for employees and their families. |

## IV. Case Studies of Companies

**Amway** is on-going with the increments, promotions, and recognition as per previous plans. The company has planned virtual engagement programs like external webinars to learn new skills and also announced employee's medical claim plans that will cover treatment costs for COVID-19.

**Hindustan Coca Cola Beverages** has launched a virtual employee engagement program that seeks to involve employee's colleagues and their family members online for their physical and mental wellness.

**McDonald's India** has adopted many of its classrooms training modules digitally and introduced e-learning modules, quizzes, master classes by managers, and many more creative learning sessions, which employees can access on their phone while in quarantine at home.

**ITC Hotels** has rolled a number of e-learning courses targeted at specific roles and levels through primary channels of E-learning to provide an opportunity for self-learning which can be accentuated through anytime app-based hosting.

## V. Conclusion

Companies are continuously wrestling with the unprecedented change and impact caused by COVID-19. All the organizations should adopt innovative and creative Human capital practices during this tough time of pandemic COVID19 to keep employees motivated, stimulated, committed, satisfied, and comfortable in this tough time. Work from home system is the new norm it will be successful only with effective training and allotment of required gadgets to implement online practices. Organizations should be transforming and implementing an online practice approach to help employees perform their task and responsibilities and have a positive bent of mind during this difficult time. Virtual relations should be crucial for companies to remain competitive in the market place and combat the present instable environment. Over and above HR Practices deals with human side of people, therefore giving employees utmost assurance of financial stability, job security, being transparent, constant communication, employee safety and leadership connect makes employees overcome the tough times with courage and confidence.

## Scope for Future Studies

1. A Study on impact of COVID-19 on HR Practices in manufacturing sector in India

2. A Comparative Study on impact of COVID-19 on HR Practices in manufacturing sector vs service sector.

3. A Study on the perception of employees on impact of COVID-19 on HR Practices.

# References

1. Carnevale, J. B., & Hatak, I. (2020). Employee Adjustment and Well-Being in the Era of COVID-19: Implications for Human Resource Management. Journal of Business Research(116), 183-187. https://doi.org/10.1016/j.jbusres.2020.05.037.

2. Elsafty, A.S., & Ragheb, M. (2020). The Role of Human Resource Management Towards Employees Retention During Covid-19 Pandemic in Medical Supplies Sector – Egypt, Business and Management Studies Vol. 6, No. 2; June 2020 ISSN: 2374-5916 E-ISSN: 2374-5924.

3. Iza Gigauri. (2020) Effects of Covid-19 on Human Resource Management from the Perspective of Digitalization and Work-life-balance. International Journal of Innovative Technologies in Economy. 4(31). doi: 10.31435/rsglobal_ijite/30092020/7148

4. Koirala,J., & Acharaya,S. (2020).Dimension of human resource management evolved with the outbreak of COVID-19.
SSRN: https://ssrn.com/abstract=3584092.

5. Parry, E., & Battista, V. (2019). The impact of emerging technologies on work: a review of the evidence and implications for the human resource function [version 1; peer review: 2 approved, 1 approved with reservations]. Emerald Open Research, 1(5), https://doi.org/10.12688/emeraldopenres.12907.1.

6. Singer-Velush, N., Sherman, K., & Anderson, E. (2020, July 15). Microsoft Analyzed Data on Its Newly Remote Workforce. Retrieved July 30, 2020, from Harvard Business Review:https://hbr.org/2020/07/microsoft-analyzed-data-on-its-newly-remote-workforce.

7. Spence, P. (2020, July 26). How COVID-19 reshapes the mental health needs of workers. Retrieved August 2020, from Ernst & Young: https://www.ey.com/en_gl/health/how-covid-19-reshapes-the-mental-healthneeds-of-workers.

8. Chanana N, Sangeeta.( 2020) Employee engagement practices during COVID-19 lockdown. J Public Affairs.;e2508. https://doi.org/10.1002/pa.2508.

9. https://assets.kpmg/content/dam/kpmg/in/pdf/2020/05/cutting-through-crisis.pdf

10. https://www.mohfw.gov.in/pdf/AdvisoryforHRmanagement.pdf

# TO ASSESS THE IMPACT OF CRM IMPLEMENTATION IN HEALTH INDUSTRY

## P. Gandhi[1] and N. Tandon[2]

[1]Jagan Institute of Management Studies, New Delhi
[2]Jagannath International Management School, Kalakaji, New Delhi

---

## ABSTRACT

*The paper takes the path of analysing the impact of implementation of customer relationship management, CRM software's in the health industry specially the hospitals of Delhi and NCR. The research present the analysis of data collected from three major stakeholders i.e. the patients, the practitioners and the other managerial people working in the hospital. The research presents the impact of CRM on enhancing the customer satisfaction, employee productivity and branding of the hospitals. Initially multiple regressions is applied and based on the result the SEM model is created to be evaluated through the structural equation modelling. The results of the study can be useful for the both govt. and private hospitals especially in the pandemic when the government is very keen to enhance the health infrastructure.*

---

## Introduction

The superior healthcare services has become prime importance in the last one year especially due to pandemic the world is facing these days. Initially , the private sector in healthcare industry are in race of providing the superior services to their customers or patients but now the government also wants to enhance their services for the patients in different government and state run hospitals.

With the identification of the problem that Indian Healthcare Sector is facing this research area was selected to "To study the impact of customer relationship management on enhancing the operational efficiency of the hospital

## Rationale of the Study

It is depicted through following images and charts:



- CRM as a holistic approach adopted in many services.
- Studies on CRM adoption and benefits for hospitals in various developed courtiers.
- The need to bring the transition from being management centred to customer centred care.
- The Ayushman Bharat , Electronic Health Record cards etc. shows Govt. interest to revamp the health infrastructure.
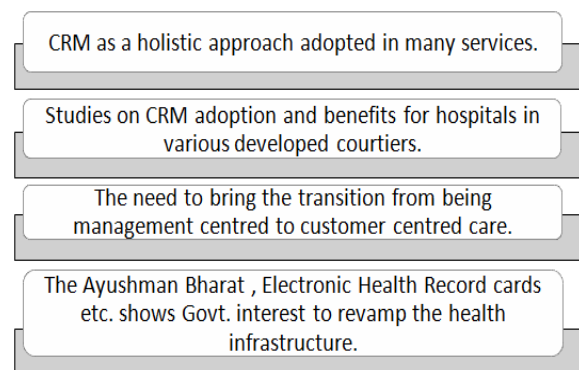
Image1:Source: Author's Own Composition.

## Review of Literature
### Table 1: Source: Author's Own Composition.

| Author Details | Paper Title | Journal Details | Major Findings of the Study |
|---|---|---|---|
| Jimmy Bunardi, Linda Salma Angreani | Customer Relationship Management Information System St. Borromeus Hospital. | Matics: Journal of Computer Science and Information Technology. | Customer Relationship Management Information System St. Borromeus Hospitals an application to process data related to the promotion, marketing and cooperation between the St. Borromeus Hospital. |
| Anil Z. Chhangani | Investigating Customer Relationship Management (CRM) in Indian Hospitals. | International Journal of Research in Advent Technology | Investigation on patient's demands and issues by utilizing CRM, to discover the influence of CRM on patient's faithfulness, to recognize the significant patient using CRM procedure. |

| Vivian Paazine Mary Adjei | Master Thesis: Customer Relationship Management in the Healthcare Industry in Ghana | Luleå University of Technology Department of Business Administration, Technology and Social Sciences | Predominate concerns and goals for accessing CRM use specially the benefits for the patients |
|---|---|---|---|
| Agariya, A. K., & Singh, D. (2013). | CRM scale development and validation in Indian public hospitals. | Journal of Health Management, 15(2), 275-291. | Explained a reliable and substantial CRM scale is explicitly taking into account to Indian public hospitals. |
| Chatterjee, S., Giri, A., Paul, P., & Bag, M. | Impact of 'Customer Relationship Management (CRM) Software'on Patient Satisfaction in Public Hospitals of Urban West Bengal, India: An Empirical Analysis. | | Usage of CRM innovation in the private hospitals of West Bengal. |
| Ghabedyan R.A(2010) | CRM and Hospital Service Quality in Nigeria | African Research Review | The study examine how CRM helps in improving health care service in Nigeria. Same factors are tested in Indian Context. |

## Objectives and Framework of Study

The Prime Objectives of the Study are:

1. To enhance the wide knowledge about the customer relationship management (CRM) and promote it to greater extent in hospitals.

2. To identify the variables that affects the CRM in healthcare organization.

3. To prioritize the critical factors that lead to improvement in CRM in private hospitals.

4. To create a conceptual framework to improve the CRM system in healthcare organization.

The entire is divided for three stakeholders in the hospitals.

– Patients.

– Practitioners.

– General : Managers and other managerial staff.

The private and public domains of Indian Hospitals are considered in demographics.

Independent Variable: Customer Relationship Management Implementation in Hospitals.

Dependent Varaible: Health Care Service Providers

• Productivity of Employees

• Branding of Hospitals

• Customer Satisfaction.

## Data Analysis Techniques

• The statistical software SPSS and AMOS are used for analyzing the relationship between the dependent and independent variables.

• The linear regression helps to analyze the relationship between the variables when the data have only one independent variable.

• The multi linear regression, the relationship between more than one independent variable and the dependent variable is measured.

• The Structured Equation Modelling was utilized to validate the hypotheses and to provide the data with statistical parameters of model fit goodness.

• The present model utilized four variables (EPE, ECS, CCTH and BH).

**Data Analysis Results**

**Overall Regression Analysis**

- Dependent Variable – BH, EPE, ECS and CCTH

- Independent Variable – CRM Implementation

- R value: 0.651

- R Square value: 0.424

- Adjusted R Square value: 0.416

- F value: 54.131

- P value: <0.000**

$Y = 0341 + 0.221X_1 + 0.152X_2 + 0.456\ X_3 + 0.085\ X_4$

The results for the analysis is interpreted either through the p-value or through the r-square value. The p value statistics signifies there is influence of CRM implementation on hospital branding, employee productivity, customer satisfaction. The r square value signifies the percentage increase in the independent variable with the implementation of the dependent variable. The final regression has helped to portray the final results of the research. In the future the research can be further enhanced and verified through detailed SEM analysis along with the introduction to the moderating variable.

**Proposed SEM Model for Analysis**
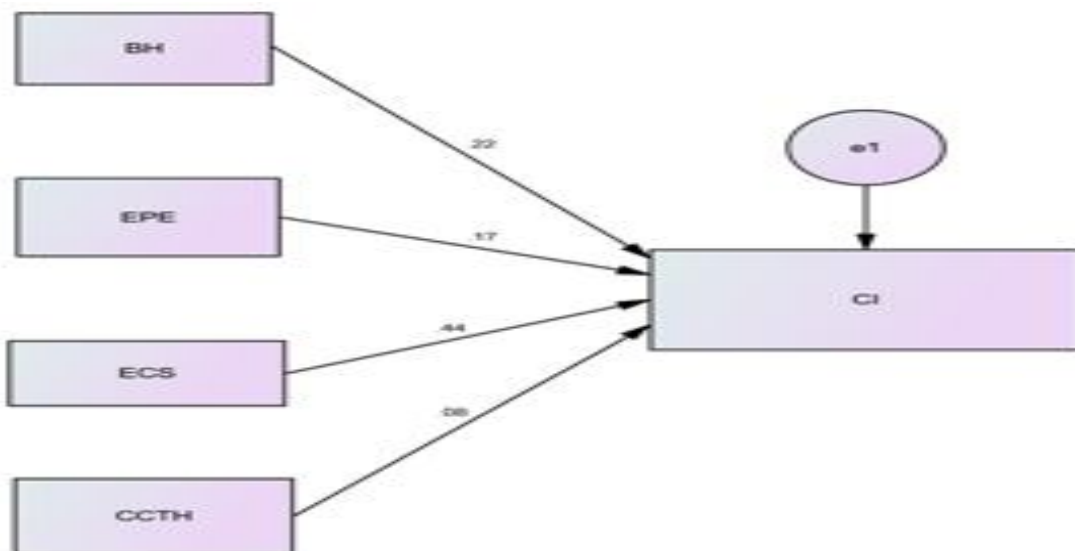


Image 2: Source: Authors Own Composition

**Conclusion**

The recommendations of the study is given under the managerial side and patient side analysis.

- CRM enhances the physician-patient relationship.

- The significance of CRM in Indian hospitals discovered that execution of CRM is important for both the hospital and also patients to improve accessibility of patient data and offering the useful patient data, information on patient grievances,

increases hospital staff response performance. Such enhancements result in patient satisfaction and, lastly, patient loyalty.

- The Technology is used in to help patients and also staff in the hospital for improving the accuracy and speed during service delivery, including medical staff. The healthcare providers use CRM technology to find out the quality of service performance of their employees and whether customers are happy with the same.

## References

1. Asgar, M.G., & Shahri, S. (2015). Customer relationship management in healthcare. Cumhuriyet Üniversitesi Fen-Edebiyat Fakültesi Fen Bilimleri Dergisi, 36(3), 1003-1005.

2. Agariya, A. K., & Singh, D. (2011). CRM Index Development and Validation in Indian Hospitals. International Journal of Healthcare Delivery Reform Initiatives (IJHDRI), 3(2), 1-22.

3. Anil Chhanganu (2013): Investigating CRM in Indian Hospitals.

4. Chaturvedi, R.K. (2014). Innovative Services and Customer Relationship Management System in Indian Health Care Sector.Indian Journal Of Applied Research, 4 (4, Apr), 76.)

5. Chen, I. J., & Popovich, K. (2003). Understanding customer relationship management (CRM). Business process management journal.

6. Cheng, B.W., Chang, C.L., & Liu, I.S. (2005). Establishing customer relationship management framework in nursing homes. Total Quality Management & Business Excellence, 16(5), 607-629.

7. Habidin, N. F., Ali, N., Janudin, S. E., Zainol, Z., Mustaffa, W. S. W., & Hudin, N. S. (2015). Customer Relationship Management and Service Quality Improvement in Malaysian Healthcare Industry. International Journal of Pharmaceutical Sciences Review and Research, 35(1), 203-209.

8. Hagland, M. (2009). Clinical transformation: under pressure to alter the cost/quality paradigm, hospital organizations are turning to IT. Healthcare informatics: the business magazine for information and communication systems, 25(14), 24-26.

9. Paazine, V., & Adjei, M. (2011). Customer relationship management in the healthcare industry in Ghana: A case study in Ashanti region and the Upper West region.

10. Wu, C.H.J., Liang, R.D., Tung, W., & Chang, C.S. (2008). Structural relationships among organisation service orientation, employee service performance, and consumer identification. The Service Industries Journal, 28(9), 1247-1263.

# A STUDY ON THE PERCEPTION OF URBAN YOUTH OF GUJARAT TOWARD INNOVATIVE FINANCIAL PRODUCTS OFFERED BY BANKS

**D.J. Gangani[1] and D. Raval[2]**

[1]School of Management, RK University, Rajkot, Gujarat
[2]School of Maritime Management, Gujarat Maritime University, Gujarat
dilipgangani@gmail.com

_____

## ABSTRACT

*This paper aims at to identify the factors that affect perceptions of respondents towards innovative financial products offered by banks and association between demographic variables and perception of respondents towards innovative financial products. The study was conducted on urban youth of Gujarat State living in Ahmedabad, Surat, Vadodara and Rajkot. Total 159 respondents were selected using convenient sampling method. A number of statements (15) including the various factors relating to perception were preparate to know level of perception of urban youth. Factor analysis has been used to extract the important factor out of 15 variables. The analysis shows 4 factors namely Ease of Use, Cost saving, Trust and Safety & Security that affects perception of respondents towards Innovative Financial Products offered by Banks among urban professional youth of Gujarat. Chi-square test was also applied to know association between demographic factors and level of perception of respondents. It is found that there is a significant association between Gender, City of Living, Education Qualification, Occupation and also insignificant association between the Age, Marital Status and Monthly Income of respondent's perception towards innovative financial products offered by banks.*

_____

*Keywords: Perception, Innovative Financial Products, Banks, Digital Financial Inclusion, Financial Literacy, Principal component Analysis, Gujarat.*

## 1. Introduction

Cashless, Paperless, and faceless is a vision of the government of India by the Digital India Program. For promoting cashless transactions various digital payment modes are available nowadays. These modes are Internet Banking, Mobile Banking, Debit Cards, Credit Cards, Unstructured Supplementary Service Data (USSD), Aadhaar Enabled Payment System (AEPS), Unified Payment Interface (UPI), Mobile wallets, Point of Sales (PoS), Micro ATMs, Bharat Bill Pay System (BBPS), etc. Promoting Digital Payments is a priority by the Government of India to bring every sector of our country under the purview of digital payment services. It is the goal of the Government of India to provide a convenient, easy, fast, secured, and affordable digital payment facility to all the citizens of India.

## 2. Review of Literature

**Rana (2017)** found that there is a significant association between gender and opinion toward digital payment, age, and overall opinion regarding mobile wallets. It is noticed that no evidence to show that any relationship exists between the type of living and opinion regarding mobile wallets. For the study purpose primary data collected using a questionnaire from 95 samples. The researcher used the purposive sampling method for sample selection. Collected data were analyzed using SPSS software by using various statistical tools like descriptive statistics and Chi-square test. This paper focused on studying the preference toward the usage of mobile wallets, find the relation between demographic factors on opinion regarding mobile wallets, to know various factors affecting the adoption of mobile wallets.

**Singh and Rana (2017)** focused on the difference is perceived by respondents for various attributes of digital payment based on gender, age, education, profession, and annual income of respondents. Data were collected from 150 respondents using a well-structured questionnaire. ANOVA and frequency analysis used to perform statistical analysis using SPSS. Cronbach's Alpha test was used to find the reliability of the data. It is found that no significant differences are perceived by male and female respondents for the majority of attributes of digital payment. The efficiency secured transactions, convince, user-friendly, cost-saving and timesaving of digital transaction, acceptance of digital wallets at the

different store has a positive influence on the rate of adoption of digital transaction of respondents.

**Gokilavani, Kumar, Durgarani, and Mahalakshmi (2018)** focused on the socioeconomic status of the customer and their perception toward digital transactions and the rate of adoption of digital payment. The present study is based on primary data. Primary data was collected from 300 respondents using a simple random sample method. Percentages are calculated to understand the socio-economic status of respondents and applied t-test and ANOVA test to find the difference between socio-economic status and perception toward digital payment. Mean and standard deviation are finding for the perception of respondents toward the digital transaction. The multiple regression is used to analyse the influence of the perception of respondents toward digital payment on the rate of adoption of digital payment. It was found that there is a significant difference between perception toward digital payment and the socio-economic status of the consumer. The efficiency, safety, and security convince, user-friendly, cost and time saving of digital transaction have a positive influence on the rate of adoption of digital transaction of respondents.

### 3. Statement of Problem

Innovative banking products and services are significantly transforming how banking services are design and delivered to customers. With the introduction of innovative banking products, the entire setup of banking has changed. The innovative financial products offered by banks have taken over traditional banking for delivery of banking facilities and consumers have saved time, energy, and paperwork. The introduction of innovative financial products offered by banks a new frontier of prospects and challenges. Even With these opportunities, there are several psychological and behavioural matters such as Ease of Use, Cost saving, Trust and Safety, and Security intervention and the like obstruct the progression of Innovative Financial Products

offered by Banks. This study is an attempt to bring out the perception of respondents towards innovative financial products offered by banks.

### 4. Objectives

1. To find association between demographical factors and perception of respondents towards innovative financial products offered by banks.

2. To identify factors that affects perceptions of respondents towards innovative financial products offered by banks.

### 5. Hypotheses of the study

- H0: There is no significant association between various demographic factors like gender, age, marital status, city of living, profession, education qualification and monthly income and perception towards innovative financial products offered by banks.

### 6. Methodology

For these objectives of research, the study considered both private and public sector bank in four major cities Ahmedabad, Surat, Vadodara, and Rajkot of Gujarat state has been selected. The study has been used both primary as well as secondary data. The primary data have been collected from classes of Salaried, Businessman, Self Employed and Daily Wager (Worker). A structure questionnaire was designed, and data was collected online using google form. Total 149 respondents were selected by using convenient sample technique. The statistical tools were used in this study are Percentage Analysis, Chi-square and Exploratory factor analysis.

### 7. Data Analysis and Interpretation

To understand the opinion of respondents were studied. The collected data were classified and systematically analysed. The various factors influencing the innovative financial services offered by banks and their perception have been analysed in detail is shown in following tables.

### Table 1: Gender and Perception

| Gender | | Frequency | Percent | Perception of Respondents | |
|---|---|---|---|---|---|
| | | | | Positive | Negative |
| Valid | Male | 84 | 56.4 | 65 | 19 |
| | Female | 65 | 43.6 | 42 | 23 |
| | Total | 149 | 100.0 | 107 | 42 |

### Table 2: Age and Perception

| Age | | Frequency | Percent | Perception of Respondents | |
|---|---|---|---|---|---|
| | | | | Positive | Negative |
| Valid | Between 15 to 24 Years | 43 | 28.9 | 28 | 15 |
| | Between 25 to 30 Years | 47 | 31.5 | 33 | 14 |
| | Between 31 to 35 Years | 59 | 39.6 | 46 | 13 |
| | Total | 149 | 100.0 | 107 | 42 |

### Table 3: City of Living and Perception

| City of Living | | Frequency | Percent | Perception of Respondents | |
|---|---|---|---|---|---|
| | | | | Positive | Negative |
| Valid | Ahmedabad | 39 | 26.2 | 24 | 15 |
| | Surat | 30 | 20.1 | 19 | 11 |
| | Vadodara | 24 | 16.1 | 13 | 11 |
| | Rajkot | 56 | 37.6 | 51 | 5 |
| | Total | 149 | 100.0 | 107 | 42 |

### Table 4: Marital Status and Perception

| Marital Status | | Frequency | Percent | Perception of Respondents | |
|---|---|---|---|---|---|
| | | | | Positive | Negative |
| Valid | Unmarried | 88 | 59.1 | 61 | 27 |
| | Married | 61 | 40.9 | 46 | 15 |
| | Total | 149 | 100.0 | 107 | 42 |

### Table 5: Education Qualification and Perception

| Education Qualification | | Frequency | Percent | Perception of Respondents | |
|---|---|---|---|---|---|
| | | | | Positive | Negative |
| Valid | Below SSC | 18 | 12.1 | 6 | 12 |
| | SSC | 27 | 18.1 | 15 | 12 |
| | HSC | 15 | 10.1 | 8 | 7 |
| | Graduate | 29 | 19.5 | 25 | 4 |
| | Postgraduate | 60 | 40.3 | 53 | 7 |
| | Total | 149 | 100.0 | 107 | 42 |

### Table 6: Occupation and Perception

| Occupation | | Frequency | Percent | Perception of Respondents | |
|---|---|---|---|---|---|
| | | | | Positive | Negative |
| Valid | Salaried | 67 | 45.0 | 61 | 6 |
| | Businessman | 26 | 17.4 | 16 | 10 |
| | Self Employed | 33 | 22.1 | 20 | 13 |
| | Daily Wager (Worker) | 23 | 15.4 | 10 | 13 |
| | Total | 149 | 100.0 | 107 | 42 |

## Table 7: Monthly Income and Perception

| | | Frequency | Percent | Perception of Respondents | |
|---|---|---|---|---|---|
| | | | | Positive | Negative |
| Valid | Below Rs. 10000 | 33 | 22.1 | 21 | 12 |
| | Rs. 10000 to 25000 | 42 | 28.2 | 35 | 7 |
| | Rs. 25000 to 50000 | 34 | 22.8 | 24 | 10 |
| | More than Rs. 50000 | 40 | 26.8 | 27 | 13 |
| | Total | 149 | 100.0 | 107 | 42 |

### Chi-Square Analysis

The perception of respondents towards innovative financial products offered by banks studied among the selected respondents in this study. The opinion collected from respondents are analysed with their demographic variables and specified factors for the purpose of measuring their perception level.

$$x^2 = \sum \frac{(O-E)^2}{E}$$ with degree of freedom (C-1)(R-1)

Where, O = Observed frequency

E = Expected frequency

C = Number of Column

R = Number of Raw

H0: There is no significant association between various demographic factors like gender, age, marital status, city of living, profession, education qualification and monthly income and perception towards innovative financial products offered by banks.

## Table 8: Summary of Chi-Square Analysis

| Sr. No. | Demographic Profile | $x^2$ Value | d.f. | P value | Significant/ Not Significant | Ho is Accepted or Rejected |
|---|---|---|---|---|---|---|
| 1 | Gender | 2.950 | 1 | .086 | Significant | Accepted |
| 2 | Age | 2.116 | 2 | .347 | Insignificant | Not Accepted |
| 3 | City of Living | 17.052 | 3 | .001 | Significant | Accepted |
| 4 | Marital Status | .660 | 1 | .416 | Insignificant | Not Accepted |
| 5 | Education Qualification | 30.280 | 4 | .000 | Significant | Accepted |
| 6 | Occupation | 24.768 | 3 | .000 | Significant | Accepted |
| 7 | Monthly Income | 4.236 | 3 | .237 | Insignificant | Not Accepted |

The Chi-square table shows that there is a significant association between Gender, City of Living, Education Qualification, Occupation and also insignificant association between the Age, Marital Status and Monthly Income of respondent's perception towards innovative financial products offered by banks.

### Principal Component Analysis of Items Referring Perception Toward Innovative Financial Services Offered by Banks.

The factor analysis is applied on the factors affecting perception of urban youth professional toward innovative products offered by banks.

| Sr. No. | Demographic Profile | $x^2$ Value | d.f. | P value | Significant/ Not Significant | Ho is Accepted or Rejected |
|---|---|---|---|---|---|---|
| 1 | Gender | 2.950 | 1 | .086 | Significant | Accepted |
| 2 | Age | 2.116 | 2 | .347 | Insignificant | Not Accepted |
| 3 | City of Living | 17.052 | 3 | .001 | Significant | Accepted |
| 4 | Marital Status | .660 | 1 | .416 | Insignificant | Not Accepted |
| 5 | Education Qualification | 30.280 | 4 | .000 | Significant | Accepted |
| 6 | Occupation | 24.768 | 3 | .000 | Significant | Accepted |
| 7 | Monthly Income | 4.236 | 3 | .237 | Insignificant | Not Accepted |

The Chi-square table shows that there is a significant association between Gender, City of Living, Education Qualification, Occupation and also insignificant association between the Age, Marital Status and Monthly Income of respondent's perception towards innovative financial products offered by banks.

**Principal Component Analysis of Items Referring Perception Toward Innovative Financial Services Offered by Banks.**

The factor analysis is applied on the factors affecting perception of urban youth professional toward innovative products offered by banks.

| Name of Factor | Eigen Value | % Variance | Items | Item Loading |
|---|---|---|---|---|
| Ease of Use | 3.926 | 21.972 | 8. Innovative Financial Products offered by Banks are better than traditional banking. | .813 |
| | | | 3. Innovative Financial Products offered by bank are useful to do banking activities faster and quicker. | .810 |
| | | | 4. Innovative Financial Products offered by banks is easily understood and readily adopted. | .803 |
| | | | 9. Innovative Financial Products offered by Banks are user friendly developed. | .724 |
| | | | 5. Use of Innovative Financial Products offered by banks are risky than traditional banking. | .494 |
| Cost saving | 2.603 | 17.351 | 1. Innovative financial products offered by banks save your time and money. | .881 |
| | | | 2. Cost of Innovative Financial Products offered by banks are comparatively lower than traditional banking? | .812 |
| | | | 10. It is very easy to make payment, transfer money and balance check through Innovative Products offered by Banks. | .808 |
| Trust | 2.488 | 16.584 | 11. Innovative Financial Products offered by banks are trustworthy. | .767 |
| | | | 13. Complain handling process is quicker in digital financial services than traditional banking. | .763 |
| | | | 12. Data provided in digital financial services are accurate and trustworthy. | .712 |
| | | | 15. I have strong faith that Innovative Financial Products offered by banks cannot make any mistake. | .524 |
| | | | 14. The facility to operate innovative financial services offered by banks available round the clock (24 hours a day, without holiday break.) | .411 |
| Safety & Security | 2.112 | 14.082 | 7. Privacy maintain when using innovative Financial Products offered by Banks. | .877 |
| | | | 6. Financial information remains secured while using Innovative Financial Products offered by Banks. | .874 |

## 8. Findings

### Findings Related to Reliability Test

- Reliability test for the perception towards innovative financial products offered by banks is the Cronbach's alpha coefficient value for 15 variables of perception towards innovative financial products offered by banks is 0.903.

### Findings Related to Association of Demographic Factors with Perception Towards Innovative Financial Products Offered by Banks.

- There is no significant association between gender of respondents and their perception towards innovative financial products offered by banks.
- There is no significant association between age of respondents and their perception

towards innovative financial products offered by banks.

- There is significant association between City of living of respondents and their perception towards innovative financial products offered by banks.
- There is no significant association between marital status of respondents and their perception towards innovative financial products offered by banks.
- There is significant association between Education qualification of respondents and their perception towards innovative financial products offered by banks.
- There is significant association between Profession of respondents and their perception towards innovative financial products offered by banks.
- There is no significant association between monthly income of respondents and their

perception towards innovative financial products offered by banks.

## 9. Conclusion

This paper has focused on appraising the urban youth perception towards innovative financial services. Two research objectives guided the study and data were collected by structured questionnaire and analysed descriptively using percentage, chi-square test and principal component analysis. It is found that, 72% respondents have positive perception towards innovative financial products offered by banks. It is found that Ease of Use, Cost saving, Trust and Safety & Security that affects perception of respondents towards Innovative Financial Products offered by Banks among urban professional youth of Gujarat.

## References

1. Byakod, R.,P., Chaya, U., Kulgude,P., Sharma, A., and Priyanka (2018). UAS-Journal of Management and Commerce. 4 (02).
2. Devi, N. S. (2018). Perception of Rural Consumers Towards Digital Transaction after Demonetization. IJRAR-International Journal of Research and Analytical Reviews (IJRAR), 5(4), 857-861.
3. Krishna Kumari, R. and Pavithra, G. (2018). International Journal of Management and Social Science Research Review. 1(45).
4. Kumar, P., & Chaubey, D. S. (2017). Demonetization and Its Impact on Adoption of Digital Payment: Opportunities, Issues and Challenges. Abhinav National Monthly Refereed Journal of Research in Commerce & Management, 6(6).
5. Rana, S. S. (2017). A Study of Preference Towards The Mobile Wallets Among The University Students In Lucknow City. Scholedge International Journal of Management & Development, 46-57.
6. Sardar, R. (2016). Preference towards mobile wallets among urban population of jalgaon city. Journal of management (JOM), 3(2), 1-11.
7. Singh, S., & Rana, R. (2017). Study of consumer perception of digital payment mode. Journal of Internet Banking and Commerce, 22(3), 1-14.
8. Yuvaraj, D. S., & Eveline, S. (2018). N, Consumers' Perception towards Cashless Transactions and Information Security in the Digital Economy. International Journal of Mechanical Engineering and Technology, 9(7).
9. Vally, K. S., & Divya, K. H., (2018). A study on Digital payments in India with perspective of consumers adoption. International Journal of Pure and Applied Mathematics, 118(24).

# TO STUDY THE IMPACT OF MOBILE PHONE ON LIFE AND HEALTH OF INDIVIDUALS

**S. Kaur[1], A. Kaushal[2] and U. Bharti[3]**
[1,3]Department of Zoology, PGGCG-11, Chandigarh
[2]PGGCG-11, Chandigarh
sandaldeep.kaur90@gmail.com

---

## ABSTRACT

*Technology advancement has led to the increased use of smart phones. Smartphones play a vital role in bringing massive change in the lives of people by offering a great platform for communication and access to a wide range of applications. The present study was conducted in a survey form to assess the effect of mobile usage on the health and life of the individuals. It was found that the participants are considering use of mobile phones as important as food, water and shelter. Younger generation is becoming addictive to the mobile use and its use has increased considerably in the school settings. Participants raised a concern that excessive use of mobile phones is affecting their work as well as home life and they are not able to maintain a balance between the both. The participants reported mobile phone as a source of both distraction and loneliness. It was also reported that excessive use of mobile phones has made them lazy and significantly reduced the level of physical activity amongst them. It is recommended to reduce the duration of mobile use and involve one's good self in various other activities of recreation including more face-to-face interactions with the family and friends.*

---

*Keywords: Health, internet, messages, smart phone, technology.*

## Introduction

With the advent of technology, use of smartphones has increased to a large extent. The function of smartphones is not limited to send messages, rather allow long distance communication (both on voice and video).Smartphones are often called minicomputer with its highlights and capacities resembling that of a desktop computer in a smaller form (Rambitan, 2015). Traditionally, telephone conversations were restricted to take place in relatively fixed locations and restricted the user's abilities to move around while talking.Using smartphones, however, gives flexibility to the user to move while talking in addition to the facilities of internet access, cameras with high quality, and management tools (Boulos et al., 2011). The capability of running feature-rich application (apps) on smartphones made smartphone a more powerful device replacing many devices such as alarms clocks, calculators, laptops, GPS navigators and digital cameras (Miller 2012). Smartphones play a vital role in bringing massive change in the lives of people by offering a great platform for communication and access to a wide range of applications (Lakshmi 2016). People enjoy great comfort with the advancement in science and technology. They find things much easier and perceive things based on technology. The excessive use of mobile phones/smart phones have taken a form of addiction and have given a setback to the face-to-face or direct communication. It has been observed that the people are busy on their phones (sending text messages, sharing pictures, etc.), while talking to others. Use of mobile phones by students in schools has become a very common affair. The students are playing games, sending messages, and calling even when the class is in progress. Rather, the mobile phones are even used at the places like hospitals, judicial courts, petrol pumps, where their use is banned.

Mobile phones proliferate in our society, influencing the way people communicate on a daily basis. Studies have examined mobile phones can be used in any settings, including restaurants, grocery stores, buses, trains, and movie theaters for e-mail, text, find information, take picture, communicate, use map etc. (Ling, 1997, 2002; Murtagh, 2002; Campbell & Russo, 2003; Rice & Katz, 2003; Campbell, 2004) whenever and wherever the need arises. Considering the use and popularity of this communication tool, it is surprising that appropriate and polite use of mobile phone is still unclear as there is no definitive set of rules for its usage (Elgan, 2010; Rosenfeld & O'Connor-Petruso, 2010).

---

### Methodology

The present study employed a questionnaire survey method, for covering a larger coverage of potential participants. Total 1028 respondents of different age groups participated in this survey. Students aged 5-28 years old were selected due to the relationship of this generation with digital technologies. Questions asked in the survey were concerned about usage pattern of mobile phones during COVID-19 and impacts of mobile phone usage as experienced by the participants. Statista (2017) found that 93.0 percent of Internet users in the age under 25 were accessing the Internet daily than older age groups.

### Results

Media innovation has become vital part of everyone's lives in the twenty-first century. The world of electronic media is changing with a fast moving pace. Use of TV has been followed by numerous other media assets like mobile phones, iPods, computer games, messaging, social networks sites and e-mails. In the present scenario, mobile phones are being used more than earlier. Out of the total 1028 respondents, majority (87.8%) belonged to the age group of 5-25 years of age followed by 10.2% belonging to age group of younger age group (25-50 years) (Fig.1.1).The gender wise distribution of the respondents found that 91% were females (Fig.1.2).
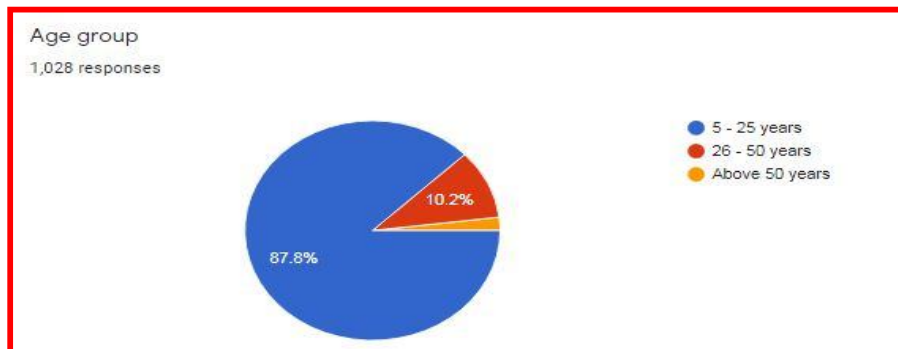


Fig. 1.1
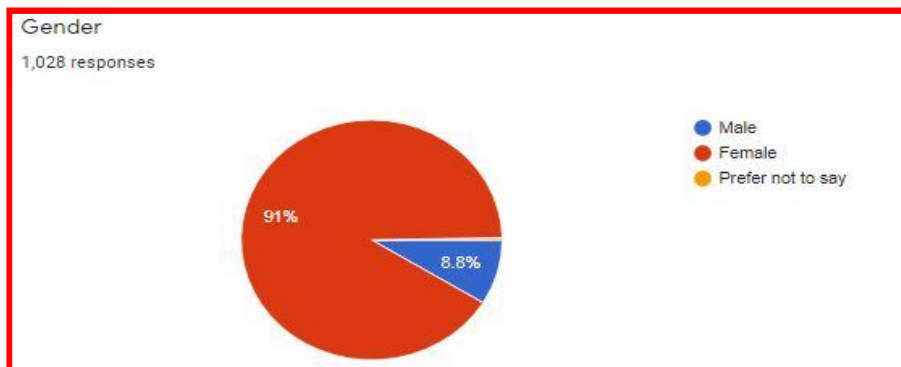


Fig. 1.2
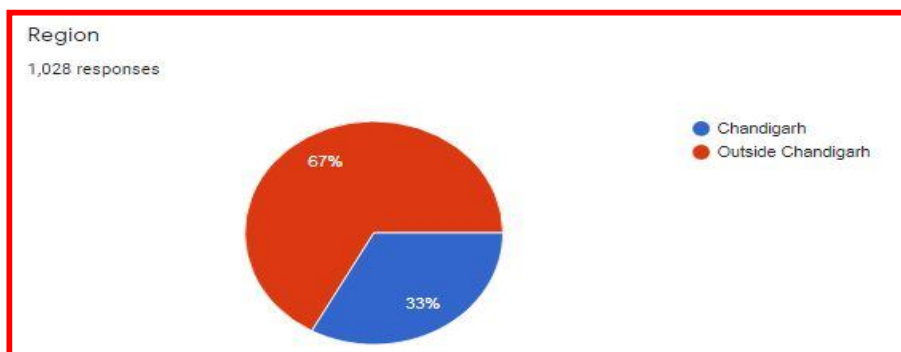


Fig.1.3
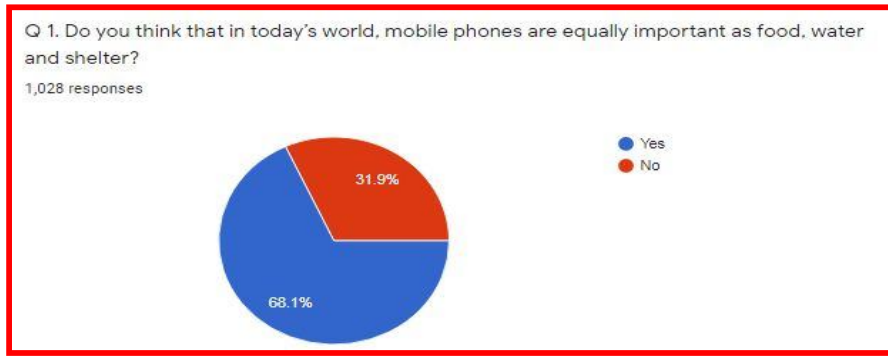
Fig.1.4

67% participants were from Chandigarh while 33% were residing outside Chandigarh (Fig.1.3). On being asked whether the mobile phones are equally important as food, water and shelter, more than two-third (68.1%) participants agreed to this statement. (Fig. 1.4).
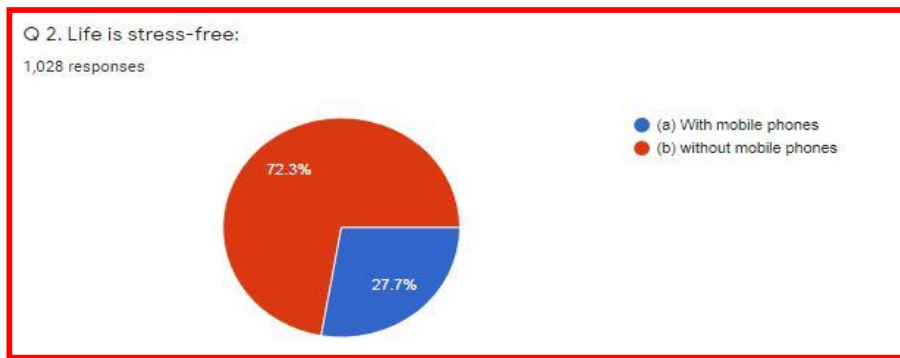


Fig. 1.5
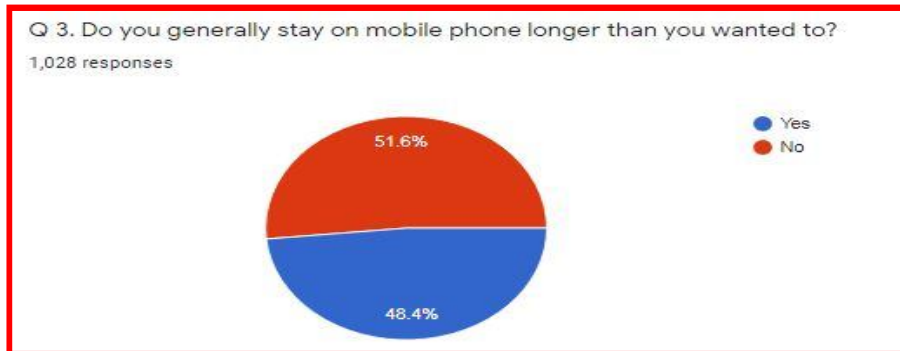


Fig.1.6

It was found in the present study that life is stress free without mobile phones as per 72.3% of the participants whereas 27.7% said that life is stress free with mobile phones (Fig.1.5). According to the present study, less than half (48.4%) of the users stay on their mobile phones for longer duration while 51.6% users reported phone usage for shorter duration(Fig.1.6).
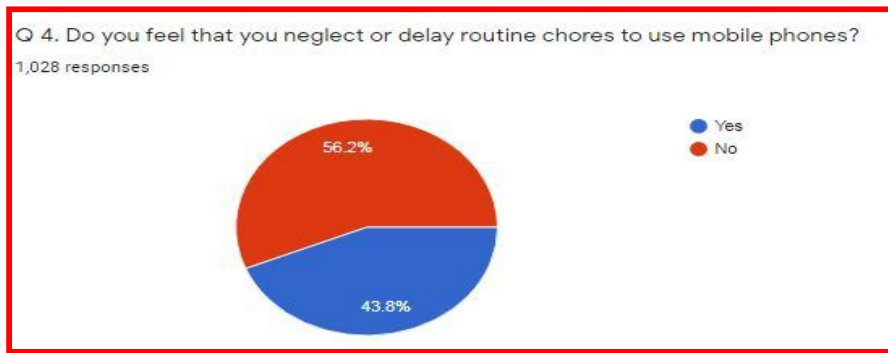
Fig. 1.7
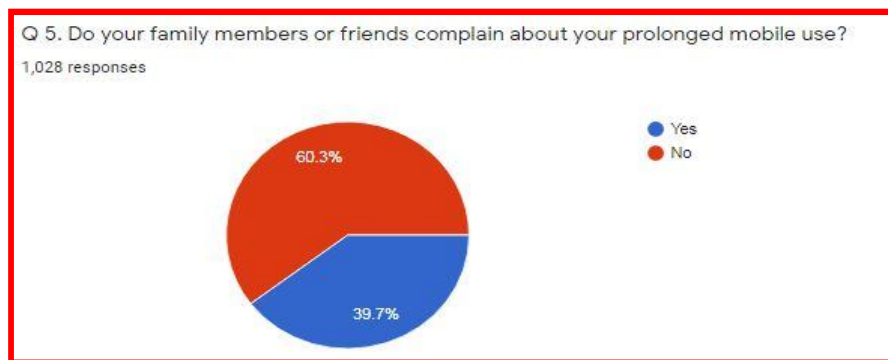


Fig.1.8

In the present study, 43.8% participants spend maximum time on their smartphone for leisure activities while 56.2% participants feel that the smartphone use has negatively affected other activities in their daily lives (Fig.1.7).Mobile phones are a significant innovation that has a very basic level changed the manner in which we impart and get data. Similarly, as with anything great, mobile phone usagecan prompt issues. According to the present study, only 39.7% participants responded that their family members and friends have a problem with their excessive use of mobile phones while the family members of 60.3% of respondents have no issues. (Fig.1.8). A majority of individuals felt the quality of their conversations degraded due to the presence of technology. In addition, the majority of respondents were bothered when family and friends used technology while spending time together. More than 78% of students noticed degradation in the quality of their conversations with others in the presence of mobile phones. This strongly indicated a decline in the face to face communications in terms of both quantity and quality.
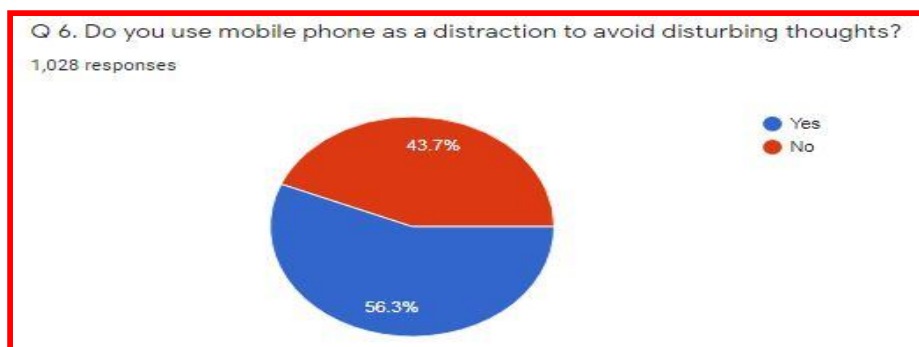


Fig. 1.9
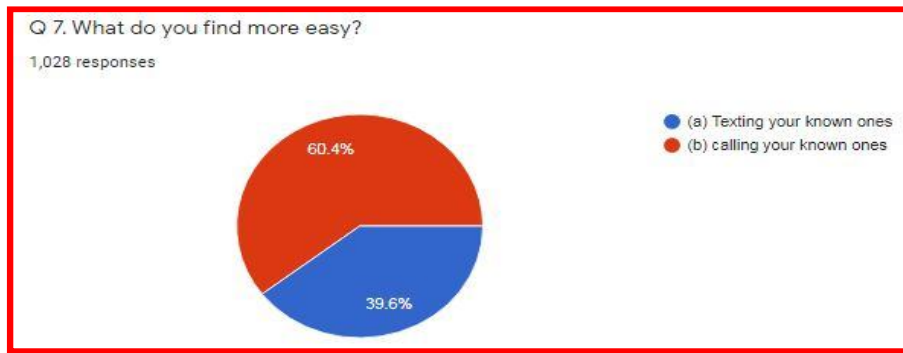
Fig. 1.10

Mobile phones were found to be used as a source of diverting the mind of 56.3% respondents from the disturbing thoughts.While 43.7% did not use mobile phones for distracting their minds (Fig.1.9).40.3% respondents felt restless or lonely when internet facility in their phones is not working or the phone's battery is fully drained. In our present study, 60.4% participants found that calling is easier and

simpler as compared tosending texts. Only 39.6% said that they feel texting to your family and friends is the easier way for communicating as compared to calling (Fig.1.10). Texting is one of thequickestapproaches for college students to get solutions of the questions from other students. It is noticeable that mobile phones are reducing interpersonal interactions.
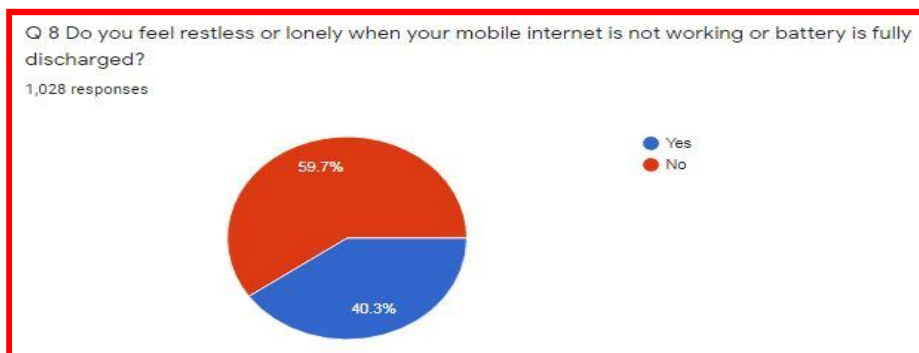


Fig. 1.11
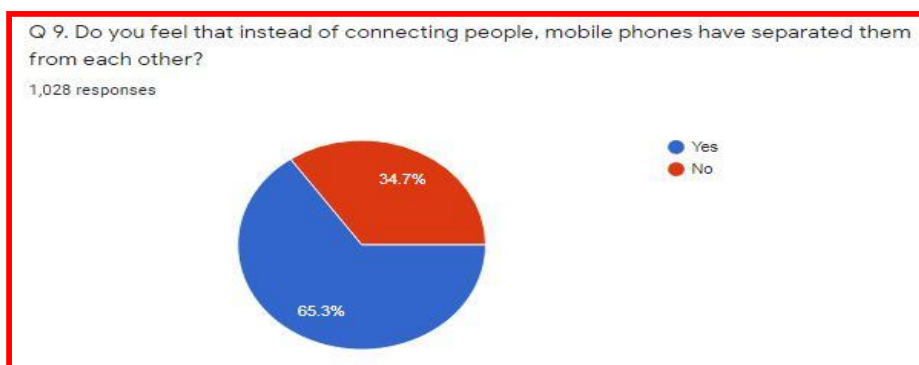


Fig. 1.12

Even mobile phone users feel lonely when their internet is not working or phone battery is fully discharged as it is also found in our present study in which 40.3% feel restless or lonely when internet is not working or battery is fully

drained (Fig.1.11). It was reported by 65.3% participants that although mobile phones make a person closer to the ones who live far away from them but actually make you far from the ones who are sitting next to them (Fig.1.12).
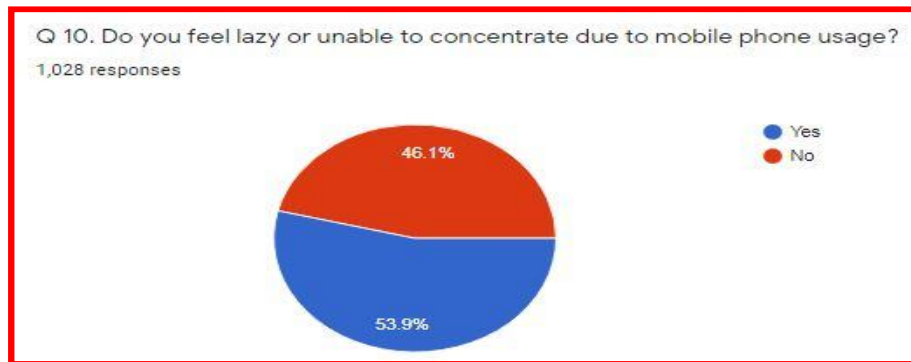
Fig. 1.13
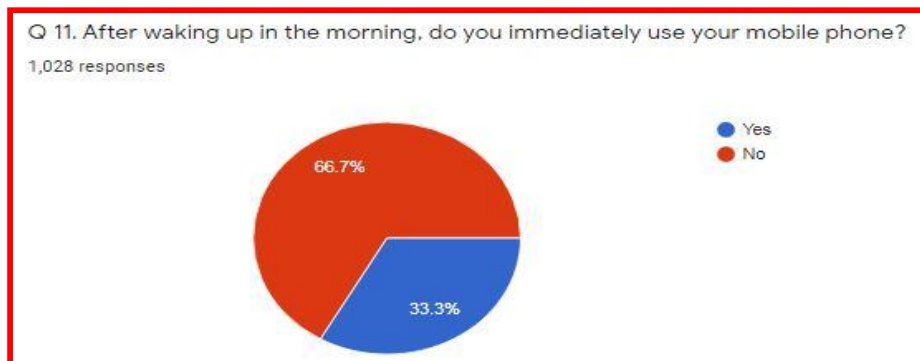


Fig. 1.14

More than half (53.9%) of the respondents feel lazy while using mobile phones. According to the survey, 66.7% participants begin their day by using mobile phones whereas only 33.3% participants start their day with some good activities other than using phones immediately (Fig.1.13). According to the survey, 66.7% participants begin their day by using mobile phones whereas only 33.3% participants start their day with some good activities instead of using phones immediately (Fig.1.14). According to this data, many individuals check their mobile phones like the morning paper, totally uninformed of the ruin it unleashes on their wellbeing.

## Discussion

Mobile phone is a portable device, used for communication and has relatively become basic need in everyone's life today. Just as every coin has two sides, similarly mobile phones also have two aspects: positive and negative. Before the invention of mobile phones, the landline telephone and letters were used as a medium of communication. Initially mobile phone was only used for communication, phone calls and text messaging but now phones have become minicomputers. It may be difficult to get some food item in the market but you will rarely find a person without a mobile phone. There is no doubt that a mobile phone is a handy tool. It eases communication with colleagues, friends, and relatives. However, every technology that provides such benefits comes with a set of negative impacts. The impact of mobile phones on youth and society is immense.

Use of the Internet has become a partof every student's life and a mean to search for the information as and when required. These days, use of mobile phones for internet purposes has become a routine and number of mobile consumers accessing the internet is surpassing fixed line internet users (Sarwar and Soomro 2013). The growing demand of Smartphones, easy availability of internet services with high speed is ready to provide an alternative channel to deliver education services. This provides an opportunity to the users to utilize their Smartphone to get educational benefits within their available time irrespective to their location (Sarwar and Soomro 2013). Distance education is a learning mechanism that focuses to liberate students from limitations of time and location, while offering flexible opportunities for education. The Smartphone with the capability of always connected makes it much easier for the students to avail this type of

education facility and makes the Smartphone a perfect fit device to access distance learning (Manoj 2011).. Students on sick leave or with health issues, or miss school for other reasons would be able to attend class through their Smartphone and keep up with their work, rather than falling behind due to unanticipated circumstances (Manoj 2011).

The smart phone provides a mean to reduce stress in busy work life. In today's busy schedule Smartphone enables users to interact with their friends and family as and when they get time. Interacting with friends and families, while traveling, waiting on bus stop enables users to utilize such time to promote their social life. It enables the users to interact and stay up-to-date with the latest news and development in the political and social circles resulting in reducing work stress. The concept of "use it or lose it" principle in psychology is very old and according to this concept, the key to keep your brain functioning in its peak condition throughout your life lies in its smart use. Instead of using the Smartphone only for entertainment, it could be used to access useful information, for example, access the news headlines, latest technology updates, and real time featured stories from respected news outlets around the world. This knowledge will build mental warehouse of information, and make the user a better communicator as well. It is also known that some videogames can have positive impact on people by strengthening their empathic tendencies. Social networking may build social bonds. Staying connected is easier than ever, and keeping the social bonds active allows reducing stress and promises social support (Gowthami and Kumar 2016).

The mobile phone usage is usually addictive especially in young ages. The usage of the mobile phone too frequently can result in severe brain damage. Many people usually suffer from headache due to using the mobile phone for a long time, particularly when chatting on it. The waves from the mobile phone move to the mind and cause a headache, which may even bring about poor memory. Excessive use of mobile phone also leads to heart diseases. If an individual is keeping their phones close to the body or considerably under the pillow, this may cause serious medical issues over the long run. Generally, excessive

mobile phone users fall asleep with the phone in their beds. Students are spending most of their time on the mobile phone, chatting with friends and posting photographs. The majority of students falls asleep with the phone in their hands or simply keeps it close in case someone calls. They spend their maximum time in using mobile phone, talking to their friends, relatives and even just checking what others posted on social networks such as Facebook or Instagram.

Using mobile phone before going to bed may cause restlessness and a sleeping disorder. This is why people spend hours trying to go to sleep after spending a lot of time on their phones. The waves of the mobile phones affect the brain, which causes difficulty while going for sleep, and thus, sleep deprivation. Not just mobile phones can influence the health of individuals if used too often, however they can also limit face-to-face communication between them. At this moment, people are able to use their phones to chat with others and even see each other even though they are far apart. But now a day's students use their phones to communicate in the classroom, in their homes instead of going out with their families and friends. It so often happens that every person sitting on the same table has their phone in their hands and chat with people or play games. Regardless of the reason, this prevents them from communicating with one another. Haugs et al (2015) reported that the blue light effects of mobile screen, using mobile in pre bed time, i.e., surfing the web, playing a game, seeing something exciting on facebook, or reading a negative email can also cause physical and psychological hyper excitability contributing to hyper arousal state and poor sleep quality.

The negative effects of smartphone use on productivity were not limited to work, but also and more strongly affected other daily activities outside of work. Duke and Montang (2017) stated that there is a moderate relationship between smartphone addiction and a self-reported decrease in productivity due to spending time on the smartphone during work, as well as with the number of work hours lost to smartphone use. These data support the idea that tendencies towards smartphone addiction and overt checking of the smartphone could

result in less productivity both in the workplace and at home.

Addiction to Smartphone is major impact on social life. Smartphone addiction is interfering with our night's sleep. Most of mobile phone users admitted that they check their phones for email and message throughout the night. This addiction to Smartphone is affecting the social and family life and creating frictions in our lives. Another aspect is that applications installed on Smartphone enabling image and video editing, allow individuals to manipulate the actual content and provide their version of the content. This shows that most of the time there will be issues with the authenticity of information received through these channels. Addiction to social networking, dating apps, texting, and messaging can extend to the point where virtual, online friends become more important than real-life relationships. Elsobeihi and Naser (2017) stated that people are avoiding to engage personally, uninhibited by mobile phones and devices and even when actually in the presence of others. They are becoming more reliant on communicating with friends and family through technology. These are partly because they spend more time on the mobile and internet and therefore have little time for interaction with their friends and family, perhaps because the internet offers them the platform for personal interactions with many people of diverse background around the world.

Smart phones play a major role in distracting our mind, especially when it comes to entertainment. Phones have become a means of unlimited entertainment for students, which helps them reenergize.After a day full of lessons and assignments, they can easily reduce their levels of stress by entertaining themselves through their phones. From latest movies, TV shows, to interactive games, as well as music, they have everything on their fingertips.There are many entertainment sources that can be both educational and fun. Many games help in enhancing various skills of the students that they can implement in their daily lives as well.

Mobile technology has drastically changed the cultural norms and behavior of individuals. The impacts are both at the positive as well as negative side. Smartphone 's enables students to text, cooperate on social networking sites,

check e-mails, play online games, and even watch TV channels. This is one of the sources of distraction. This is not only distracting for the student, but it can also become distracting for other students around them and even sometimes for whole class.Teenagers hide their smart phones on their seats and text one another, looking down to view responses while the teacher is not paying attention.In addition, it would not be easy for students to make calls during exams to cheat but it may be easy for students in a crowded classroom or examination hall to use their Smartphone's to access information online to cheat in exams. Relying on texting as a primary mode of communication can increase anxiety in teens. Texting is instantly gratifying, but it also produces anxiety. The instant replies by a friend can bring joy and excitement. However, in case of delayed response or no response, this same pleasure can turn into disappointment. In addition, cell phone addiction can turn into an obsession to check messages and reply immediately. It may also increase anxiety by creating an illusion that they had received a message even when there was no message, making them frequently check their phones.

Mobile phones have been linked to the increasing trends of loneliness in the society. One of the consequences of mobile phones is the development of internet addiction. With today's sophisticated mobile technology that provides access to social media sites, internet addiction has become a serious problem, mainly among adolescents. Earlier, loneliness was associated with old age but now teenagers having phone addiction are becoming lonely. According to Takao, et al. (2009) it is conceivable that lonely people are eager to maintain contact with their peers through frequent calls so as to fulfill their loneliness. We therefore would expect that higher or problematic phone use is predicted by loneliness. It is noticeable that mobile phones are reducing interpersonal interactions. Jin and Park (2012) found that more face-to-face interactions were associated with lower levels of loneliness; however, more cell phone calling was associated with greater loneliness. Reid and Reid (2007) revealed that lonely people preferred calls and rated text such as short

message service (SMS, or text messaging) as a less intimate method of contact.

Smartphone usage is responsible to blur the distinctions between the work and family life. The smartphone causes the employees to take the work into the home domain. Consequently, the blurring work and family life might lead to a worsened work–family balance. In short, the higher integration of the work and home facilitated by smartphone result in work home interference, which is considered as a potential source of stress (Sarwar and Soomro 2013).

Lazy thinking, cognitive easing or being a cognitive miser, is becoming more and more common. Instead of using our brains, we use shortcuts and offload information. The problem is that our brains are plastic and learning creates new neural pathways. As we age, neuroplasticity decreases. Relying on our smartphones to process, this information might have adverse consequences as our brains age. Our smartphones help us find a phone number quickly, provide us with instant directions and recommend restaurants, but new research indicates that this convenience at our fingertips is making it easy for us to avoid thinking for ourselves. Fawareh and Hejab (2017) reported that 61.41% strongly agreed that they feel incomplete or unable to concentrate when their smartphone is not with them.

Most importantly, we can't totally evade cell phone use, but we can reduce our phone usage and lower the risks associated with excessive mobile phone use. Maybe, one should not to neglect the significance of a sound morning schedule, which will establish the pace for the afternoon.Gibson (2017) stated that some people are replacing face-to-face conversations with cyber ones. Clinical psychologist Lisa Merlo says, "Some patients

pretend to talk on the phone or fiddle with apps to avoid eye contact or other interactions at a party.Furthermore,70% check their phones in the morning within an hour of getting up, 56% check their phones before going to bed, 48% check their phones over the weekend, 51% constantly check their phones during vacation and 44% reported they would feel very anxious and irritable if they did not interact with their phones within a week (Perlow and Leslie 2012).

## Conclusion

Use of mobile phones was found to have negative effect on the health and lives of the participants. It is recommended to reduce the duration of mobile use and involve one's good self in various other activities of recreation including more face-to-face interactions with the family and friends. Therefore, this technology should be used but with ample awareness so that it can be utilized properly. Efforts should be made to transform mobile radio communication to an efficient, secure and convenient system useful for the welfare and positive advancement global society and for this the government should take necessary steps for the mobile industry with proper regulation. A mobile phone could both be positive and negative; depending on how a user uses it. As mobiles have become a part of our life so we should use it in a proper way, carefully for our better hassle-free life rather than using it improperly and making it a virus in life.

## Acknowledgement

## References

1. Al Fawareh, Hejab M (6 November 2017). "The Use and Effects of Smartphones in Higher Education". International Journal of Interactive Mobile Technologies. 11 (6): 103-111.
2. Boulos M N, Wheeler S, Tavares C and Jones R (2011). How smartphones are changing the face of mobile and participatory health care; an overview, with example from eCAALYX.Biomed Eng Online. 10: 24.
3. Campbell S (2004). Normative mobile phone use in public settings.Annual Meeting of the National Communication Association. Chicago, IL.
4. Campbell S and Russo T (2003).The social construction of mobile telephony:

An application of the social influence model to perceptions and uses of mobile phones within personal communication networks. Communication Monographs. 70: 317- 334.

5.  Duke E, Montag C (2017) Smartphone addiction, daily interruptions and self-reported productivity, Addictive Behaviors Reports. Vol 6: 90-95.

6.  Elgan M (2010). Here Comes the New Cell Phone Etiquette. www.computerworld.com: http://www.computerworld.com/article/2522809/mobilewireless/here-comes-the-new-cell-phone-etiquette.

7.  Gibson E (2011). Smartphone dependency: a growing obsession with gadgets. Retrieved 27 September 2013 from USA Today.

8.  Gowthami S and Kumar V K S (2016) Impact of Smartphone: A pilot study on positive and negative effects. International Journal of Scientific Engineering and Applied Science (IJSEAS) – Volume-2, Issue-3, March 2016 ISSN: 2395-3470

9.  Haug S, Castro R P, Kwon M, et al (2015). Smartphone use and smartphone addiction among young people in Switzerland. Journal of Behavioral Addictions. 4:299-307.

10. Jin B and Park N (2012).Mobile voice communication and loneliness: Cell phone use and the social skills deficit hypothesis. New Media & Society. 1-18.

11. Lakshmi S K (2016) Smartphone impact on today's society. International Journal of Multidisciplinary Research and Development. Vol 3: 269-272.

12. Ling R and Thrane K (2001). "It actually separates us a little bit, but I think that is an advantage" - The management of electronic media in Norwegian households. Proceedings of the ICUST'01, Paris, France.

13. Ling R (1997). ''One can talk about common manners!'': The use of mobile telephones in inappropriate situations. Stockholm: Telia.

14. Ling R (2002). The social juxtaposition of mobile telephone conversations in public spaces. Conference on Social Consequences of Mobile Telephones. Chunchon.

15. Loughran S P, Wood A, Barton J M et al (2005). The effect of electromagnetic fields emitted by mobile phones on human sleep. NeuroReport. 16:1973-1976.

16. Manoj Kumar (2011). Impact of the Evolution of Smart Phones in Education Technology and its Application in Technical and Professional Studies: Indian Perspective‖. International Journal of Managing Information Technology. Vol 3: 3.

17. Miller G (2012). The Smartphone Psychology Manifesto. Perspectives on Psychological Science. 7(3): 221-237.

18. Murtagh G (2002). Wireless world: Social and interactional aspects of the mobile age. B. Brown, N. Green, & R. Harper içinde, Seeing the ''rules'': Preliminary observations of action, interaction and mobile phone use (s. 81-91). London: Springer.

19. Perlow and Leslie A (2012). Sleeping with your smartphone: how to break the 24/7 habit and change the way you work. Boston: Harvard Business Review Press.

20. Rambitan V M M. (2015). The Effect of Smartphone on Students' Critical Thinking Skill in Relation to the Concept of Biodiversity. American Journal of Educational Research. 3(2): 243-249.

21. Reid D J and Reid F J M (2007). Text or talk? Social anxiety, loneliness, and divergent preferences for cell phone use. Cyber Psychology& Behavior. 10: 424-435.

22. Rosenfeld B and O'Connor-Petruso, S. (2010). Rudeness in the classroom: A survey of college students' perceptions of inappropriate use of technology. 33rd Proceedings of the Association for Educational Communications and Technology: On the Practice of Educational Communications and Technology. 2: 263-266. USA.

23. Sahin S, Ozdemir K, Unsal A, et al (2013) Evaluation of mobile phone addiction level and sleep quality in university students. Pakistan Journal of Medical Science. 29:913-918.

24. Sar A H (2013). Examination of loneliness and mobile phone addiction

problem observed in teenagers from the some variables. The Journal of Academic Social Science Studies. 6(2): 1207-1220.

25. Sarwar M and Soomro R T (2013) Impact of Smartphone's on Society. European Journal of Scientific Research Vol. 98:216-226.

26. Takao M, Takahashi S and Kitamura M (2009).Addictive personality and problematic mobile phone use. Cyber Psychology and Behavior. 12(5): 501-507.

# EMPLOYING LITERATURE- DRAMA-AS AN EFFECTIVE TOOL FOR ENGLISH LANGUAGE TEACHING IN COVID ERA

**P. Tewari**

Department of English, Lloyd Law College, Greater Noida, Uttar Pradesh, India
drpreetitewari@lloydlawcollege.edu.in

_____

## ABSTRACT

*Almost no part of the world is untouched by the unpropitious impact of the pandemic- Covid 19. Teaching is one such field which has got the maximum jolts due to the lack of preparations and training of the teachers involved in the newly evolved teaching demands. So, without compromising on the quality of the teaching and, at the same time, making teaching (In this case, English Language) an enjoyably engaging activity, various tools could be considered even in the remote learning method- Drama could be one of those; as it is all about performance(s). Interestingly, a performance is sure to ignite the sensibilities of a student in a way that makes him/her not only understand but, internalize the concepts in a much better way. Role plays, simulations, etc. could be employed to enact parts/sections of a drama or the complete drama itself too. Students would be expected to read the text thoroughly and even acquaint themselves of the vocabulary, plot, idiomatic expressions used, and other such related aspects in order to portray the drama/ play exactly as expected which would lead to an enhanced experience of ELT. That is, without losing the soul of its essence, the play shall work as a catalyst in comprehending and practicing English language in a given context.*
*In a nutshell, the génré of the text is to be understood at all costs apart from the other significant elements to enact the same before a wider audience. Be it a terse dialogue delivery (including correct pronunciation) or adopting an apt body language including appropriate facial expressions and other related aspects, drama is capable of teaching language related nuances in the most engrossing of the ways, as, a good performance is even certain to impact learning of the non participating members of the batch in an inductive manner.*

_____

## I. Introduction

"Theatre in Education is a Basic Thread of 'Learning by Doing' "

– Radha – Teaching artist

"A school system can never be any better than the teachers teaching in it, if you want to start a revolution in education, make it happen in your own classroom."

– Sir Ken Robinson

Regrettably, the Covid 19 pandemic hit everybody in some or the other way. Education as a sector too had to face the music in this regard. And, consequently it increased the responsibility of the stakeholders-esp. the teaching fraternity- manifolds. The task of a teacher is, now, not only to cover the syllabus on time, but, to even incorporate tools that enhance the effectiveness of the said process of imparting education in a remotely accessible situation. The pandemic is a time when 'creativity' has become one of the most needed skills to be able to engage a large group of participants and to retain their unswerving attention. Drama, in my opinion, can help a teacher in conducting collaborative tasks in an online mode without any real need of major infrastructural facilities. A mere willingness to be able to *collaborate*, *experiment* and *execute* could be the key to staging a play successfully.

As we already know, Bharata Muni in the *Nāṭya Śāstra* emphasized upon the importance of drama in exploring the various avenues of learning a whole range of activities through the performing arts. Drama works wonders in the teaching and learning of the nuances of any language and its key elements. Drama has a lot of scope of playing with words; understanding characters and using creative imagination in developing their communicative competence and performance. Moreover, employing literature in teaching language gives way to practicing it in several given situations which require critical thinking along with being interactively engaging with all involved in the said process.

A classroom is a formal setting conducive to learning concepts in a variety of ways. Using drama in the classroom environment helps

students gain confidence by doing away with the stage freight which is generally present in most of the students. Learning tends to become exciting and a collaborative effort helps students learn from each other too.

Be it visualizing imaginatively or adopting as well as adapting to a given scenario; one learns to cope with all these by becoming flexible and accommodating.

Interestingly, literature is full of lexical items which are diverse, vividly distinct from the everyday vocabulary and specific to a particular génré, at times. And, learning these lays bare the colorful world of words- of all varieties which improves one's lexical repertoire apart from strengthening communication skills.

## II. Role of Drama in Imparting Language Skills

As already discussed in the introduction, drama plays a vital role in imparting language skills to the learners/ students by engaging them in a major way. It not only helps them learn grammar- integral to any language- but, it even exposes them to myriad socio-cultural contexts in which grammar is used in our everyday life situations.

Learners begin to enjoy the process of learning language (English, in the given context) with the help of short utterances. Especially, for a non native speaker like us- Indians, it caters to the cultural need to understand a particular word and its usage in a foreign setting.

Below are enumerated few of the various roles of drama in imparting English language:

- Drama could act as a great ice breaker for the newly admitted students (both in an online as well as offline mode)

- Literature and drama are a repertoire of possibilities with respect to English language teaching

- Drama can be easily employed as an important teaching learning tool which makes learners aware of the socio-cultural difference prevalent in different societies and time periods

- All stories have the same human emotions which are woven as per the specific social conditions

- It may successfully make students learn a moral values and ethical practices which otherwise could get ignored in a remote learning environment

- Classical literature helps widen learner's horizons and intensifies their learning experience

- The stress levels dip while participating in a dramatic presentation as it is a fun activity too

- Students' creative imaginative powers get developed

- Psychologically, there's no pressure of a teacher while learning through drama

- Life and its crucial lessons are learnt by all the learners, either implicitly or explicitly

- Character building and personality related intricacies can be understood in the most vivid of the ways

- Words specific to a particular génré can be learnt that too in the context(s) in which they are to be used

- Learners begin to acknowledge the role that literature plays in molding one's thought process which further shapes their personality too

- There are masterpieces in both English as well as American literature which gives exposure to the students and they begin to be appreciative of the world literature

- Learning any language in isolation is a waste. Therefore, drama gives ample chance to combine the two and internalize the concepts for life

## III. Benefits of Employing Drama in Imparting Language Skills Online

There are a number of benefits of employing drama in imparting language skills in an online method of teaching and learning. These could be given as under-

- Employing drama while teaching English increases the chance of grasping it by

almost all the students as it caters to all involved

- Drama has all the ingredients required to understand and learn a language and its nuances in detail

- The target language (which is English, in our case) can be easily learnt using drama sparingly as understanding the background, socio-cultural setting, and meaning of certain culture specific words is necessary in order to avoid any miscommunication/ misinterpretation

- Role of a teacher increases as s/he needs to have a thorough understanding of the drama being employed for imparting English language lessons

- The position of the teacher shifts from being at the centre to being at the background by playing the role of - an organizer, moderator, guide- as s/he needs to encourage the learners to make use of their creativity and other such skills while performing drama (either online or offline)

- Employing drama helps introvert learners become more participative and interactive

- Dialogue delivery and other related paralinguistic features help learners grasp the target language in one of the most effective of the ways

- Many students tend to emerge as leaders while working collaboratively for drama being used as one of the English language learning tools

- Critical thinking too gets enhanced given the different characters and their representation in different settings

- Employing drama even ensures understanding human emotions and using appropriate word(s) while communicating with people of different ranks and playing a variety of role in one's life

- It's drama that enlivens the characters and situations in a given milieu and passes on the language structures through usage

- LSRW (Listening, Speaking, Reading & Writing) may all be practiced using drama as a teaching tool

## IV.     Conclusion

At last, it may be said that the given pandemic scenario is not at all easy for people directly or indirectly associated with teaching. Language teaching, on the other hand, is a challenge in itself since there is no face to face interaction most of the times. Neither the teachers nor the students are trained to conduct themselves and learn in the said communication context. Online teaching in itself is full of many challenges that one needs to overcome with every passing day. As the adage goes- *The show must go on!* Hence, we are certain to work in such an environment for another couple of months, or may be years. And, for this, it's crucial to incorporate strategies and tools that prove to be feasibly effective. One such tool that can be employed in ELT is 'drama', of course!

Further, The Presentation of Self in Everyday Life is a 1956 work by the Canadian sociologist Erving Goffman in which he discusses from a sociological perspective in detail the way we present ourselves in everyday life. All of us are acting out theatrical performances in order to present ourselves with regard to how we wish to be seen. While facing the others, we are on the stage, to an extent. Essentially, we are recreating ourselves all the time with the evolution of our social world. In everyday life, first impressions are crucial. Therefore, the way we are perceived often depends on a blink of a moment, which may characterize us for a long period, if not forever. Even our communication skills have a role to play in the way we are perceived by others. In reality, each one of us wears a mask in public and reveal/hide as per the requirement.

Drama and literature are employed to use all the elements that encompass the projection of one's complete personality. Therefore, these should be considered to be used by all language teachers. Though, the complexity of literature could vary as per the class/grade/level. Role plays, simulations and staging complete dramas could be used as per the requirement of the learners and their respective levels. Further, it shall even better one as a communicator because the oratory skills get sharpened with every enactment. One even learns to present oneself in varied

situations using appropriate vocabulary and sentence structures. Fluency is attained as a byproduct of rehearsing and then, performing in the target/second language. The learners also get to understand the nuances of paralinguistics which accessorizes one's speech.

**Collie** and **Slater** (1987: 3-6) support the inclusion of literature in the language classroom as it provides priceless authentic material, develops personal involvement and help add to readers' cultural as well as language enrichment. These advantages, they move on to assert, can be achieved provided teachers use relevant and appealing material to learners through the use of activities that promote involvement, reader response and a solid integration between language and literature.

To sum up, it can be said that an intelligent trainer/ teacher/ faculty knows how to employ drama in enhancing the learners' second language learning experience by the non-native speakers. Though, the curriculum still needs to be upgraded in order to accommodate any such interactive activity which needs a well trained instructor/ teacher/ faculty who knows how to use this as a vital teaching tool to impart English language and, later, to be able to assess each of the learners appropriately. As a matter of fact, a lot of preparation and institutional support is needed to use this innovative technique in the optimum manner depending upon the learners' level and individual needs. A rich library and audio visual aids too would be required to acquire all important classics and to show some masterpieces to the students as and when feasible. Practically speaking, any innovative and creative inclusion to enhance the learning experience should be welcomed by the entire teaching fraternity looking for best of the results.

## References

1. Goffman, Erving (1956), The Presentation of Self in Everyday Life. Penguin Books, London.

2. Holden, Susan (1981): Drama in Language Teaching. Essex: Longman

3. Johnstone, Keith (1999), Impro for Storytellers. Routledge, Taylor and Francis Group, NewYork

4. Royka, Judith (2002). Overcoming the Fear of Using Drama in English Language Teaching. The Internet TESL Journal, vol. 8, #6, June. http://iteslj.org/Articles/Royka-Drama.html

5. Sam, Wan Yee (1990) Drama in Teaching English as a Second Language- a Communicative Approach. The English Teacher, vol. 9, July. Malaya.

6. Wessels, Charlyn (1987). Drama. Oxford, Oxford University Press.

7. Collie, J. and S. Slater. (1990). Literature in the Language Classroom: A Resource Book of Ideas and Activities Cambridge: CUP.

# IMPACT OF COVID-19 PANDEMIC ON SAVING AND INVESTMENT HABITS: A STUDY ON INVESTORS OF SHIVAMOGGA CITY

## Dileep Kumar S.D.[1] and Rudramuni P.B.[2]

[1]PG Department of Commerce, PESIAMS, Shivamogga
[2]Department of Commerce and Management, PESIAMS, Shivamogga
[1]dileepsd87@gmail.com, [2]pbrpbr1996@gmail.com

_____

## ABSTRACT

*Covid-19 Pandemic has impacted the whole world in all respects to the entire humanity. However, it has also a huge effect on the savings and investment of people due to the huge impact on income and liquidity position. It has disrupted our spending habits and preferred investment also. Nowadays people cautiously spend money pondering - how, when and where to spend. Due to above the change in spending and savings are quite obviously happened. Worldwide/Nationwide lockdowns helped to reduce the massive spread of Covid-19 but it disrupted the entire business community/activity which made business and job to suffer at a greater extent. In this challenging scenario, saving and investment has emerged as two strong pillars of our economy that helped to sail through in survival from pandemic. Savings in general is a deeply rooted and ancestral prudence in our nation. It has saved us several times from economic disaster for centuries. The purpose of the research paper is to analyze the impact of Covid-19 pandemic on Saving habits of individuals in Shivamogga. The aim is to understand to what extent did savings help a normal citizen ride out the massive storm of Covid-19 and what are the changes have happened in the saving and investment habits.*

_____

*Keywords: Covid-19, Investor preferences, Savings, Investment etc.,*

## Introduction

Investing is an emotional and enthusiastic activity where it is associated with necessities and dreams and when uncertainty rises, it puts your planning for your need and dreams at stake. The COVID-19 shock was unprecedented in our lifetime; however, so was our response. Investing activity in the pandemic has become a more emotional experience for the investor because of the high volatility and unpredictability of the markets and the changed sentiments of the investors. Believed to be incepted in Wuhan city of China, COVID -19/Noble Corona Virus, an infectious disease has assumed the title of a pandemic due to the speed with which it is growing and the effect that it has on life. Covid- 19 has affected millions of people around the world and claimed lakhs of lives, leaving families broken and the world deeply wounded. Virtually, it has brought the world to stand-still. Apart from its effects on the physical health of the people, it has also hit very hard by the economy where it hurts the most. It has affected the pockets of almost every stratum of the society, leaving thousands jobless and without a steady source of income. As India took a very aggressive stance, slow the spread of Covid 19, the economic activity came to a halt and has brought it to its knees. With reduced mobility, and disrupted supply chain management, businesses across all sectors have had to scale down their operations drastically, lay off employees or reduce salaries. The muted economic activity and ceasing of multiple businesses has forced us all to rethink the role of saving and investment in our everyday lives and for the future. Many families and individuals have had to dive into their meager savings to sail through this uproar of Covid 19, and this has once again highlighted the benefits of smart saving and investment. In this research paper, we will try to analyze the impact Covid-19 has had on the saving and investment and preferred avenues for investments due to this catastrophic impact with global ramification. Let us first understand the different level of effect on different dimensions of life.

## Significance of the Study

The effect of Covid-19 on various working sectors: Covid-19 effect can be seen among people working across all above sectors, but the scale of its effect varies across all sectors. The worst affected are daily wage earners and citizens engaged as domestic help because they were the least prepared for the calamity and because they were the first to lose their

employment. Many were left in such sad states that they had to resort to begging which otherwise would have been a taboo were the. Many waited and continue to wait for the government's support for their daily survival. We were made to understand from the beginning of our career through our parents/relatives about the importance of saving money. In the initial years, saving is little difficult as we have just started to earn limited money and we want to buy each and everything that we like. Covid-19 has taught us to save more and spend less. Nowadays, people are not spending more due to lockdown. They are not shopping, not spending on leisure, not travelling and neither are they eating outside food. People are getting pay cuts, losing jobs, etc. So now, people are spending only on necessities like grocery, vegetables, etc., rent, education, insurance, EMIs, etc. There is a change in the behavior of Indian consumers now there are no impulse buying and discretionary expenses have reduced . The situation has made us realize that financial planning is very important. One must create an emergency fund which should be at least 6 months of the expenses. One should start investing in liquid instruments or recurring deposits or SIPs because as of now, it is essential to hold cash. By investing in liquid assets, one gets a minimum return as idle cash earns nothing. One should increase the savings with the increase in income. People are concerned that their savings will finish soon. It is found that few people are saving more as now they do not have access to spend due to lockdown situation on the other hand it is also observed that few people are not able to save due to pay cut. It is also discovered that due to COVID-19, few people have withdrawn their savings like fixed deposits, recurring deposits, etc. This is not the time to borrow so you must delay your expenses like buying car or home, etc. As per RBI report, now the people are hesitant to take loans, education loan reduced by 0.8%, personal loan by 2.9%, vehicle loan by 2.7% and home loan by 0.7%. All the markets and malls are open, but the crowd is less due to be cautious on where to spend. Let's hope that the saving habit of young people may continue even after this pandemic is over. Hence, the present study has been taken up. On the lines of the above observations, a comprehensive and systematic study is required at the micro level covering different inter-related aspects of this problem area extensively.

## Objectives of the Study

The primary objective of this research paper is to evaluate the Impact of Covid-19 Pandemic on Saving and Investment Habits. In addition to the primary objective, the supportive objectives are set to make the study more meaningful and which are presented as below:

- To analyse the major effect of Covid-19 pandemic on saving habits of the investors.

- To study the investors' preference towards investment habits during Covid-19 pandemic.

- To offer valuable suggestions based on the findings of the study.

## Scope of the Study

To fulfil our objectives, the methodology adopted is to visit various areas in Shivamogga city seeking the opinion of the population about their life before and during Covid-19, their income source, and stability and saving habits. Shivamogga city proves to be an excellent research and sampling area due to its growing urbanization on the one hand to its industrialization in the other hand. It has earned its name as a growing educational hub for the country while at the same time is a home to various businesses both old and start-ups. Shivamoggacityt has therefore seen the effect of Covid-19 on its economic activity, on its jobs and its businesses.

## Research Methodology

Research methodology which mainly explains the flow of research is concerned. It is an important section of the study, which particularly throws light on the study area followed by adoption of the sampling procedure, sources of data, statistical tools and techniques used for data analysis and so on.

## Research Design

The present study is purely a descriptive research as it analyses, describes and evaluates the data related to impact of covid-19

pandemic on saving and investements habits of an individual investor.

### Sources of Data Collection

For obvious reasons, this study is mainly based on the primary and secondary data.

a) **Primary Data:** The primary data has been collected through online survey of the concerned respondents with structured Questionnaire.

b) **Secondary Data:** The secondary data has been collected from published sources such as textbooks, journals, newspapers, periodicals, websites, annual reports submitted by various committees or departments and commissions, etc.

### Sampling Design

a) **Target Population:** The population for the research is people who are engaging in different kinds of activities like business, start-ups, Government or private employees, daily wage workers and self-employed professionals etc.

b) **Sampling Technique:** convenient sampling has been used in the selection of the respondents.

c) **Sample Size:** Total sample size 137 respondents.

### Research Discussion and Results

### The COVID-19 pandemic, financial impact on the Indian Economy

The impact of COVID-19 has far-reaching effects on the Indian market. The major brunt of the economic crisis is being shouldered by the country's citizens. So far, the Covid-19 financial impact has been negative and led to the following:

❖ **Sudden rise in unemployment rates:** Due to lockdowns & several other restrictions majority of the industries were shut down. It has created the continuous rise of unemployment rates. It is one of the main side effects of the Covid-19 economic loss. Citizens continue to lose their jobs/business/livelihoods. Those in the informal work sector are experiencing the hardest of economic hardship. As daily wagers/unorganized sector function are at standstill. Specially the work force engaged in construction, real estate, trade, transport and manufacture seem to have suffered the Covid-19 financial impact the most. They are struggling for their both ends meet. Even house maids, drivers, servants, small traders, street vendors are finding it very difficult to survive due to restrictions were put on the movements and logistics. Start-ups and unorganised sector took a massive blow due to the disrupted supply chain, unable to pay off their employees or even pay EMI's of their loans.

❖ **An empirical Crash in GDP:** It is a special phenomenal affect on economy. India's GDP was already facing a massive slowdown in the past years. But the arrival of the pandemic has led the country's GDP towards a new low. In April-June, the National Statistics office recorded a contraction of -23.9% of India's GDP rate. It is evident from these numbers that the intensity of the Covid-19 economic loss is set to get worsen. However, there is massive recovery has been observed during October-December quarter due to phased removal of restriction and opening of industries. Accordingly the shrink on GDP has been estimated at around 9% for the financial year 2020-21. Old and well settled businesses were also not left untouched. They did however have handsome sums saved up for a rainy day, which was sufficient to ride through the storm but it wasn't enough and hence made it impossible for them to continue paying their employees even during the loss period. Many of them lay off employees, cut-off salaries and even those who were able to take care of their employees had to pay a heavy price for it. The subdued cash flow and uncertain business environment have forced them to take above survival measures. The difficulties faced by businesses had a direct impact on private employees who almost in a day lost their jobs or were forced to work on half or even less salaries. In this sector, saving and investment the most important role as they had to dive into their savings for their survival. Many of them took menial jobs or started their own little businesses to

make their ends meet and manage the gloom created by pandemic.

- ❖ **Shattered health infrastructure:** Due to sudden outbreaks of pandemic and mammoth requirements of health infrastructures, it has created tremendous pressure on citizens, India's public health infrastructure. The absence of ample infrastructure, coupled with the explosive population, has led to poor health care practices. Moreover, under staffing in hospitals is putting the burden of treatment on the handful of the country's doctors. As a consequence, even healthcare professionals are facing a harsh Covid-19 financial impact. Several of doctors, nurses, support staffs lost their lives serving the Covid-19 suffering patients.

- ❖ **Huge migrations:** The work force from metros to rural/native place has happened in bulk which has crumbled the industry. It has created almost chaos on the roads and other mode of transport. Several people lost their lives, near & dear ones due to massive migration through roads. They also faced social boycotts and kept in isolation to control the spread of the virus. Citizens employed in government jobs, although did not face the eye of the storm but had to make various lifestyle changes. Pandemic made them more cautious while spending and increase the portion of savings.

### COVID-19 affect on financial goals of an Individual

Covid-19 has disrupted people's financial aims/planning. This has forced them to reassess their financial inflow and situation. Covid-19 personal finance impact has seen a sharp increase. And in the past few months, the cost of living has become higher due to cascading effect on demand/supply & production.

### Major Effect of Covid-19 on Saving Habits of People Under Various Age Groups:

This study showed that people age group between 30 - 40 years of age already had a habit of saving inculcated in them from the beginning, the young generation and millenials were considerably new to the idea. Their philosophy in life was "living in the moment" and "spending what you earn". But this

philosophy changed almost overnight, with Covidd-19 bringing their incomes to a halt, making them realize the importance of a small sum of money saved up for a rainy day. More and more individuals below the age of 40 years seemed to be interested in understanding the various ways and techniques of investments, some even hired relationship managers for this purpose.

- a) **Reduced savings and investments:** Investing money in investment avenues such as the stock market, mutual funds, equity, real estate, fixed deposits, etc. have always been investment avenues and saving options. But, since the start of the year, the loss of jobs has led to a decline in investments. As a result, citizens have suffered a severe COVID-19 personal financial impact.

- b) **Increased insurance premium:** Another impact of COVID-19 is the increase in insurance premiums in existing insurance policies. Several insurance companies have put the burden of the Covid-19 economic loss on policyholders. This has put holders of life and medical insurance policies in a fix. By the end of the year, insurance premiums for varying insurance policies will hike up by 10-20%.

- c) **Unplanned halt to professional/ career goals:** One of the drastic Covid-19 personal finance impacts has been the sudden shift in career and professional goals. Those in the early stages of their career like graduates and part-timers are finding it hard to find a job. Those with plans to move out of the country for studies have faced a sudden halt to their plans due to the added financial cost and travel restrictions in most countries. Moreover, middle-aged workers are facing a heavy cash crunch. And retired individuals are at a risk of their savings drying up.

### Investors Preference Towards Investment Options During Covid-19

Indian savings contribute to about 60 percent of the country's savings. However, the covid-19 uncertainty has caused a rise in force savings and slow spending. Various ways of saving are available to us, following four

assumed the most important in the current pandemic situation:

❖ **Health Insurance:** this study shows that many individuals started investing in health insurance without much hesitation, which is considerably new for our society and is a welcome step and growth in premium/policy observed over 30%.

❖ **Life Insurance policies:** Covid-19 has shown the absolute uncertainty of life. The plight of families left alone and without earning members is not hidden from anyone. More and more people each day is opting for life insurance, as a means to safeguard their family's future.

❖ **Systematic Investment Plans (SIPs):** SIP has been gaining popularity with Indian investors for quite some time now but Covid-19 pandemic gave it much more importance. When the small monthly savings in the form of SIPs helped individuals in sustaining these hard times, it led to more and more people adopting SIPs as a way of life.

❖ **Bank Fixed Deposits:** When the entire economy was brought to its feet, the only thing that provided a little solace was that amount of money that was tied up in Fixed deposits in banks. It was safe, easily retrievable and catered to all short term needs of the citizens. For many people, when everything else failed, fixed deposits in the bank was the only form of saving that helped them face these difficult times.

### Summary of Major Findings

Novel Corona Virus has put very profound effect on the world, causing an unprecedented health as well as economic crisis. Almost all sectors of people took pay cuts; many became unemployed and suffered irreversible losses in business. The pandemic has once again highlighted the importance of saving and how saving is a tradition in India, which has many a times sheltered India from the effects of global economic turbulence. Not just the middle aged and older population, but young adults and millennials too have identified with the importance of saving and are trying to inculcate the habit of consistently saving. The situation is grim and the rainbow at the end of

this storm will not be seen for a while, but there is hope  vaccination which is already started. As long as we work together, save and move forward no pandemic in the world can stop us in our journey towards growth and prudent investment continues.

### Suggestions of the Study

The study showed consensus among people over all age groups, work sectors that saving is necessary and need of the hour. The following are the suggestions from individuals about what they considered was the best way to save money so as to invest it for future use.

➤ Important to decide on a percentage of income that will go to the saving fund, in spite of the amount that one earns should be at least 30%.

➤ Establishing a budget by realizing one's spending habits and analyzes it every month.

➤ To begin Small but consistent.

➤ Keep your tax returns and find ways for better planning.

➤ Stop impulse buying & unsubscribe for marketing emails or websites that lead to impulse buying.

➤ Reduce spending on social events like marriage, birthday etc.

➤ Sponsor one day a week "as nil expense day".

➤ Buy only what is necessary/essential & control habit of stocking in excess, stock only non perishable items available at reasonable price.

➤ Regularly check on your utility bills and analyze it.

➤ Go Natural & neutral rather on ready made.

### Conclusion

Investor savings and investment habits are dynamic. They are influenced by investor behavior and also a number of external forces. Therefore, Covid–19 was an unprecedented event that changed the paradigm of the entire world and has established a "new life of people". This research has made a systematic attempt to study the impact of covid-19

pandemic on saving and investment habits of an individual. Generally Investors prefer asset classes that ensure constant and steady returns at minimum risk.Ultimately Investment is a rational decision that depends on the individual's risk appetite and return expectations arising out a subjective assessment of multiple factors.

## References

1. www.Covid19India.org
2. www.financialexpress.com
3. www.timesofindia.indiatimes.com
4. https://www.outlookindia.com/outlookmoney/opinions-and-blogs/impact-of-pandemic-on-our-savings-culture-7194

# ASSOCIATION OF PERCEIVED SOCIAL SUPPORT WITH DEPRESSION, ANXIETY AND STRESS AMONG PRIMARY INFERTILE COUPLE

## S. Mittal

Pandit Deendayal Energy University, Raysan, Gandhinagar

mittalsoni12@gmail.com

_____

## ABSTRACT

*Background: Studies conducted on infertile women in the literature investigated some features such as loneliness, depression, anxiety, quality of life, and social support. However, there has been no study examining the relationship between levels of perceived social support and depression, anxiety, & stress in infertile couples. Considering this deficiency, the study was conducted to determine the association between perceived social support and depression, anxiety, and stress in primary infertile couples. Materials and Methods: 30 couples (30 females and 30 males) entered into the study, who were treated by an in vitro fertilization process after being diagnosed with infertility. We collected the data using the Information Form, Multidimensional Scale of Perceived Social Support (MSPSS) by Zimet, Dahlem, Zimet & Farley (1988), which has 12 statements and the Depression Anxiety and Stress Scale (DASS) by Lovibond, S.H. and Lovibond, P.F.(1995), which has 42 statements. The obtained data was evaluated by applying independent samples t-test using SPSS 23 (Statistical Program for Social Sciences) Packaged Software. The significance level was p<0.05. Results and Conclusion: we observed that out of the participants, 50% are female and 50% male, 75% are living in nuclear family, and 80% couples from urban area and all couples are primary infertile. We found that the mean score of MSPSS is 62.07±6.921 and DASS is 40.03±30.838. There was a high statistical significance between MSPSS and DASS (p<0.01). The present study suggests that perceived social support negatively affects the level of depression, anxiety and stress of infertile couples.*

_____

## Introduction

Having a child is one of the life beauties. In present times, family values are changing tremendously, yet the necessity of motherhood for women and men remains indisputable. Infertility is the failure of couple to become pregnant after one year of regular, unprotected intercourse. There are two type of infertility. Primary infertility refers to couples has never conceived after at least 1 year having sex without using any contraception. Secondary infertility refers to couple previously conceived but was unable to conceive later. Globally most infertile couples suffer from primary infertility. Infertility has been classified as the social illness by World Health Organization (WHO).

Infertility affects an estimated 15% of couples globally. According to WHO one in every six couples in developing countries is affected by infertility. Nearly 80 million people have been impacted by infertility. According to Indian Society of Assisted Reproduction (2019), currently infertility affects about 10 to 14% of Indian population, with higher rates in urban areas. Infertility can affect both males and females. The inability to get pregnant is typically self-diagnosable. According to The

American Reproductive Medicine Society, Fertility often starts to fall in the 20's and 30's for most women and decreases faster when they are aged 35. Married couple feel like not fulfilling the duty of family when they does not succeed in reproducing. Negative effects on marriage, sex life, future goals, the image of the body, and the quality of life of couples. Stress, worry, sadness, guilt, social loss, dread, societal labelling or despondency are suffered by infertile couples.

## In Vitro Fertilization

Nowadays, many couples prefer to delay conception which has an raised infertility issue associated with age. In vitro fertilization (IVF) is intricate procedure used to help to prevent genetically problem and assist with conceiving pregnancy. IVF is one of the most effective forms of supporting reproductive technology. IVF has been effectively used to help blocked fallopian tubes and hereditary for more than 20 decades. In a medically supervised laboratory mature embryo are retrieved from the ovaries and fertilized by semen under artificial conditions. . IVF success rate depends primarily on the age of the patient. For women under 30 the success rate is about 60%, women

between 30 to 35 years, the rate is approximately 50%, for those between 35 to 40 years, it is approximately 40% and above 40 years, it is about 33% (Okafor NI, Ikechebelu NN, Ikechebelu JI. 2017). Normal people recognition the use of IVF treatment by infertile couples has raised day by day from 60%(2008) to 76%(2015). The statistics of IVF using for heterosexual couples is 60%, compared to 44% for a survivor. The ratio of IVF acceptance is reportedly higher for families, individuals (61%) and same-sex couples (64%) (Fauser et al., 2019).

### Perceived Social Support and Depression, Anxiety, and Stress

Social support is important factor for the infertile couples to help preserve their physical and emotional health. Social support is a good technique of coping that leads to love, affection, trust, expressiveness, self-awareness, and belonging. Even though the unpleasant circumstance, it enables individuals to be more optimistic by decreasing their levels of anxiety. It helps people cope with challenges and generate new solutions, and reduce their despair. Perceived social support is associated with well-being, as perceived levels of support, care and love may provide positive experience (Siedlecki et al., 2014). The research has shown that high level of social support are associated with good physical and psychological health (Uchino et al.,2013).

According to WHO, worldwide more than 264 million people are suffer from depression. It is feeling of sorrow, loss of interest, disturbances of sleep and hunger, fatigue, etc. Both anxiety and stress are comparable, but not identical. Stress reflects the day-to-day difficulties and poor living conditions, while anxiety is a counter action to the stress (2017). Many early studies suggested that infertile women reported no significant differences in symptoms of anxiety and depression than fertile women. However, Chen TH. (2004) study utilized a structured psychiatric interview. A total of 122 women were interrogated and results show that 40 per cent of women were diagnosed with depression and anxiety before their initial infertility appointment.

### Research Studies

Different research studies have shown that infertile couples require emotional support, professional psychological treatments and patient-centered interventions. Infertile couples are suffering from fear, animosity, distrust, fear and sadness (Csemiczky et al., 2000) and experienced pregnancy failure are linked to an increasing level of depression (Slade et al., 1997). Male and female reactions differ for infertility related stress. (Benyamini et al., 2004, 2009). Both partners apply various methods to deal with infertile stress (Peterson et al., 2006). Study showed that the very ART and certain IVF treatment processes have an adverse psychological effect on people (Eugster and Vingerhoets, 1999). The psychosocial function of both partner and as individual may be affected by different phases of IV F procedures [blood testing, daily injection, provision of sperm samples, ultrasound inspection, etc.]. Stress is also linked with the unfavourable social assessment of infertility treatment, because becoming as a parent is an important factor of adult social role and identity (Möller and Fällström, 1991; Malina et al., 2016). Study described that social support decrease fertility issues related stress (Cobb, 1976; McNaughton-Cassill et al., 2000; Dudek and Koniarek, 2003; Koss et al., 2014; Ying et al., 2015). One of the characteristics of childlessness is the inability to utilize normal social support resources because of the low level of disclosure of infertility (Holas et al., 2002; Hoff et al., 2009). Hence, processes of social support offer an initial step to help infertile couples dealing with fertility issues (Dembinska , 2012). Although there are some research studies showing that psychological support can improve the subjective well-being of couples who are infertile, few studies have discovered social support and its effect on stress hormones level (Boivin, 2003). The mental support of spouse has always been an important factor for coping with infertility (Ying et al., 2015a). Research explains that support for partners may be an essential intervention objective in order to enhance outcomes of pregnancy. Studies have revealed that pregnant women suffer from prenatal anxiety, depression and smoking with poor partners' support (Cheng et

al., 2016). Some research show that psychological assistance is used to alleviate stress by training for relaxation or conduct treatment and to increase pregnancy (Eugster and Vingerhoets, 1999). Supporting social contact is critical to the management of stressful fertility treatment circumstances. Inadequate psychological support, lack of therapeutic intervention, low socioeconomic position, inadequate foreign citizenship and poor support for partner groups are all linked to an increased risk of depression (Atherton F, Howel D. 1995).

## Methodology

**Aim:** The present research is to study the relationship between infertile couple with IVF treatment, perceived social support and depression, anxiety and stress.

## Methods and Materials

Through purposive sampling data was collected from 30 infertile couples with IVF (30 males; 30 females) from Gujarat. The criterion for selection is married couples who had been processing IVF treatment after diagnosed with primary infertility. The participants had different gender from female (50%) & male (50%), different family type from Joint family (25%) & Nuclear family (75%), and different habitat from urban (80%) & rural (20%).

## Tools

### 1. Multidimensional Scale of Perceived Social Support (MSPSS)

MSPSS developed by Zimet et al. in 1988. It is a 12 question scale to subjectively assess the social support was used in this study. In 1995, Eker and Arkar carried out a reliability and validity assessment of the scale. The MSPSS include 12 items, 7-point, Likert-scaled, which comprising three sub-variables: family, friends, and significant other. There are 4 items for each sub variable. The MSPSS measures family support from items no. 3, 4, 8, and 11; items 6, 7, 9, and 12 measure the friend

support; and items 1, 2, 5, and 10 measure the support of significant others. The higher score obtained from the scale signifies a higher level of perceived social support.

### 2. Depression Anxiety and Stress Scale (DASS)

In 1995, Lovibond, S.H. & Lovibond, P.f. developed DASS. This is a 42-item scale, containing three self-assessment scales to measure negative emotional states of depression, anxiety, and stress, and each scale contains 14 items. The depression scale evaluates dysphoria, devaluation of life, hopelessness, lack of interest, self-deprecation, anhedonia, and inertia. The anxiety scale evaluates autonomic arousal, situational anxiety, skeletal muscle effects and subjective experience of anxious affect. The stress scale is evaluated nervous arousal, difficulty relaxing, irritable/over-reactive, impatience and being easily upset. . DASS is a 4-point severity/frequency scale, $28_+$ score describe extremely severe depression, the $20_+$ score describe extremely severe anxiety, and the $34_+$ score describe extremely severe stress level.

## Data Analysis

Responses obtained on various measure and data subjected to various analyses such as Mean, Standard Deviation, t-ratio, and p value. Obtained results was interpreted and discussed in the light of procurable literature.

## Results

In the present research study data analysis has been done by statistical package for social sciences version 23 (SPSS-23). Results described as per hypothesis are follows as:

### Hypothesis 1 , 2, & 3

There is a significant difference in the MPSS between Gender.

There is a significant difference in the MPSS between Family type.

There is a significant difference in the MPSS between Habitat.

**Table-1: Showing t-test was used to compare the mean score of Multidimensional Scale of Perceived Social Support (MPSS) obtained from gender, family type and habitat.**

| Multidimensional Scale of Perceived Social Support (MPSS) | | | | | | |
|---|---|---|---|---|---|---|
| Variables | | N | Mean | SD | t-value | p-value |
| Gender | Female | 30 | 61.77 | 7.04 | -.333 | .664 |
| | Male | 30 | 62.37 | 6.91 | | |
| Family Type | Joint | 16 | 63.00 | 6.57 | .627 | .139 |
| | Nuclear | 44 | 61.73 | 7.09 | | |
| Habitat | Urban | 49 | 62.22 | 6.87 | .370 | .527 |
| | Rural | 11 | 61.36 | 7.43 | | |

Results showed that all three hypothesis are rejected as p-value is grater than 0.05(p>0.05). This shows that there is no significant difference between female & male, joint & nuclear family, and urban & rural population.
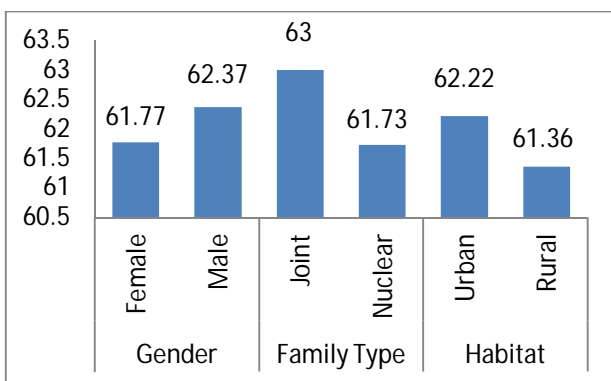


Figure 1: Graph depicting means of MPSS among gender, family type, and habitat of

infertile couples with IVF. There are no higher difference seen between means score of female and male, joint and nuclear family, & urban and rural population it was nearly similar. Based on the results, a significant difference was observed in the relationship between demographic variables and MPSS, means of gender (p>0.05), family type (p>0.05), and habitat (p>0.05).

### Hypothesis 4, 5, & 6

There is a significant difference in the DASS between Gender.
There is a significant difference in the DASS between Family type.
There is a significant difference in the DASS between Habitat.

**Table-2**: **Showing t-test was used to compare the mean score of Depression, anxiety, and stress scale (DASS) obtained from marital status and family type.**

| Depression Anxiety and Stress Scale (DASS) | | | | | | |
|---|---|---|---|---|---|---|
| Variables | | N | Mean | SD | t-value | p-value |
| Gender | Female | 30 | 40.20 | 31.53 | 1.568 | .094 |
| | Male | 30 | 33.87 | 29.36 | | |
| Family Type | Joint | 16 | 38.63 | 30.17 | -.212 | .355 |
| | Nuclear | 44 | 40.55 | 31.41 | | |
| Habitat | Urban | 49 | 41.20 | 31.15 | .617 | .270 |
| | Rural | 11 | 34.82 | 30.26 | | |

Results showed that all three hypothesis are rejected as p-value is grater than 0.05(p>0.05). This shows that there is no significant difference between female & male, joint (8 couples) & nuclear family (22 couples), and urban & rural population.
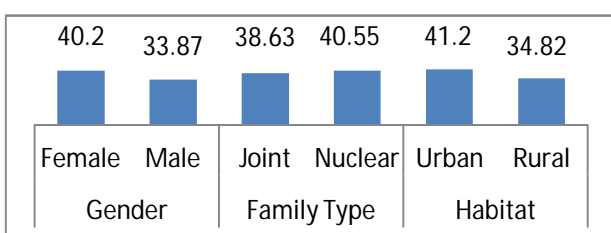


Figure 2: Graph depicting means of DASS among gender, family type, and habitat of infertile couples with IVF. There are not much difference seen between means score of female & male, joint & nuclear family, and urban & rural population it was nearly same. Based on the results, a significant difference was observed in the relationship between demographic variables and DASS, means of gender (p>0.05), family type (p>0.05) and habitat (p>0.05).

**Table: 3 Showed the t-test was used to compare the mean score of Multidimensional Scale of Perceived Social Support (MPSS) and Depression, Anxiety, and Stress Scale (DASS).**

| Variable | N | Mean | SD | t-value |
|---|---|---|---|---|
| MPSS | 30 Couples | 62.07 | 6.921 | 6.301 |
| DASS | 30 Couples | 40.03 | 30.838 | |

Sig=.000

Table showed that the mean score of MPSS is 62.07 and DASS is 40.03. The t-value of MPSS and DASS is 6.301. The p-value is less than $0.01 (p<0.01)$, there is a highly significant difference in the MPSS and DASS.
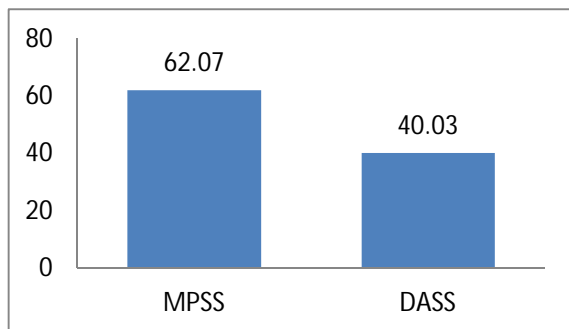


Figure 3: Graph showing mean score of MPSS and DASS among infertile couples with IVF treatment.

### Discussion

The results of the t-test showed that no significant difference was seen in MPSS between gender (female & male), family type (joint & nuclear), and habitat (urban & rural). The current research has been supported by Erdem K and Ejder Apay S(2014) on a sectional study: the relationship between perceived social support and depression in Turkish infertile women. Examining the DASS mean scores also showed that there is no significant difference between gender (female & male), family type (joint and nuclear family), and habitat (urban & rural).

The MPSS means score of female(61.77) & male(62.37), joint(63.00) & nuclear(61.73) family, and urban(62.22) & rural(61.36) population and DASS mean score of female(40.20) & male(33.87), joint(38.63) & nuclear(40.55) family, and urban(41.20) & rural(34.82) population, there are not much difference seen it was nearly same. The MPSS and DASS t-value is 6.301 and the p-value is lower than 0.01 $(p<0.01)$. There is a highly significant difference in the MPSS and DASS.

As a consequence of this study, it is observed that as couples with perceived social support score higher, the level of depression, anxiety, and stress automatically goes down. The present study has been supported by Erdem, K. & Ejder Apay, S.(2014) on a sectional study: the relationship between perceived social support and depression in turkish infertile women. Another research study was supported by Khalid, A. and Dawood, S.(2020) on social support, self-efficacy, cognitive coping and psychological distress in infertile women.

### Conclusion

We indicated that the findings of the study showed that the research objectives, gender, family type and different habitats of infertile couples affect their perceived social support and depression, anxiety, and stress. We saw that treatment of IVF negatively influenced both perceived social support and depression, anxiety, and stress. Depression, anxiety, and stress automatically subside when perceived social support is high. We determined that the infertile male had higher perceived social support than the female. As a result, females have higher level of depression, anxiety, and stress than males. Couples who were living in a joint family had higher perceived social support than a nuclear family and couples who were living in a nuclear family had a higher level of depression, anxiety, and stress than a joint family. Infertile couples who lived in urban areas perceived more social support than those who lived in rural areas.

### Implication and Recommendation

The present study focuses on the psychological difficulty facing couples who are treated for infertility, such as IVF. The findings can also enable academics and experts in psychiatric health to understand and solve the problem of infertile couples. Social support was considered as an essential component that can

make people less susceptible to the treatment of infertility. In future research, self-esteem, quality of life and efficacy can thus be used as an effective procedure in the treatment of infertility. Further study is needed in this area with a bigger sample size and the research would be more significant in comparison with various metropolitan cities in different countries.

## References

1. Burns LH. (1999) "Psychology of infertility". New York: Parthenon.

2. Atherton F, Howel D. (1995) Psychological morbidity and the availability of assisted conception: A group comparison study. Journal of Public Health Medicine; 17:157-160

3. Burnett JA. (2009) Cultural considerations in counseling couples who experience infertility. J Multicult Couns Devel;37(3):166–177.

4. Boivin, J. (2003). A review of psychosocial interventions in infertility. Soc. Sci. Med. 57, 2325–2341. doi: 10.1016/s0277-9536(03)00138-2

5. Benyamini, Y., Gozlan, M., and Kokia, E. (2004). On the self-regulation of a health threat: cognitions, coping, and emotions among women undergoing treatment for infertility. Cogn. Ther. Res. 28, 577–592. doi: 10.1023/b:cotr.0000045566. 97966.22

6. Csemiczky, G., Landgren, B.-M., and Collins, A. (2000). The influence of stress and state anxiety on the outcome of IVF-treatment: psychological and endocrinological assessment of Swedish women entering IVF-treatment. Acta Obstet. Gynecol. Scand. 79, 113–118. doi: 10.1034/j.1600-0412.2000.079002113.x

7. Cobb, S. (1976). Social suport as a moderator of life stress. Psychosom. Med. 38, 300–314. doi: 10.1097/00006842-197609000-00003

8. Cheng, E. R., Rifas-Shiman, S. L., Perkins, M. E., Rich-Edwards, J. W., Gillman, M. W., Wright, R., et al. (2016). The Influence of Antenatal Partner Support on Pregnancy Outcomes. J. Womens Health 25, 672–679. doi: 10.1089/jwh.2015. 5462

9. Chen TH, Chang SP, Tsai CF, Juang KD. (2004) Prevalence of depressive and anxiety disorders in an assisted reproductive technique clinic. Hum Reprod. ;9(10):2313–2318.

10. Dudek, B., and Koniarek, J. (2003). Social support as a modifier of response to stress: theoretical aspects and measurement. Med. Pr. 54, 427–435.

11. Dembinska, A. (2012). Bioethical dilemmas of assisted reproduction in the ´ opinions of Polish women in infertility treatment: a research report. J. Med. Ethics 38, 731–734. doi: 10.1136/medethics-2011-100421

12. Eugster, A., and Vingerhoets, A. J. J. M. (1999). Psychological aspects of in vitro fertilization: a review. Soc. Sci. Med. 48, 575–589. doi: 10.1016/s0277-9536(98)00386-4

13. Erdem, K., & Ejder Apay, S. (2014). A Sectional Study: The Relationship between Perceived Social Support and Depression in Turkish Infertile Women. International journal of fertility & sterility, 8(3), 303–314.

14. Eren N. (2008) The impact of the levels of perceived social support in infertile couples on stress related with infertility and marital adjustment.Presented for Ph.D. Ankara: Gazi University.

15. Fauser, B. C., Boivin, J., Barri, P. N., Tarlatzis, B. C., Schmidt, L., and LevyToledano, R. (2019). Beliefs, attitudes and funding of assisted reproductive technology: public perception of over 6,000 respondents from 6 European countries. PLoS One 14:e0211150. doi: 10.1371/journal.pone.0211150

16. Fahami, F., Quchani, S. H., Ehsanpour, S., & Boroujeni, A. Z. (2010). Lived experience of infertile men with male infertility cause. Iranian journal of nursing and midwifery research, 15(Suppl 1), 265–271.

17. Holas, P., Radziwon, M., and Wójtowicz, M. (2002). Niepłodno ´´sc a zaburzenia ´ psychiczne. Psychiatria Pol. 36, 557–566.

18. Hoff, L. A., Hallisay, B. J., and Hoff, M. (2009). People in Crisis: Clinical and Diversity Perspective. New York, NY: Taylor & Francis.

19. Jafarzadeh-Kenarsari, F., Ghahiri, A., Habibi, M., & Zargham-Boroujeni, A. (2015). Exploration of infertile couples' support requirements: a qualitative study. International journal of fertility & sterility, 9(1), 81–92. https://doi.org/10.22074/ijfs.2015.4212

20. Koss, J., Rudnik, A., and Bidzan, M. (2014). Do´swiadczanie stresu a uzyskiwane wsparcie społeczne przez kobiety w ci ˛azy wysokiego ryzyka. Doniesienie ˙ wstêpne. Fam. Forum 4, 183–201.

21. Khalid, A., Dawood, S. (2020) Social support, self-efficacy, cognitive coping and psychological distress in infertile women. Arch Gynecol Obstet 302, 423–430. https://doi.org/10.1007/s00404-020-05614-2

22. Möller, A., and Fällström, K. (1991). Psychological consequences of infertility: a longitudinal study. J. Psychosom. Obstet. Gynaecol. 12, 27–45.

23. Malina, A., Błaszkiewicz, A., and Owczarz, U. (2016). Psychosocial aspects of infertility and its treatment. Ginekol. Pol. 87, 527–531. doi: 10.5603/GP.2016. 0038

24. Monga, M., Alexandrescu, B., Katz, S. E., Stein, M., and Ganiats, T. (2004). Impact of infertility on quality of life, marital adjustment, and sexual function. Urology 63, 126–130. doi: 10.1016/j.urology.2003.09.015

25. McNaughton-Cassill, M. E., Bostwick, J. M., Vanscoy, S. E., Arthur, N. J., Hickman, T. N., Robinson, R. D., et al. (2000). Development of brief stress management support groups for couples undergoing in vitro fertilization treatment. Fertil. Steril. 74, 87–93. doi: 10.1016/s0015-0282(00) 00564-1

26. Okafor, Nneka & Joe-Ikechebelu, Ngozi & Ikechebelu, Joseph. (2017). Perceptions of Infertility and In Vitro Fertilization Treatment among Married Couples in Anambra State, Nigeria. African Journal of Reproductive Health. 21. 55-66. 10.29063/ajrh2017/v21i4.6.

27. Peterson, B., Newton, C., Rosen, K., and Skaggs, G. (2006). Gender differences in how men and women who are referred for IVF cope with infertility stress. Hum. Reprod. 21, 2443–2449. doi: 10.1093/humrep/del145

28. Riahi ME, Zarezade Mehrizi E. (2012) A study on the gender differences in psycho-social consequences of infertility: infertile couples using Yazd' Infertility Center Services. Women's Strategic Studies. ;14(56):155–210.

29. Schmidt L. (1998). Infertile couples' assessment of infertility treatment. Acta obstetricia et gynecologica Scandinavica, 77(6), 649–653. https://doi.org/10.1034/j.1600-0412.1998.770612.x

30. Siedlecki, K. L., Salthouse, T. A., Oishi, S., and Jeswani, S. (2014). The relationship between social support and subjective well-being across age. Soc. Indicat. Res. 117, 561–576. doi: 10.1007/s11205-013-0361-4

31. Uchino, B. N., Bowen, K., M., and Birmingham, W. (2013). Psychological pathways linking social support to health outcomes: a visit with the ghost of research past, present and future. Soc. Sci. Med. 74, 949-957 doi: 10.1016/j.socscimed.2011.11.0223.Psychological

32. Van Empel, I. W., Nelen, W. L., Tepe, E. T., van Laarhoven, E. A., Verhaak, C. M., & Kremer, J. A. (2010). Weaknesses, strengths and needs in fertility care according to patients. Human reproduction (Oxford, England), 25(1), 142–149. https://doi.org/10.1093/humrep/dep362

33. Ying, L. Y., Wu, L. H., and Loke, A. Y. (2015a). Gender differences in experiences with and adjustments to infertility: a literature review. Int. J. Nurs. Stud. 52, 1640–1652. doi: 10.1016/j.ijnurstu.2015.05.004

# NEW SOCIAL MEDIA RULES, 2021 AND CYBER SOVEREIGNTY OF INDIA

## A. Sahni[1], P.S. Bhatia[2] and J. Kaur[3]

[1]Department of Political Science, Kanya Maha Vidalaya, (Autonomus) College, Jalandhar
[2]Department Mass Communication and Video Production, DAV College, Amritsar, Punjab
[3]Department of Political Science, Punjabi University, Patiala
sahniashima1@gmail

_____

## ABSTRACT

*Implementation of New Social Media Rules is likely to shape new paradigm of cyber sovereignty of India in times ahead. Though, Digital adaptation and societal inclusiveness through technological opportunities has transformed the societies. However, the excessive politicization of social network sites in India has raised questions on complexities of issues of freedom of speech and expression of social media platforms and Sovereignty of India. Since the issue of CAA-NRC (2019) particularly during Covid times and farms bill controversy; Social media platforms in India were flooded with fake news& hate speeches against Indian social and political order aiming to create political & social disruption. To strengthen national interest of India, it is important to make social media platforms more accountable and responsible for content on their platforms. Indian government must ensure strict data-handling practices by these platforms. There is urgent need to strictly implement new media rules, 2021 in India. This paper seeks to analyses new media rules, 2021 and immediate issues that led Government of India to make these rules. This study is done in a historiographical and analytical context. The findings indicate urgency to strictly implement these rules. The study in this particular context needs further research, especially; research studies on impacts of new media rules in India will be useful for Government of India for their further policy making on social media platforms.  Objective of this paper is to understand 1. To study over- politicization of government's decision by social media platform. 2.  To examine the menace of Fake news, misinformation & articulation of opinions by immature users on issues of National Interest. 3. To study the 'New Social Media Rules -2021' in India.*

_____

*Keywords: - Second Wave, Social Media, Governance, Fake News*

## Methodology

The methodology used for this paper is descriptive, analytical, and observational. This study is based on secondary data. Most of the data which is incorporated in the study are the publicly available reports at Ministry of electronics and information technology, Government of India website and of different think tanks e.g. Centre for Policy Research, Delhi, Carnegie India; Institute of Social Studies Trust (ISST), The data used in this work also comprise of variables based on the existing literature such as books, journals, online newspaper. The literature review includes all related publication from 2000 through 2021 in Google Scholar, Pub Med, Cross Ref and articles published from 2000 through 2021 using the search terms Pandemic, Farms bill and new social media laws 2021.

## Overview

Social media in enriching the right of freedom of expression and speech but has failed to keep nefarious elements at bay and by interfering with political processes of sovereign countries it is trying to supersede the laws of the nation States. These platforms are not accountable as are nation states to their citizens.  Users of these platform are not matured enough to articulate their opinions on sensitive issues while respecting democratic limits.

## Findings

Social media has emerged as an asymmetric threat for survival of neo-liberal order and are making authoritarian regimes superior. Visual digital contents are consumed more in India than other contents. The new media rules, 2021 is likely to be burdensome for social media companies, it is a much needed one.  This requirement will bring more transparency and will ensure private players give due consideration to the rights of users while filtering content. This will shape the new power game between social media and Indian polity and will also accelerate the espionage on social media with more intense actions by government. From the ideological perspective of democracy, Social media has opened up new spaces for dialogue, debates, and issue-based deliberations; But Social networking can only

facilitate not creates the leadership that is necessary for survival and success of democracy like India.

## Introduction

Open criticism of government policies is a must for success of democracy but negative attitude and lack of constructive criticism of the government destroys democracy. In recent times, the over-intellectualization of Social media content and weaponization of these platforms against India by rogue states is cause of concern for Indian democratic set-up. Every Government has a right to know the source of information at social networking sites. Being a big business houses these Social media platforms cannot ignore laws of the land.

India was ranked as the second largest online market worldwide in 2019, coming second only to China. The number of internet users was estimated to increase in both urban as well as rural region, indicating a dynamic growth in access to internet. Despite the digital divide, the engagement of voters and citizens, particularly the educated youth, is a sign of deepening democracy and an expanding public sphere in India, where citizens understand the need to engage with the current social, economic and governance issues in the country. However, during pandemic and farms bill, Fake news and misinformation have created numerous hurdles for governments at all levels; central, state and local, in their fight against the pandemic and other issues of National interest. Authorities have found repeatedly engaged in issuing clarifications to keep people away from not falling prey to such rumours and fake news. The most-popular subjects of conversation on social media in the India in 2020 were politically motivated. This has raised several issues to current trajectory of Indian polity e.g. Are these platforms leading us towards an ideal society? Or is this a new mechanism for building narratives which was earlier an exclusive domain of Govt., social scientist and researchers. Does this indicate a new space for human dialogue which was confined to intelligentsia in formal settings, such as conferences, seminars, symposium etc.? Can this be regarded as a contribution of Social media in enriching the right of freedom of expression and speech in general and particularly that of youth? Is social media laying foundation of new democratic society? How will this have an impact on "Appeasement policy" or a 'vote bank politics' a sole strategy that safeguards varied interest of politicians across the globe and particular in region of south Asia. Will the political discussion on social media platform dig up the truth which politicians often hide in the name of security, unity, integrity and harmony and end up leading to chaos and anarchy and making law and order a secondary issue? Are the users matured enough to articulate their opinions on sensitive issues while respecting democratic limits? Is social media in the name of democracy is emerging as a new threat for the very survival of neo-liberal order and making authoritarian regimes superior?

There is no denying a fact, the issue of political propaganda has presumed greater noteworthiness in the era of the internet since the accessibility of the internet allows the speaker to influence a greater number of audiences in a short duration of time. A right to express one's opinion is one of the precious gifts of democracy but not when it stifles the voices of others or puts them in danger, freedom of speech must not supersede freedom to life. The protect unity and integrity of India and to stop the menace of negative propaganda of Govt., Fake news and misinformation's on social media sites Government of India was compelled to enact the new social media rules. It was a much needed step. These rules may be called the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 202

## Fake News and Covid

India's social media was rife with fake posts, wild rumours, and conspiracy theories, doctored videos about the disease's origin, its subsequent spread and possible remedies. Once the country started reporting more cases, a torrent of fake messages began populating all major social media platforms Fake News/ Fake post; is much debated in communication fields and social sciences. It got popularised in the 2016 US Presidential election and Brexit. Fake propaganda and misinformation has the potential to polarise public opinion, to incite violence and extremism. During pandemic

government was not only dealing with the virus and its capacity to overwhelm healthcare institutions, but also with a wave of misinformation that was costing human lives and negatively impacting those who worked for the health and wellbeing of the population. The use of social media and diffusion in videos and supposed evidence in platforms such as YouTube has been key in the propagation of the info media. As per the data compiled by the International Fact Checking Network (IFCN) between January and April 2020, fake news particularly in social media can be put into five broad categories: content about causes, symptoms, and cures, spread of the virus, government documents and misrepresentation of comments, photos and videos of politicians, and conspiracy theories blaming certain country, groups or communities for the spread of virus

As per Statistical data the seven themes of fake news were health, religion, political, crime, entertainment, religious, and miscellaneous. Health-related fake news (67.2%) was on the top of the list that included medicine, medical and healthcare facilities, viral infection, and doctor-patient issues; the seven types of fake news contents are text, photo, audio, video, text and photo, text and video, and text and photo and video. More fake news takes the form of text and video (47.2%). Online media produces more fake news (94.4%) than mainstream media (5.6%). More interestingly, Fake news has more international connections (54.4%) as the COVID-19 pandemic is a global phenomenon. The COVID-19-related fake news was negative. (63.2%) this situation has also shed light on the need for educating both the population and the media, and has exposed prejudices against the medical community.

## Politicization of Social Media Platform and Farms Bills

Social media have played an unlimited role to form a new political system in India. Recently, social media reflected significant competition over narratives with respect to three controversial farms laws. This sheer liberal reach of face-book became the harbinger of democracy and also various strands of Narratives were utilized. Political narrative is both a theoretical concept and also a device used by political strategists to influence how people view their environment, their community and relationships between groups. According to Polkinghorne (1988) narrative is "the primary form by which human experience is made meaningful." Narratives are the way we understand reality, as the stories we tell about things construct our understanding of those things. The value of stories is in helping people to make sense of the world and their place in it. Stories help us all to understand who we are, who others are and how we relate to them and the world. "People's political common sense is shaped by their experience but it is also shaped by stories they read and hear on TV, stories told by friends and acquaintances, stories that substitute memory for history, stories that make the experience of others seem as if it is their own, and stories whose truth is relatively unimportant to their value." (Polletta et al).

One of the most widespread and powerful forms of discourse in farmer's agitation were two narratives firstly, " farmers will lose their lands won't get MSP:" false narrative was created that with the implementation of these laws farmers would lose their land and would't get support price for their crops and secondly, "Khalistani angle". These two narratives out-shined all the other narratives articulated by protesting farmers as well as those by anti –farmer propagandist. These narratives generated by and through social media were directed toward goals e.g., elimination of three laws these narratives articulated by Facebook soon became headlines of national channel across India as well in foreign news rooms. These narrative projected through face-book led to clear cut division of Indian channels between Haves ( Govt in power ) and Have-nots( protesting farmers ) and diluted the general ethics associated with media reporting of both the sides it was clear cut case of struggle for power not through constitutional means alone but basically through social media platforms.

## New Social Media Rules 2021

The increasing instances of misuse of social media by criminals, anti-national elements

have brought new challenges for law enforcement agencies. Citizen activism is higher than ever before and the young in India are certainly showing a fair amount of restlessness and unhappiness at the state of affairs. However, such an individual and societal interconnectivity will require a traceable measurement of risks and vulnerabilities in the digital and technological domains, complemented by a new societal culture of information literacy and digital learning. The setting up of a social media lab by Indian police to track social media activity to anticipate possible trouble spots and identify those they see as trouble makers is a new concept in policing. The existing Information Technology (IT) Act 2008 is toothless to tackle fake content and unfortunately, there is no robust complaint mechanism wherein the ordinary users of social media and OTT platforms can register their complaint and get it redressed within defined timeline. Hence, lack of transparency and absence of robust grievance redressal mechanism. Have left the users totally dependent on the whims and fancies of social media platforms. But, the New Social Media Rules, 2021 e.g. Technology Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021. substantially empower the ordinary users of digital platforms to seek redressal for their grievances and command accountability in case of infringement of their rights. In this direction, the following developments are noteworthy:

- The Supreme Court in suo-moto writ petition (Prajjawala case) vide order dated 11/12/2018 had observed that the Government of India may frame necessary guidelines to eliminate child pornography, rape and gangrape imageries, videos and sites in content hosting platforms and other applications.

- The Supreme Court vide order dated 24/09/2019 had directed the Ministry of Electronics and Information Technology to apprise the timeline in respect of completing the process of notifying the new rules.

- There was a Calling Attention Motion on the misuse of social media and spread of fake news in the Rajya Sabha and the

Minister had conveyed to the house on 26/07/2018, the resolve of the Government to strengthen the legal framework and make the social media platforms accountable under the law. He had conveyed this after repeated demands from the Members of the Parliament to take corrective measures.

- The Ad-hoc committee of the Rajya Sabha laid its report on 03/02/2020 after studying the alarming issue of pornography on social media and its effect on children and society as a whole and recommended for enabling identification of the first originator of such contents.

The Ministry of Electronics and Information Technology (MEITY) prepared draft Rules and invited public comments on 24/12/2018. MEITY received 171 comments from individuals, civil society, industry association and organizations. 80 counter comments to these comments were also received. These comments were analysed in detail and an inter-ministerial meeting was also held and accordingly, these Rules have been finalized. The Intermediary Rules 2021 are divided into three parts - Part I deals with defining all the terms used therein; Part II deals with the due diligence requirements which must be followed by a social media intermediary (SMI) and a significant social media intermediary (SSMI) and Part III deals with the code of ethics and procedure and safeguard in relation to digital media. Section 2(w) of the IT Act defines intermediary as "intermediary", with respect to any particular electronic records, means any person who on behalf of another person receives, stores or transmits that record or provides any service with respect to that record and includes telecom service providers, network service providers, internet service providers, web-hosting service providers, search engines, online payment sites, online-auction sites, online-market places and cyber cafes. The Intermediary Rules 2021 introduce the concept of a "SMI" and define it to mean "an intermediary which primarily or solely enables online interaction between two or more users and allows them to create, upload, share, disseminate, modify or access information using its services. Based on the number of

users on the social media platform, intermediaries have been divided into "SMI" and "SSMI" (number of registered users in India should be above 50 lakhs as notified by the Central Government).

## SMI (Social Media Intermediary)

Under the Intermediary Rules 2021, there are certain due diligence requirements that have to be observed by **SMI** while discharging their duties, which includes the following:

a. **Publish**: To publish a Privacy Policy, User Agreement, and Rules and Regulation for usage of its website or app or both informing the user (i) to not host, display, upload, modify, publish, transmit, store, update or share any information that belongs to other person, or infringes on any Intellectual Property Law, or is obscene, harmful to a child, is pornographic, encourages gambling, threatens the sovereignty and unity of India etc.; (ii) the access to the website/app can be terminated if they are not in compliance with these policies; (iii) any changes in these policies.

b. **Remove**: It shall remove any objectionable content, within 36 hours that it has stored, hosted, or published on its servers, once it gains actual knowledge, in the form of a court order or such notification by the appropriate government. The information of any user who has withdrawn or cancelled his registration or the objectionable content should be stored in servers for 180 days or more (if court or government permits)

c. **Protect**: It shall protect the data following reasonable security procedures and practices as laid down in Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Information) Rules, 2011.

d. **Access**: It shall provide information under its control or possession to the government agency within 72 hours, after being in receipt of order and not install any kind of technical configuration to its computer resource, altering the normal course of its operation, in order to by-pass the law.

e. **Report**: It shall report any cyber security incident and share the same with Indian Computer Emergency Response Team, in accordance with (The Indian Computer Emergency Response Team and Manner of Performing Functions and Duties) Rules, 2013.

f. **Grievances**: It shall prominently publish on its website/app the contact details of the Grievance Redressal Officer (GRO) and mechanism to lodge the complaint against any content on the website/app. The GRO shall acknowledge the receipt of such complaint within 24 hours and dispose-off the same within 15 days from receipt. However, if the complaint is regarding content which shows any kind of nudity prima facie, then the GRO must take down such content within 24 hours of being in receipt of such complaint. Further, the GRO must acknowledge and receive any order, notice or direction by the appropriate government, any competent authority, or a court of competent jurisdiction.

## SSMI

Under the Intermediary Rules 2021, there are certain due diligence requirements that have to be observed by SSMI while discharging their duties, which include the following:

Appoint: It shall appoint a Chief Compliance Officer for compliance with IT Act and corresponding rules, a 24/7 Nodal Contact Person for assisting the law enforcement agencies & for complying with their orders and requisitions, and a Resident Grievance Officer (RGO) for dealing with complaints lodged by any person with respect to any content on the website/app.

First Originator: It shall enable identification of first originator of the information, in case of messaging platforms, which would require chats to be backed up to encrypted cloud server, rather than providing end-to-end encryption to its users.

Ownership of content: It shall clearly mark any information as being advertised, marketed, sponsored, owned or exclusively controlled, if such intermediary is deriving direct financial benefit by advertising information on someone else's behalf, to which it owns a copyright, or

has an exclusive license, or in relation with which it has entered into any contract that directly or indirectly restricts the publication or transmission of that information through any means other than those provided through the computer resource of such SSMI.

Physical Address: It shall have a physical contact address in India published on its website, mobile application, or both for the purposes of receiving the communication addressed to it.

Removal of Information: In case, a user's access to the website or app has been revoked, or any other content that has been uploaded by the user has been removed, it shall inform the user prior to such removal about why the action is being taken, and on what grounds is the action being taken. However, it shall also provide the user an opportunity to contest this claim of removal and the user's request to re-upload the content. However, this should be done within reasonable time. The RGO shall oversee this process. It can be asked to furnish any additional information as deemed fit by the MIB.

Objectionable contents: It shall employ technology-based measures to identify and remove information that depicts any sexually explicit content or any identical information which has already been removed by it. It shall display a notice to the user who is attempting to access such information that it has identified such information as objectionable. The measures taken by the SSMI must be proportional and have regard to the interests of free speech and privacy of the individual. The SSMI must further review periodically the technology-based measures to ensure there is no propensity of bias and discrimination in such measures.

Complaints: It shall implement an appropriate mechanism for the receipt and processing of complaints which shall enable the complainant to track the status of such complaint by providing a unique ticket number. It should endeavor to provide the complainant with reasons for any action taken or not taken pursuant to the complaint.

Voluntary verification: It shall enable users to voluntarily verify their accounts by using any

appropriate mechanism and provide such users with a demonstrable and visible mark of verification, which shall be visible to all users of the service.

Safe harbor: If it fails to adhere or follow the Intermediary Rules 2021, they would not be able to claim protection under Section 79(1) of IT Act, which is safe harbor provision for intermediaries.

Compliance Reports: It must publish compliance reports every month containing the details in respect of the complaints which were received and the action taken on those complaints, and the number of links or information removed while using proactive monitoring through automated tools.

## Code of Ethics and Procedure and Safeguards in Relation to Digital Media

The Intermediary Rules 2021 prescribe a code of ethics for online news, OTT platforms and digital media. It also provides for self-classification of content for OTT platforms into five age-based categories - U (Universal), U/A 7+, U/A 13+, U/A 16+, and A (Adult). Platforms will be required to implement parental locks for content classified as U/A 13+ or higher and reliable age verification mechanisms for content classified as "A". The OTT platform shall prominently display the classification rating specific to each content or programme together with a content descriptor informing the user about the nature of the content and advising on viewer description (if applicable) at the beginning of every programme enabling the user to make an informed decision, prior to watching the programme. Publishers of news on digital media would be required to observe Norms of Journalistic Conduct of the Press Council of India and the Programme Code under the Cable Television Networks Regulation Act thereby providing a level playing field between the offline (Print, TV) and digital media. Lastly, a three-level grievance redressal mechanism has been established under the Intermediary Guidelines with three levels of self-regulation, i.e., self-regulation by the publishers; self-regulation by the self-regulating bodies of the publishers; and an oversight mechanism. The Intermediary Rules 2021 classify its subjects

into two categories namely (i) Publishers of news and current affairs content; and (ii) Publishers of online curated content. The publisher has to give an acknowledgment of the grievance to the complainant, within a period of 24 hours; address the grievance and convey its decision to the complainant within 15 days. If the grievance remains unaddressed even after 15 days, it will be escalated to the self-regulating body at level two, a self-regulatory body registered with MIB. The self-regulatory body is supposed to ensure that the publishers adhere to the Code of Ethics, provide guidance on the same to them, address grievances which remain unresolved with the publishers and hear appeals which are filed by the complainants against the decision given by the publishers. The body also has the power to issue guidance or advisories to the publishers, 'warning, censuring, admonishing or reprimanding' them or requiring an apology, warning card or a disclaimer from the publisher. The self-regulatory body can further direct the publisher of online curated content to reclassify the ratings of content, make modifications in the age classification and access control measures, and refer content to the MIB for consideration.

The final level comprises an Oversight Mechanism which is constituted by the MIB, to ensure adherence to the Code of Ethics by the publishers. The MIB has to designate an officer as the "Authorized Officer, who shall have the power to initiate the procedure for deletion, blocking or modification of information by the publisher, and for blocking of information in case of an 'emergency'. The Oversight Mechanism shall establish an Inter-Departmental Committee for hearing grievances shall refer grievances to the said committee and shall issue guidance, advisories, and directions to publishers. The Inter-Departmental Committee has the onus of hearing complaints in relation to grievances received from Level I or Level II and the ones which are referred to it by the MIB.

## Conclusion

New social media rules 2021 aims to give digital freedoms with safety measures. However, the automated proactive monitoring and censoring illegal content as mandated under the new rules might lead to privacy challenges otherwise these laws will help to protect the interest of citizens at large and will keep a check on anti- social elements. Success rate of these laws will depend on the spirit of its implementation by law enforcing agencies of India as well as how maturely people of India handle these sites in times to come. Implementation of these rules will provide new insights to researchers and academician. These new media rules are likely to play positive role in the evolution process of social media platforms particularly in India.

## References

1. Gerbaudo, Paolo. (2012). Tweets and the Streets: Social Media and Contemporary Activism. London: Pluto Press.
2. Kanter, Beth, and Allison Fine. (2010). The Networked Nonprofit: Connecting with Social Media to Drive Change. John Wiley & Sons.
3. Kessler, Sarah. (2012). "Amplifying Individual Impact: Social Media's Emerging Role in Activism." Pp. 205–15 in Media, Mobilization, and Human Rights: Mediating Suffering, edited by Tristan Anne Borer. London, UK: Zed Books.
4. Ku, A.S.M. (1999). Narratives, Politics, and the Public Sphere. Aldershot: Ashgate
5. Auger, Giselle A. (201)3. "Fostering Democracy through Social Media: Evaluating Diametrically Opposed Non-profit Advocacy Organizations' Use of Facebook, Twitter, and YouTube." Public Relations Review 39:369–76.
6. Vignesh, T. and Yoganandan, G., (2020) A study on farmers hard work and farmer producer organization in salem districts in Tamil Nadu / International Journal of Scientific and Technology Research, vol. 9, no. 2, pp. 1466-1473
7. Al-Zaman, (2021) M.S. COVID-19-Related Social Media Fake News in India. Journal. Media., 2, 100-114.

https://doi.org/10.3390/journalmedia20100
07

8. Bennett, W. Lance, Chris Wells, and Deen Freelon. (2011). "Communicating Civic Engagement: Contrasting Models of Citizenship in the Youth Web Sphere." Journal of Communication 61(5):835–56.

9. Carrion-Alvarez D, Tijerina-Salina PX. (2020) Fake news in COVID-19: A perspective. Health Promot Perspect.;10(4):290-291. Published 2020 Nov 7. doi:10.34172/hpp.2020.44

10. Mandelbaum, M. (1967). "A Note on History as Narrative", History and Theory 6(3): 413–419 .Google Scholar | Crossref | ISI

11. Merchant RM, Asch DA. (2018) Protecting the value of medical science in the age of social media and "fake news" JAMA; 320(23):2415–6. doi: 10.1001/jama.2018.18416. [PubMed] [CrossRef] [Google Scholar]

12. Lahouati M, De Coucy A, Sarlangue J, Cazanave C. (2020) Spread of vaccine hesitancy in France: what about YouTube™? Vaccine.; 38(36):5779–82. Doi: 10.1016/j.vaccine.2020.07.002. [PubMed] [CrossRef] [Google Scholar]

13. Rodrigues U.M. (2014) The Indian public sphere in social media era. In ANZCA 2014 Conference Jul (pp. 8-11).https://www.researchgate.net/profile/Usha-Rodrigues-Veil,

14. Shari R., Tara Buehner, and Michael J. Palenchar. (2011). "A Work-In-Process Literature Review: Incorporating Social Media in Risk and Crisis Communication." Journal of Contingencies and Crisis Management 19(2):110–22.

15. https://www.statista.com/statistics/255146/number-of-internet-users-in-india/

16. 3/publication/271272800_Indian_Public_Sphere_in_the_Social_Media_Era/links/54c426170cf2911c7a4deef5/Indian-Public-Sphere-in-the-Social-Media-Era.pdf

17. https://www.researchgate.net/publication/337972166_Social_Media_and_Hate_Speech_in_India_A_study_on_the_use_of_YouTube_as_a_tool_of_Political_Propaganda

18. https://theprint.in/campus-voice/right-to-free-speech-is-democracys-precious-gift-but-not-when-it-stifles-others-voices/555715/

19. https://www.orfonline.org/expert-speak/how-fake-news-complicating-india-war-against-covid19-66052/

20. https://blog.ipleaders.in/fake-news-disinformation-threats-national-security-possible-solutions/

21. https://www.brightoncafe.com/2020/05/political-storytelling-structure-of.html

22. https://www.hindustantimes.com/india-news/farm-laws-protests-live-feb-24-2021-rakesh-tikait-disha-ravi-singhu-border-kisan-panchayat-bharatiya-kisan-union-congress-bjp-narendra-singh-tomar-rahul-gandhi-

23. https://www.euractiv.com/section/defence-and-security/opinion/strategic-security-implications-due-to-covid-19-pandemic/

24. https://www.meity.gov.in/writereaddata/files/Intermediary_Guidelines_and_Digital_Media_Ethics_Code_Rules-2021.pdf

25. https://pib.gov.in/PressReleseDetailm.aspx?PRID=1700749

26. https://www.mondaq.com/india/social-media/1075196/social-media-rules-2021-transforming-social-media#:~:text=The%20Intermediary%20Rules%202021%20prescribe,%2C%20and%20A%2

# INSITU ROCK TEMPERATURE MEASUREMENT AT JAMADOBA MINES, DHANBAD

## S. Kishore and M. Kumar
Department of Mining Engineering, Jharkhand Rai University, Ranchi

---

## ABSTRACT

*Insitu rock temperature measurement is a time-consuming method due to the difficulties in determining the temperature of virgin rock below earth. Because in-situ rock temperature varies arbitrarily over time, checking it on a regular basis is essential. In order to meet the criteria of good working conditions, we must pay close attention to insitu rock temperature. This is because rock temperature also serves as a source of heat addition to the intake air, which has a direct impact on worker efficiency. The numerous thermal properties of rock, such as thermal conductivity, thermal diffusivity, and heat flux, can be determined via in-situ rock measurement. We can determine the amount of heat added to the mine environment as a result of measuring these properties, and by knowing this quantity, we can take measures to improve ventilation requirements met under statutory norms directed by DGMS in order to address the problem of inefficiency of workers and machineries operating below ground. Isitu Rock Temperature (IRT) measurement is critical for ventilation planning. This aids in the improvement of the mine environment by utilizing various procedures such as mine air refrigeration to fulfil the required standards (by using chemicals freons).*

---

## 1. NSITU Rock Tempertaure Measurement

Heat transmission, water balance, and mass exchange activities that occur across porous media surfaces require in-situ rock temperature measurements. Understanding thermal behaviour, particularly in regard to determining subsurface heat flux, necessitates a thorough understanding of heat transmission. The rate of heat transmission from rock to ventilation air or in the opposite way is measured by the surface heat transfer coefficient, h. It's crucial for determining the heat flux into the ventilation air in underground apertures during the early stages of rock cooling after excavation. Fourier's law governs heat transmission by conduction. Determining the heat flux requires knowledge of the manner in which temperature varies within the medium and the temperature distribution. The rate of heat conduction, **q**, is proportional to the temperature difference across the boundary layer of air between the rock surface and the main air stream, and is given by the following equation:

$$q_x = -kA\frac{dT}{dx}$$

where k, the thermal conductivity (W/m————————K) is an important thermal property of material. Heat flux, though, is a vector quantity hence the equation can be written as a more general statement of the conduction rate equation (Fourier's law) as follows:

$$q'' = -k\nabla T = -k\left(i\frac{\partial T}{\partial x} + j\frac{\partial T}{\partial y} + k\frac{\partial T}{\partial z}\right)$$

where V is the three dimensional Del operator and T(x.y.z) is the scalar temperature field. There are a variety of laboratory measurement methods and sophisticated procedures for obtaining thermal conductivity and diffusivity for samples of rock taken from an underground mine. The accuracy of the methods is dependent upon the sophistication of the equipment and the care taken in the measurement process. An in-situ borehole measurement method called REKA (Rapid Evaluation of k and alpha), has been proposed and further developed, tested, and applied.

## 2. Geothermal Gradient
## Virgin Rock Temperature

The geothermal gradient is the increase in the VRT of strata (unaffected by subsurface activity) as depth increases. For each unit rise in temperature, it is the linear increase in depth.

The geothermal gradient changes depending on the thermal conductivity of the local rock and the depth of the earth's crust. The geothermal gradient must be determined in order to

---

estimate stratum heat flow in subterranean locations..

To measure VRT, data on natural rock temperature at a known elevation is required. A gigantic rock drill dug a 6m long, 60 mm diameter hole at the JAMADOBA mine. In the development panel, the VRT test was performed. The hole was drilled close to the face of the fresh air course (23 m out by the last open cross cut). The EASY LOGGER SET was instantly put into the hole when it was bored. At the bottom of the hole, one thermocouple was installed (6mfrom the hole collar). The spot was 60 metres below the surface and 180 metres away from the incline's mouth. To avoid intake air affecting the results, the hole was sealed from the atmosphere with urethane foam.. The thermocouple along with easy logger is kept into the hole until the desired course of time has been elapsed.

### 3.    Transducers

Transducers are devices that can convert one type of energy into another, allowing it to be used for a variety of purposes. Temperature transducers are used to measure temperature. Transducers are designed to be compatible with digital multimeters (DMMs).

Resistance temperature detectors (RTDs), thermistors, IC sensors, and thermocouples are the four types of transducers usually used for temperature readings using a DMM. Each variety has its own set of benefits and drawbacks.

These are the ones that come after.

- RTDs(resistance temperature detectors)
- Thermistors.
- IC Sensors
- Thermocouples.

### 3.1 Resistance Temperature Detectors(RTDs)

Resistance Temperature Detector (RTD) is an acronym for Resistance Temperature Detector. RTDs are sometimes referred to as "resistance thermometers" in general. The word "resistance thermometer" is defined as follows by the American Society for Testing and Materials (ASTM):

A temperature-measuring device consisting of a resistance thermometer element, internal connecting wires, a protective shell with or without means for attaching a connection head, or connecting wire or other fittings, or both, is known as a resistance thermometer.

An RTD is a temperature sensor that uses the n otion that the resistance of a metal chang  with temperature to measure temperature.

In practise, an electrical current is passed through a piece of metal (the RTD element or r esistor) that is placed near the temperature mea surement area.

An instrument then measures the RTD element' s resistance value.

Based on the known resistance properties of the RTD element, this resistance values then connected to temperature.

### 3.2    Thermistors

A thermistor is a type of resistor that has a higher temperature dependence than normal resistors. The term is a combination of the words thermal and resistor. Inrush current limiters, temperature sensors (usually negative temperature coefficient or NTC type), self-resetting overcurrent protectors, and self-regulating heating components are all common uses for thermocouples (positive temperature coefficient or PTC type typically).

They are made of semiconductor materials and have high sensitivity, but their temperature range is limited, often ranging from -80°C to 150°C. Because thermistors' temperature-resistance interactions are highly complex, their conversion techniques are complicated.. Modern DMMs make thermistor measurements by storing a table of thermistor resistance values and the temperatures they map to. Keysight DMMs like the 34460A, 34461A, 34465A and 34470A use the standard Hart-Steinhart approximation to provide accurate conversions, with a typical resolution of 0.08°C.

### Basic Operation of Thermistors

Assuming, as a first-order approximation, that the relationship between resistance and temperature is linear, then:

$\Delta R = k\Delta T,$

where

Δ R, change in resistance

ΔT, change in temperature

k, first-order temperature coefficient of resistance

Thermistors are divided into two categories based on the sign of k. When k is positive, the resistance increases as the temperature rises, and the thermistor is known as a positive temperature coefficient (PTC) thermistor, or posistor.

When k is negative, the resistance reduces as the temperature rises, resulting in a negative temperature coefficient (NTC) thermistor. Non-thermistors are constructed with a k as close to 0 as possible so that their resistance remains almost constant over a large temperature range.

The temperature coefficient of resistance is occasionally used instead of the temperature coefficient k.

It is defined as -

$$\alpha_T = \frac{1}{R(T)}\frac{dR}{dT}.$$

### 3.3 IC Sensors

The integrated circuit sensors may come in a variety of interfaces — analogue or digital; for digital, these could be Serial Peripheral Interface, SMBus/I²C or 1-Wire.

The integrated circuit sensors may have analogue or digital interfaces; for digital, these may include Serial Peripheral Interface, SMBus/I²C, or 1-Wire.

Since OpenBSD 6.1, several of the I²C temperature sensors listed below have been supported and are available through the generic hardware sensors framework[2], which also includes an ad-hoc technique of automatically scanning the I²C bus by default on system boot.

Many of these I²C sensors are also available and accessible in NetBSD via the envsys framework, albeit none of them are enabled by default outside of Open Firmware designs like macppc, and they require manual settingis required before first use on i386 or amd64.

### 3.4 Thermocouples

A thermocouple is an electrical device made up of two dissimilar electrical conductors that, at different temperatures, produce electrical connections. As a result of the thermoelectric effect, a thermocouple creates a temperature-dependent voltage, which can be used to monitor temperature. Thermocouples are a form of temperature sensor that is commonly utilised.

Commercial thermocouples are low-cost, interchangeable, come with standard connectors, and can measure a wide temperature range. Thermocouples, unlike most other methods of temperature sensing, are self-powered and do not require any external excitation. Precision is the fundamental drawback of thermocouples.; system errors of less than one degree Celsius (°C) can be difficult to achieve.

In science and industry, thermocouples are frequently utilised. Temperature measurement for kilns, gas turbine exhaust, diesel engines, and other industrial processes are among the applications. Thermocouples are also utilised as temperature sensors in thermostats and as flame sensors in safety systems for gas-powered equipment in homes, workplaces, and companies

### Principle of Operation

A magnetic field is noticed when various metals are linked at the ends when there is a temperature difference between the joints, as discovered by German physicist Thomas Johann Seebeck in 1821. Seebeck coined the term "thermo-magnetism" to describe this effect at the time. The thermo-electric current was eventually discovered to be the source of the magnetic field he observed. The voltage generated at a single junction of two distinct types of wire is of interest in practise because it may be used to monitor temperature at extremely high and low temperatures. The magnitude of the voltage depends on the types of wire being used. Generally, the voltage is in the microvolt range and care must be taken to obtain a usable measurement. Although very little current flows, power can be generated by a single thermocouple junction. Power

generation using multiple thermocouples, as in a thermopile, is common.
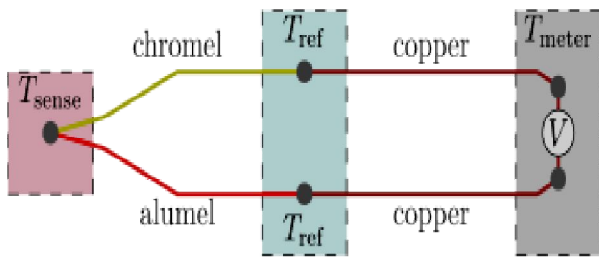


**Figure 1: Thermocouple circuit diagram**

### 4. *Seebeck Effect*

The Seebeck effect refers to an electromotive force whenever there is a temperature gradient in a conductive material. Under open-circuit conditions where there is no internal current flow, the gradient of voltage ($\blacktriangledown V$) is directly proportional to the gradient in temperature ($\blacktriangledown T$):

$\blacktriangledown V = -S(T)\blacktriangledown T$

where $S(T)$ is a temperature-dependent material property known as the Seebeck coefficient.

The standard measurement configuration shown in the figure shows four temperature regions and thus four voltage contributions:

1. Change from $T_{meter}$ to $T_{ref}$, in the lower copper wire.

2. Change from $T_{ref}$ to $T_{sense}$, in the alumel wire.

3. Change from $T_{sense}$ to $T_{ref}$, in the chromel wire.

4. Change from $T_{ref}$ to $T_{meter}$, in the upper copper wire.

Because both locations include the same temperature change and the same material, the first and fourth contributions cancel out identically. As a result, has no effect on the voltage measured. Because the second and third contributions use distinct materials, they do not cancel each other out.

The voltage that was measured turned out to be

Where S- and S+ are the Seebeck coefficients of the conductors attached to the positive and negative terminals of the voltmeter, respectively.

### 5. Easy USB Logger

A USB logger can be used to measure in-situ rock temperature, and the logger used here is called the EL-USB-TC-LCD. This standalone data logger collects over 32,000 measurements from thermocouples of the J, K, and T types. It comes with a K Type probe with a measurement range of 0 to 200°C (32 to 392°F) right out of the box. Use the on-board display to switch between the current, minimum, and maximum temperature logs witnessed throughout the session with the touch of a button. By putting the logger into a PC's USB port and using the free Easy Log programme, you can easily set up the logger and see downloaded data. The information can then be graphed, printed, and exported to other programmes. By putting the logger into a PC's USB port and using the free Easy Log programme, you can easily set up the logger and see downloaded data. The information can then be graphed, printed, and exported to other programmes for further study. 12 AA battery, K-type probe, and wall mount clip included



Figure 2: USB logger attached with thermocouple

**Technical Specifications used at Jamadoba Mines**

**Table 1: Technical specification of USB logger**

| Temperature: | |
|---|---|
| Measurement range | -35°C to 80°C (-31°F to 176°F) |
| Internal resolution | 0.5°C (1°F) |
| Accuracy (overall error) | 0.55°C (1.04°F) typical (5 to 60°C) |
| Long term stability | <0.02°C (0.04°F) / year |
| Relative Humidity: | |
| Measurement range | 0 to 100%RH |
| Internal resolution | 0.5%RH |
| Accuracy (overall error) | 2.25%RH typical (20 to 80%RH) |
| Long term stability | <0.25%RH / year |
| Logging Rate | User selectable between 10 seconds and 12 hours |
| Battery Life | 2 Years |
| Calibration Certificate | **Available Separately** |

## Working Operation of the Logger

USB data logger functioning and operation can be divided into five parts

1. Software
2. Device setup
3. Led codes
4. Lcd indicators
5. Reading data

### 5.1 Software

- Software used for data logger is easy log software
- Particularly ei-win-USB-control software
- It can be installed in any windows and provides the following feature

1. Set up and start the USB data logger
2. Stop the USB data logger
3. View previously saved data

### 5.2 Setting up of USB Data Logger

1. Remove the protective USB cover.
2. Plug the instrument into any convenient USB port .

3. Program the data logger with the provided EasyLog software (image 2):

- Give the logger a unique name (convenient when deploying multiple units).
- Select the required sample rate.
- Select high and/or low alarm thresholds.
- Select the specific date and time to begin logging.

Now remove the data logger from the USB port, replace the USB cover, and deploy the instrument wherever we need it.

### 5.3 LED Codes

1. Leds blinking significance
2. Two leds are present on the usb data logger and their flashing sequence are important
3. Green or Red flushing denotes the logging status of logger.
4. The logger will flash red when the logged temperature has exceeded a Low or High alarm level. "Hold" mode is disabled by default. In this mode the red LED will no longer continue to flash after the logged temperature has returned to normal from an alarm condition.

5. They also tell about alarm status.

6. Their flushing sequence is important and is tabled below:-



Figure 3: LED codes

### 5.4 LCD Indications

1. When the device is set up to delay start pushing the button on device lcd will display **dS.**



Figure 4: LCD showing delay start

1　When the device is push to start then it will show PS and when the button is furthered pushed it will show log which means that it has started recording.



Figure 5: LCD showing push start



Figure 6: LCD indicating that logging has started

### 5.5 Reading Data on LCD and Procedure

Following steps are done to read the data on logger:-

1. When button is pressed for first time it shows the current temperature.

2. When pressed for second time it shows current humidity.

3. When pressed for third time it shows highest recorded temperature.

4. On pushing it for fourth time it shows lowest recorded temperature.

5. Fifth time pushing will show highest recorded humidity.

6. On pushing button for sixth time it reads lowest recorded humidity.

7. Seventh time pushing will return it to current temperature.

### 6. Data Analyzation at Jamadoba Mines:

When we want to review stored data using the application or using Microsoft Excel, for getting meaningful results from recorded data is fast and easy:

1. Remove the protective USB cover.

2. Plug the instrument back into the PC's USB port.

3. Use EasyLog software to stop recording, access the instrument's stored data, and save it to a file that you name on the PC, all in one easy operation. The file format is Excelcompatible.

4. Immediately EasyLog's Graph utility is enabled to display all the stored data in one compressed view.

5. A cursor allows you to determine signal magnitude and time and date of acquisition

for any value, and a magnifier utility allows you to zoom in for a closer look over any range – Easy and fast.

6. For more custom analysis and report generation, simply import the stored data

file to Microsoft Excel for virtually unlimited flexibility in how you view and interpret your results.

The Result data and analysis is shown with the help of following table and graph respectively.

**Table 2: Temperature recording of Jamadoba mines**

| Reading Date | Celsius(°C) | Comm |
|---|---|---|
| 4/10/2019 10:16:18 AM | 26.0 | |
| 4/10/2019 10:31:18 AM | 25.0 | |
| 4/10/2019 10:46:18 AM | 24.5 | |
| 4/10/2019 11:01:18 AM | 24.5 | |
| 4/10/2019 11:16:18 AM | 25.0 | |
| 4/10/2019 11:31:18 AM | 24.5 | |
| 4/10/2019 11:46:18 AM | 25.0 | |
| 4/10/2019 12:01:18 PM | 25.0 | |
| 4/10/2019 12:16:18 PM | 25.0 | |
| 4/10/2019 12:31:18 PM | 25.0 | |
| 4/10/2019 12:46:18 PM | 25.0 | |
| 4/10/2019 1:01:18 PM | 25.0 | |
| 4/10/2019 1:16:18 PM | 25.0 | |
| 4/10/2019 1:31:18 PM | 25.0 | |
| 4/10/2019 1:46:18 PM | 25.0 | |
| 4/10/2019 2:01:18 PM | 25.0 | |
| 4/10/2019 2:16:18 PM | 25.0 | |
| 4/10/2019 2:31:18 PM | 25.0 | |
| 4/10/2019 2:46:18 PM | 25.0 | |
| 4/10/2019 3:01:18 PM | 25.0 | |
| 4/10/2019 3:16:18 PM | 25.0 | |

| | | |
|---|---|---|
| 4/11/2019 5:01:18 AM | 23.5 | |
| 4/11/2019 5:16:18 AM | 23.5 | |
| 4/11/2019 5:31:18 AM | 23.5 | |
| 4/11/2019 5:46:18 AM | 23.5 | |
| 4/11/2019 6:01:18 AM | 23.5 | |
| 4/11/2019 6:16:18 AM | 23.5 | |
| 4/11/2019 6:31:18 AM | 23.5 | |
| 4/11/2019 6:46:18 AM | 23.5 | |
| 4/11/2019 7:01:18 AM | 23.5 | |
| 4/11/2019 7:16:18 AM | 23.5 | |
| 4/11/2019 7:31:18 AM | 23.5 | |
| 4/11/2019 7:46:18 AM | 23.5 | |
| 4/11/2019 8:01:18 AM | 23.5 | |
| 4/11/2019 8:16:18 AM | 23.5 | |
| 4/11/2019 8:31:18 AM | 23.5 | |
| 4/11/2019 8:46:18 AM | 23.5 | |
| 4/11/2019 9:01:18 AM | 23.5 | |
| 4/11/2019 9:16:18 AM | 23.5 | |

**Graphical representation of the above data**
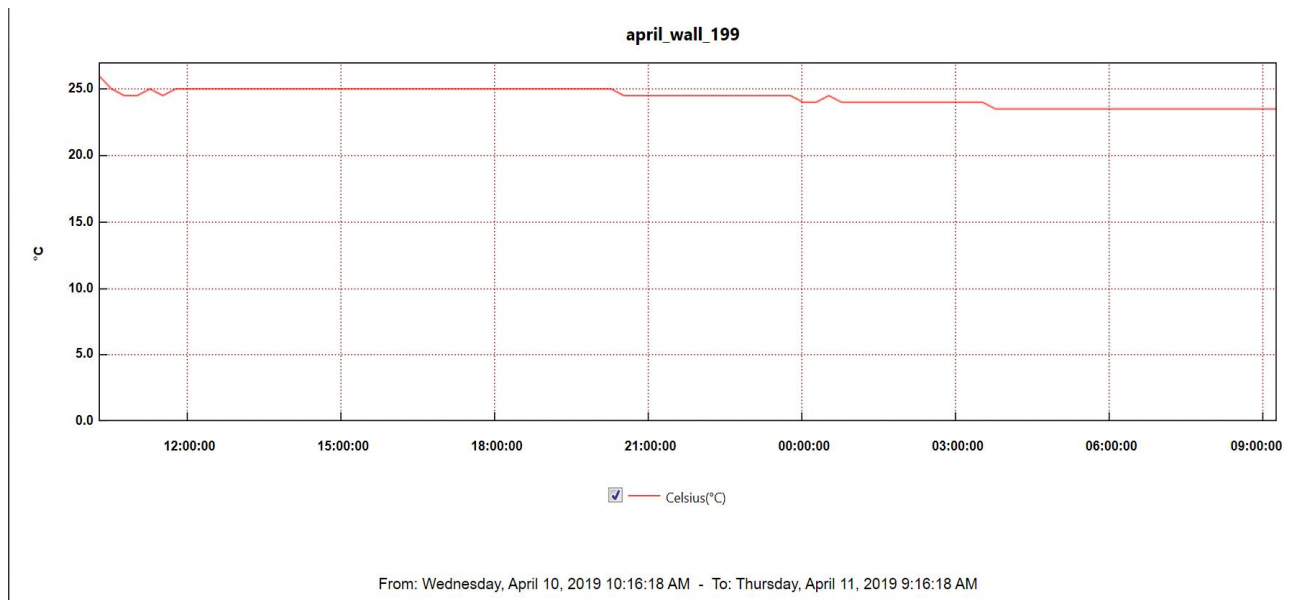
Figure 7: Graphical representation of temperature of Jamadoba mines

## Conclusion

- The temperature of in-situ rock changes with time and climate. For a period of time, the jamadoba mines remain consistent.

- The temperature of the mines declined, then increased, then remained steady for a long time, then increased, decreased, and remained constant again, implying climatic effects.

- We can determine conductivity as well as the rock's conductivity using data from numerous boreholes.

- In-situ rock temperature is necessary from time to time in order to compute the amount of heat added by the rock temperature and the amount of air required to maintain suitable operating conditions.

- Refrigeration can be used if the heat level continues to rise as the temperature rises.

## References

1. G. Danko, P.F. Mousset-Jones, In situ measurement of the heat conductivity and thermal diffusivity at the waldo mine.
2. I.J. Duckworth, Rapid evaluation of rock thermal parameters at the lucky friday mine, Mine Ventilation Services,
3. A. Habibi, R.B. Kramer, A.D.S. Gillies, Comprehensive pressure quantity survey for investigating the effects of booster fans in a trona mine.
4. P.F.X. Mousset-Jones, Determination of in-situ rock thermal parameters and the simulation of the underground mine climate.
5. K.R. Vost, In situ" measurements of the surface heat transfer coefficient in underground airways
6. Lascar Electronics.
7. Wikipedia

# MINE VENTILATION & PLANNING OF DEEP AND GASSY MINES WITH REFERENCE TO CHASNALA MINES, SAIL

## S. Kishore, M. Kumar and U.K. Mistry
Department of Mining Engineering, Jharkhand Rai University, Ranchi

_____

## ABSTRACT

*The fundamental goal of ventilation planning is to provide appropriate ventilation for worker safety, health, and efficiency in various regions of the mine while using as little energy as feasible. On the other hand, the ventilation system to be chosen is determined by the method of development and operation of the number, size, and location of openings, as well as the manner in which they are connected to the workings. It should form an integral part of the working plan and may be modified to achieve overall economy. For example, the amount of ventilation required in a mine, the type of the material mined, or the environmental circumstances may necessitate a greater or larger aperture than would be required for raising the mineral alone. For example, the quantity of ventilation required for raising the mineral alone may be determined by the mine's productivity, the kind of the mineral mined, or the environmental circumstances. Ventilator plans should be written out for various phases of the working process to ensure that they are integrated with the production plans.If there are significant discrete changes in the development and production program during the mine's life, the ventilation should be adjusted accordingly. Otherwise, they can be drawn out in 5-year increments over a 15.20-year span. Long-term planning is fruitless since manufacturing plans beyond this time frame are usually speculative and prone to major changes.*

_____

*Keyword: Ventilation Planning, Openings, Ventilator, Mineral Mined*

## 1. Introduction

### 1.1 Steps in ventilationplanning

The various steps involved in ventilation planning are--

1) Selection of ventilation norms for various portions of the mine based on productivity, number of personnel worked, acceptable explosive gas and respirable dust concentrations, permissible air velocities, and hazardous and environmental conditions such as dry and wet bulb temperature. Statutory requirements must always be met.

2.) Ventilation of the air requirement in various pits of the mine on the basis of selected norms.

3) Estimation of the amount of air cooling required, if any part or all of the mine is to meet environmental standards.

4) Selection of feasible ventilation systems.

5) Working out detailed air distribution andcontrol arrangement for each system.

6) Estimation office total quantity requirement and volumetric efficiency for each system.

7) Calculation of aerodynamic resistance of various branches and circuit of each system.

8) Solution of the ventilation network for each system.

9) Estimation of the pressure requirement and drawing of the mine characteristics for each system.

10) Repetition of the above steps for different periods in the life of the mine.

11) Selection of fan or fans to suit the varying mine characteristics taking due consideration of N.V.P

12) Estimation of the total cost of ventilation for each system.

13) Selection of the most economic ventilation system for the various stagesof planning.

14) It working out the schedule al implementation, of the ventilation plan.

### 1.2 Desirable features of a ventilation system

The selection of a ventilation system has to be done carefully in order to ensure safety reliability and economy. It should be flexible enough to meet emergencies future requirements the following desirable features

should be borne in mind in selectingventilation systems.

- Openings for men's travel should be taken as far as possible Men's egress route should always be inaugurated during emergencies such as fires and underground explosions.

- The mine's total resistance for the economical ventilation is kept to a minimum.

- Fresh air should be trained directly to work as quickly as possible.

- Dusty and hot sites should siempre be ventilated through separate air splits.

- Easy leakage and recirculation should be avoided; Leakage decreases ventilation volumetric efficiency and therefore increases ventilation costs.Requirement is a hazard to safety and health of workers.

- The regulators should be employed to reduce ventilation rather than using regulators to control a ventilation that is unpleasant and can be extremely dangerous for gaseous coal. Regulator valve control waste electricity.

- In good ventilation systems, highly tortuous, restricted and obstructed should always be avoided

- Ascension ventilation should be accepted as far as possible, since it supports Meats for the development of N.V.P. The decayed ventilation claimed to reduce the quantity of heat added to the air at work, which would decrease the amount of work due to air and mineral transport in the same direction.

- Major airways such as main intake and return shafts or admits as well as main intake and return roadways the mine should be of adequate.

## 1.3 Air Quantity Requirement

Supply of an adequate quantity of air to the face is necessary for the following reasons:

1. Supplying to workers with Barat should contain mine

- A mine air should contain at least 19% of oxygen

- "A man is confined space needs fresh air supply at the rate of about 0.125 cubic me

Lain in order to maintain the $O_2$content at 19%.

- o. 5 cubic meters/min if co2 content has to be kept below 0.5% as required by regulations

2. Diluting impurities in mine air such as Inflammable and noxious eases as well as pathogenic and inflammable dusts to safe concentration.

- .0 5% maximum inflammable gas at the face.

- 75% maximum inflammable gases in return of the district.

- 5ppm (o. ooo5%) nitrous fumes to be diluted within 5 min.

- 50ppm(.005%) of CO to be diluted within 5 min

3. Diluting heat and humidity of the mine air.

4. Producing sufficient face air velocity for comfortable working conditions.

- .0.5-20 m/sect is reasonable for comfortable working conditions velocities.

Above this general causes discomfort and raise dusts.

5. Vehicular emission dilution in case of diesel locomotives.

### 1.4 Norms of air Requirement

**Strata Gas**: To dilute the gas and bring it under permissible limit in the ventilating air.

Q=100 g/cg

Where Eg gas emission rate (in cubic meter/sec

Cg =permissible limit for general body of air.

**DUST:**

Q. = (Ed/Cd)* (P/3600)

Where P=mineral production ('tonne/hrs)

Ed= Dust emission rates in g/tonne)

Cd= allowable increase limit

### Manpower

Q= 6 cubic meters/man/min in the district of largest shift.

### Production

Q= 2.5 cubic meters/man/tonne of daily production.

### Workshop and Otherancillary Areas

2 cubic meters/sec of air quantity for ventilating

- ✓ Haulage
- ✓ Pump house
- ✓ Workshop
- ✓ Engine room

47 cubic meters/sec of air quantity for Battery charging room if situated underground to dilute gas emitted in the battery charging room.

### 1.5 Air Requirement for Heat Dilution

$Q= q/ \{d (S2-S1)\}$

Where     (S2-S1)     [{0.622Esw/IP-Sew}) (2502.5.2.386Tw) 1.005 two]

Where

S1= initial heat in air

S2. =maximum permissible heat in air

q=total heat flux added in the mine

S2-S1= sigma heat

D= density

Sew= vapor pressure

P= Barometric pressure

Two= WBT

## 2    Data Collection

### 2.1 Case Study: Sail Chasnalla

ISP is SAIL's sole steel mill with coal reserves that can be mined. The coal mine division's headquarters are located in the Chasnalla Colliery Complex. Chasnalla Group of Collieries, Jitpur Colliery, Sitanalla Block, and the Tasra Project are all part of it. Jharkhand is home to all of the collieries. Apart from the aforementioned, another colliery may be found in Ramnagore, West Bengal, near the Kulti works.

1. **Location** - situated at south eastern corner of Jharia coal field over 866 acres & lies between longitude 86°26'52'' to 86°27'57'' East and Latitude 23°40'3'' to 23°38'33''.

2. The general strike of the formation is N86°W to S62°E.

3. 50% surface area overlying under Damodar River & a prominent dyke of 3.5m thickness trending north to south is tracked closed to the western boundary of the mine.

4. Project report was made in the year 1966 and exploitation of 13/14 development was done in 1973.

5. Coal production started in the early half of Nov'1975.

6. Colliery Bench Mark with reference to Sudamdih Railway station- 142.19m

7. Colliery National grid Bench Mark- 142.38m

8. No of seams-18

9. Working seams -12,13,14,15,13 &14

10. Gradient-1 in 1.3 (38°)

11. Dip – 25° to 40°

12. HFL-132.69m

13. Entries-Shaft 1 & 2

14. Method of Working- Jankowice method in conjunction with hydraulic sand stowing.

15. Coal Reserve- 36.21 MT as on 01.04.07

16. Depth of working-172m in 1$^{st}$ Horizon & 282 m in 2$^{nd}$ Horizon (110m)

17. RMR-in 1$^{st}$ Horizon 42.3 & in 2$^{nd}$ Horizon is 38

18. Depth – D/C Shaft- Men & Material-399.9m

19. Depth- U/C Shaft-Men-327.9m

20. Gassiness- Degree 3

### 2.2 Manner of Extraction

I. The manner of extraction is by JANKOWICE METHOD.

II. Not more than 2.2m (true) thickness in 13 seam and 2.4m in 14 seam (true) thicknesses of the seam is extracted in

any lifts. A parting of 0.6m thick coal with underlying lift is maintained.

III. The faces are advanced at a uniform rate and extraction of immediate overlaying lift is not commenced unless the bottom lift has advanced by 20m.

IV. Extraction in the panel is not done vertically below the upper seam panels. The face is kept either ahead or behind the upper seam faces by at least 10m.

V. Total length of the panel along strike is worked block wise and by breasting. Block along the strike is made by driving staples of length not more than 5.5m measured from barricade and the width of breasting not exceeding 4.5m. Block is not more than 25m in length.

VI. After extracting each block the void created is stowed immediately up to 4.5m from the stowed goaf leaving 1m clearance between the face and barricade. Extraction in the next block is started only after adjoining void has been stowed completely.

VII. Each staple is breasted by putting shot holes so placed that there is minimum damage to the support in the area along strike.

VIII. Each Rise/Cut is stowed immediately after it use is over.

IX. Flumes of adequate size and the suitable material is installed at suitable places for proper drainage of stowing water.

X. Barricade of adequate strength to contain sand is made.

XI. The rate of extraction is uniform as practicable and one cycle of operations (including stowing) is completed within 36 hrs.

XII. The extraction in each lift is completed within a period of 6 months. The panel is isolated by isolation stoppings after completion of extraction.

## 2.3 Ventilation control

I. Face valve according to the statute. I. I. Two intakes (two cuts) and two returns are used for each lift (two cuts). Every production face always offers 1000 m3 of air per minute.

II. Astt's manager/ventilation officer with an approved automatic detector shall at least test the air in the Longwall Face Return Airway for the percentage of CO once in the early stage. At least once every 7 days the air in the return airways is completely analysed to determine the CO/O2 ratio absorbed

III. The extraction of coal from any panel takes place through regular thermal compositional monitoring with the approved research / academic institute for the early detection of spontaneous heating.

IV. In a panel such as CH4& CO the environmental parameters are continuously monitored by means of appropriate instruments. An automatic audio-visual alarm system is installed for monitoring the inflammable gas in the district's airways. Such devices are connected to the district's main power switch in such a way that the electricity in the districts/panel decreases as soon as the percentage of CH4 in its back airway is above 0.5 percent.

## 2.4 Mine Ventilation Systems

The regulation of air movement, its amount, and direction is known as ventilation. Despite the fact that it has no direct impact on the production phase of an operation, poor ventilation frequently leads to lower worker efficiency and productivity, increased accident rates, and absenteeism.

Air is required not only for breathing, but also for dispersing chemical and physical pollutants (gases, dusts, heat, and humidity). Mine ventilation is tightly controlled in the United States and around the world, particularly in coal and gassy (noncoal) mines, and other legislation govern the amount of air required to dilute diesel emissions, blasting fumes, radiation, dusts, battery emissions, and a variety of other contaminants.

Provision is provided for acceptable channels (airways or aircourses) for the air to move down the mine to the working locations and suitable routes out of the mine when it has become unfit for further use to ensure proper

ventilation of a mine. The primary ventilation system thus comprises of a fresh air intake or intakes (or downcasts), the mine workings, and an exhaust or exhausts (or upcasts) where the air passes after having ventilated the mine working locations.Mine fans can be installed on the intake airshaft, return airshafts, or both, either on the surface or underground (Figure 9-1).
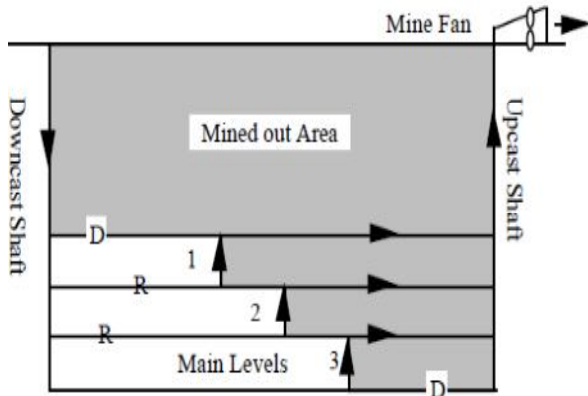


Figure1: Basic ventilation system underground where D is a ventilation door or airlock, R is a mine regulator and 1, 2, 3 are working places with a surface exhaust fan.

Careful planning ahead of time is required to provide appropriate ventilation throughout the mine's lifespan. Two main things must be considered while considering advanced ventilation:

(1) The mine's total volume flow rate of air, as well as its suitable and cost-effective distribution

(2) The mine fan's necessary pressure (s). A properly built ventilation system should be efficient, adaptable, and cost-effective.

## 2.5 Major Ventilation Systems

Any ventilation system has two goals in mind. To provide fresh air for face ventilation, primary ventilation must first route air through the main airways to the immediate working region out by the working faces, and then return the polluted air to the surface via return (exhaust)airways. Second, the face ventilation system must be designed to efficiently use the available air in the local working area to sweep the working face, capture and remove dust, and dilute and transport any gas emitted during mining activities. A productive production cycle would be impossible without a well-designed ventilation system.The system should deliver the requisite air quantities and quality at reasonable pressure losses, with the least amount of interference and expense to production, and in the most cost-effective manner possible.

Furthermore, even if the primary ventilation system is well-designed, the overall system will fail if the available air supplied into the working area is not appropriately utilised for ventilating the faces where the majority of workers are positioned.

Ventilation schemes can be split into two major categories, depending on the type of mine and the geology of the surrounding area: a U-tube system or a through-flow design. Figure 2 depicts a simple U-tube arrangement in which air flows towards and past the work area before returning along adjacent airways, which are frequently separated from intakes by tall pillars and/or stoppings. Traffic between the intake and return airways is made easier by access doors in the stoppings. Room-and-pillar and longwall mining technologies are two variations of this layout. Figure 9-2b depicts the alternative configuration.Intakes and returns are usually geographically separated from neighbouring airways, which are either all intakes or all returns. Despite the fact that geographical isolation necessitates fewer stops and airways, which often results in reduced air leakage, air current restrictions and boosters may be required for airflow control in work areas (McPherson, 1993). The bleeder system in a longwall panel and parallel flows between intake and return airshafts in multilevel metal mines are two examples of this type of layout.

Actual underground layouts could be variations of either system or a hybrid of the two.

9. Mine Ventilation Systems
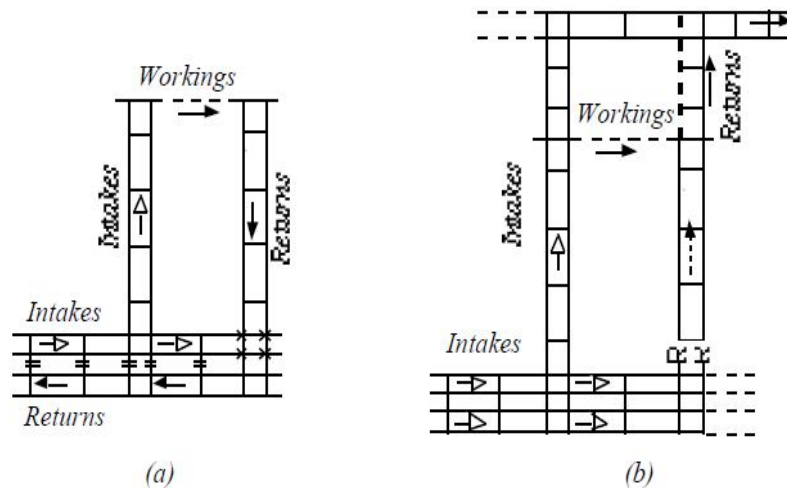


*Figure 9-2. Basic ventilation systems (a) U-tube and (b) through-flow (McPherson, 1993).*

### 1.4. **For Stratified Deposits**

Longwall or room-and-pillar mining is used in the vast majority of underground mines that extract tabular forms of ore bodies (coal, potash, salt, limestone, etc.). While the particular layouts for these two processes can differ greatly from mine to mine and region to region due to local geological conditions, the essential design for both approaches remains the same. The sections that follow describe the most common airflow distribution system.

### A) Longwallsystems

Controlling methane or other gases that accumulate in the gob area (Haake, et al., 1985; Highton, 1980; McPherson, 1993; den Drijver, et al., 1997; Diamond, 1997; Dziurzynski and Nawrat, 1997), as well as the increasing high rate of rock breakage on heavily mechanisedlongwalls that produces dust, ga

(Uchino and Hirago, 1984; Battinoand Mitchell, 1985; Organiscak and Jankowski, 1996; Colinet, et al., 1997; Stokes and Tuck, 1997).

Figure 3 shows a few of the most typical ventilation schemes for longwall sections.

A minimum of two entries is required in the United States, but single entry longwalls are mainly used in European coal mines (Fuller, 1989; McPherson, 1993).

When mining under sloped, thick, gassy coal seams with numerous faults, system architectures become increasingly complicated. To deal with these challenging conditions, narrower and shorter panels are required. Other types of layouts have been used to fit certain geological circumstances (Fuller, 1989 and Tien, 1995).

9. Mine Ventilation Systems
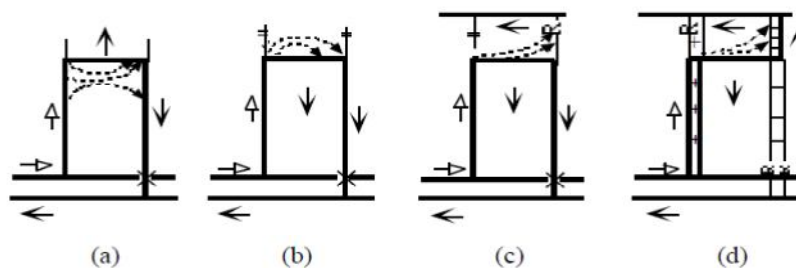


Figure3: Classifications of longwall ventilation systems (a) single-entry advancing; (b) single-entry retreating; (c) single-entry retreating with back bleeder; (d) doubleentry retreating with back bleeder (after McPherson, 1993).
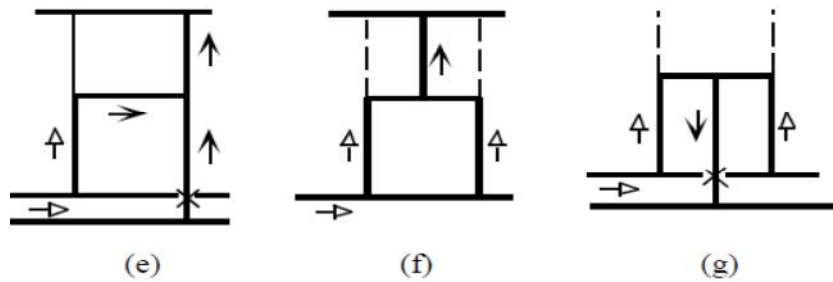
Figure 4. Classifications of longwall ventilation systems (e) Y-system; (f) double-Z system; (g) W-system. (after McPherson, 1993).

b)  Room and pillar systems

In a coalmine with various entry, Figure 5 depicts the two techniques of ventilation a chamber and a pillar development panel. The directed, or W-system, is depicted in Figure 9-4a, in which intake air courses are located in the centre area of the panel, with return airways on both sides, and is also known as the fish-tail approach. The unidirectional system, shown in Figure 5, has intake and return on both sides of the neutral airway (belt and track).

The conveyor belt and/or track are in the centre in both cases, with a brattice curtain at the end to control airflow. Under normal circumstances, air in these entry is not supposed to be used to ventilate working areas in US coal mines unless a special petition is approved in advance by MSHA, thus they are diverted directly to the return airway through a regulator. The airflow separates at the panel's end, with each airstream ventilating the operational rooms sequentially across one half of the panel only, resulting in less leakage due to a lower pressure differential across the barrier; and any gas emissions will flow automatically to return airways. The number of stops necessary is double that of the unidirectional system, which is an evident drawback. Due to the additional stoppings, air leakage is also doubled (McPherson, 1993).
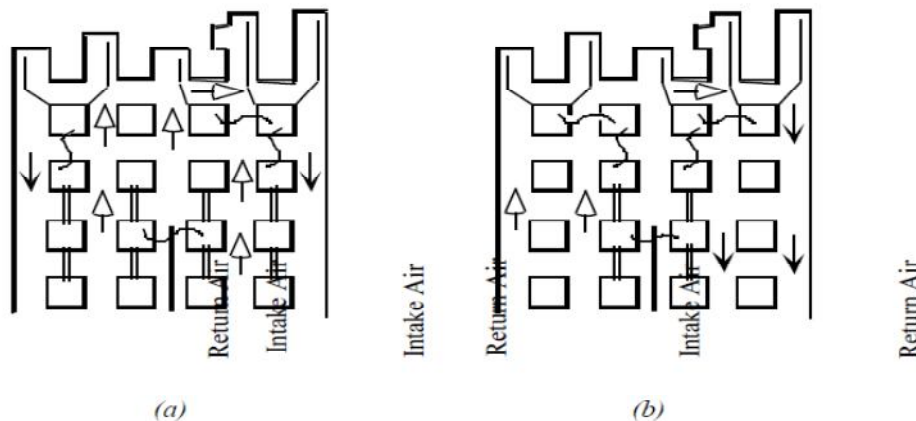


Figure 5: Room and pillar development with line brattices to regulate airflow in conveyor belt entry: (a) bi-directional system; (b) uni-directional system.

Because there are fewer stoppings in a unidirectional system, it should have a higher volumetric efficiency at the face. One negative is that the increased volume comes with a higher ventilation pressure, which leads to more leakage.

### 3. Recommendation

Only the function of temperature-humidity regulation, often cooling or heating, is referred to as air conditioning. The qualifying term "total" should be used to denote total mine air cooling and all of the environmental control functions it implies.

The functions of total air conditioning are: (1) quality control, (2) control of quantity and (3) control of the air temperature and humidity. Individual conditioning procedures are used to achieve these goals; in mining, they include the following:

1. **Quality control** (purifying air and removing contaminants)

A. Gas control—vapors and gaseous matter, including radiation

B. Dust control—particulate matter

2. **Quantity control** (regulating magnitude and direction of airflow)

a. Ventilation
b. Auxiliary or face ventilation
c. Local exhaust

3. **Temperature-humidity control** (controlling latent and sensible heat)

a. Cooling
b. Heating
c. Humidification
d. Dehumidification

Control processes can be used separately or in tandem. If total air conditioning of the mine is the goal, all three goals must be satisfied, and multiple techniques may be used at the same time.

Certain technical principles are basic and apply to the control of any contaminant while dealing with air environmental concerns in mining. Gases and dusts are the most common pollutants, but heat and humidity are also present. Engineering control concepts are as follows, in order of preference for application (Hartman, 1968):

1. Prevention or avoidance
2. Removal or elimination
3. Suppression or absorption
4. Containment or isolation
5. Dilution or reduction

If the goal is to control the quality of a dust hazard, for example, these five actions should be considered and implemented in the sequence listed. Although ventilation, a dilution measure, may be the best option, it should be used in concert with other measures such as prevention, removal, suppression (by water), and containment (by suitable enclosure of the source).Other procedures available to mine officials in charge of safety, ventilation, and air conditioning include in addition to engineering control. Education, physical examinations, lung x-rays, personal protective equipment, prophylaxis, and rehabilitation are all examples of medical control principles. The last set of legal control principles include statutory and regulatory provisions, as well as workers' compensation legislation. All of these resources can be put to use in the fight against environmental hazards.

## 4. Conclusion

Ventilation requirements and expenditures eventually reach untenable levels at large depths. Under these extreme heat conditions, ventilation at considerable depths must be supplemented by air conditioning to maintain mine atmospheric quality.

Although the heat generated by depth is the ultimate limit, the mine and its atmosphere must also contend with other hazardous situations. Typically, they are pollutants in the air, such as gases and dusts. As mines grow in size, complexity, personnel, and mechanisation, so do the demands on the ventilation-air conditioning system to meet stricter environmental regulations. Fortunately, advancements in mining science and technology tend to keep up with the escalating dangers underneath. The struggle, on the other hand, is ongoing, as evidenced by both human safety and running expenses.

## 5. References

1. Banerjee S.P. (2003); "Mine Ventilation"; Lovely Prakashan, Dhanbad, India.
2. Deshmukh, D. J. (2008); "Elements of Mining Technology, Vol. – II"; Denett& Co., Nagpur, India.
3. Hartman, H. L., Mutmansky, J. M. & Wang, Y. J. (1982); "Mine Ventilation and Air Conditioning"; John Wiley & Sons, New York.
4. Le Roux, W. L. (1972); Mine Ventilation Notes for Beginners"; The Mine Ventilation Society of South Africa.
5. McPherson, M. J. (1993); Subsurface Ventilation and Environmental Engineering"; Chapman & Hall, London.
6. Misra G.B. (1986); "Mine Environment and Ventilation"; Oxford University Press, Calcutta, India.

# SHRM IN EDUCATION SECTOR – A SYSTEMATIC REVIEW AND SCOPE FOR RESEARCH EXTENSION

**S. Fatima and R. Sharma**

Mangalayatan University, Aligarh

saherafatima@gmail.com, rajeev.sharma@mangalayatan.edu.in

_____

## ABSTRACT

*Educational leadership in the school sector, as a significant factor contributing to teacher and student performance has been a research interest to scholars for quite some time now. Such researchers are now increasingly gaining interest in strategic human resource management (SHRM). Strategic human resource management is the process of linking HR foundation with the organization's strategic goals and objectives for enhancing organizational culture, encouraging innovation and organizational performance. This paper is a systematic review of the research in the study area of SHRM in the school sector carried out in various countries. The paper attempts to provide insights into the impact of SHRM on school performance. The researcher also draws agenda for future research in this direction.*

_____

***Keywords:** Strategic human resource management, educational leadership, high-power work systems, quality of working life, school sector*

## 1. Introduction

### 1.1. Strategic Human Resource Management

HR professionals working on strategic planning find both challenges and opportunities. Human resource professionals and leaders of global companies in today's world work on strategic decision making. They take strategic planning as a major functional role and team up with organizational strategy makers to make while making HR decisions. However, the HR managers of small and medium organizations do not involve much in the strategic planning. Often HR managers of such organizations often need to convince their managements about the benefits of strategic management and the role of SHRM in achieving business goals. Becker and Huselid (2006) carried out research in this area and identified the key challenges of strategic human resource management. Becker et al worked on identifying new directions in both practice and research of strategic HRM. The research focussed on a more clear articulation of the 'black box' between the organizational performance and human resource management. The study also emphasized on the execution of strategic implementation as a variable that is centrally mediating in such relationship. The study highlighted the importance of differentiated HR architectures across and within firms (Becker and Huselid, 2006). Strategic human resource management is a process of developing and executing HR practices that are aligned with the organizational goals. Tuss and Gratton defined SHRM as the process of linking HR foundation with the organization's' strategic goals and objectives for enhancing organizational culture, encouraging innovation and enhancing organizational performance (Hunt, 2019). The changes in the labour market in all sectors coupled with ambitious organizational vision calls for alignment of HR practices with organizational goals.

Over the past two decades, SHRM researchers have investigated why and how organizational goals are achieved through the use of HR practices. While the traditional HRM research was focused on the effect of different HR practices individually, researchers from a strategic perspective examined the impact of bundles of HR practices on employee performance and organizational outcome. Such bundles of HR practices were referred to as high-involvement, high-commitment, or more often as High-Performance Work Systems (HPWS) (Jiang, Lepak, Hu and Baer, 2012). In recent times, organizations are focusing on improving employee performance through creating (HPWS). HPWS are a range of HR practices that include recruitment and selection, compensation and incentives, performance management systems, work engagement, training and flexible working arrangements for employees which are aimed at enhancing employee performance. HPWS satisfies employee needs beyond job satisfaction.

Through the mediation of Quality of Working Life (QWL), HPWS affects employee work behavior positively (Shen, Benson and Huang, 2014)

According to Wright and McMahan, strategic human resource management (SHRM) is a pattern of planned human resource deployments and activities intended to enable the firm to achieve its goals. The definition implies human resources are the primary resources that should be leveraged strategically as a source of competitive advantage. It also focuses on the HR programs, policies and practices as the means to gain human resources competitive advantage. SHRM is a consistent pattern and plan or the strategy to achieve vertical and horizontal fit with the firm's strategy and various HR activities. The purpose of SHRM is goal achievement (Wright, 1998).

The research in strategic human resource management focuses more on the impact on performance rather than HR practices at the individual level (Boon, Den Hartog and Lepak, 2019). For example, a Libyan based study on 52 oil and gas companies carried out by Al Adresi and Darun (2017) found that employees' commitment to their organizations was better when the organizations had best SHRM practices. It was further revealed that the employees were concerned with security of their jobs and dynamic working conditions. Organizational support was one more factor found to be contributing to the organizational commitment.

Researchers have been carrying out studies to investigate the effectiveness of strategic human resource management (SHRM) on employee performance since the 1990s. While there has been empirical evidence of the value SHRM adds to the organizational performance through enhanced productivity, profitability and employee retention (Knies, Boselie, Gould-Williams and Vandenabeele, 2018), researchers are also increasingly gaining interest in the area of SHRM practices in education sector too. For example, Beall (1997) explored the factors that the school leadership should consider in order to shape their organizations so as to attract and develop effective teachers. He worked on strategic leadership from the viewpoints of recruitment, compensation and teacher development. Kwan (2009) too worked in this

area and suggested alignment of school development plans with teachers' individual goals.

The purpose of the current study is to explore the prominent research carried out in the area of SHRM in the school education sector across various countries. The countries where such studies were carried out, study areas, methodologies and the findings of the studies reviewed are summarized and presented in the form of tables. The conclusions from the data are drawn and further research recommendations are made.

## 1.2. Research Objectives

The objective of this review study is to explore the research done across various countries in the area of SHRM practices in school sector and analyze if SHRM practices have an impact on organizational management in school education sector. The aim is also to identify research gaps so as to draw agenda for further research in this study area.

## 1.3. Methodology

The current review research has primarily focused on finding patterns from the previous researchers. The study has used inductive reasoning approach by collecting information and making observations through previously done researches and drawing inferences based on that.

The approach of this study is structured review. Structured review is a domain-based research review that is specifically based on theories, research methods and constructs that give insightful information to the readers. The information in structured review articles is classically presented in well-designed tables (Paul and Criado, 2020).

## 2. Literature Review

SHRM refers to the planning and the pattern in which human resource activities are carried out so as to achieve organizational goals (wright et al, 1992). These are the human resource management deployment and practices executed through planned behavioral patterns aligned in the direction of organizational success. SHRM practices refer to the deployment and activities to achieve organizational success through a pattern of planned behaviors. Employing SHRM

practices help in increasing productivity and organizational efficiency of organization. Practices like employee training and development, career ladder system, making performance appraisals goal-oriented, job security, participative management, providing performance-based incentives etc., are some of the SHRM practices that have been found to have enhanced organizational efficiency (Al Adresi and Darun, 2017).

Early studies of strategic human resource management gave some insights into the challenges of SHRM. The initial studies on the effectiveness and challenges of strategic human resource management had varied findings. For example, an Australian based study carried out by Teo (2002) examined the effectiveness of SHRM function executed by corporate HR department of a public sector company. The researcher studied the HRM functions before and after corporatisation of the department. The mixed approach of survey and interviews of senior managers found that though the strategic management and HRM were better integrated, the role effectiveness of strategic HRM function was low. It was also revealed that more than adding value, the strategic HRM function was more effective in the administrative role. The challenges of playing dual roles of strategic business partner and managing a corporate headquarter unit caused hindrances to the effectiveness of strategic HRM (Teo, 2002). According to a 2003 case study of Mauritian civil services, SHRM was not feasible in Mauritius because it was not well known and the framework for strategic management was not there. There was centralized staff management and a lack of political will for any radical changes. McCourt and Ramgutty-Wong (2003), who studied the case, argued that SHRM practices did not have universal validity. Thus a piecemeal approach to good practice of HR was suggested (McCourt and Ramgutty-Wong, 2003).

However, more recent studies have established positive correlation between HR practices and organizational effectives. As the workforce ages, organizations have to ensure and enhance the employability of their workforce sustaining throughout their working life. Ybema et al (2017) investigated the implementation of HR practices for enhancing sustainable employability with respect to employees' health, motivation, knowledge and skill development. The quantitative study found to have positively impacting the employee satisfaction and productivity (Ybema, van Vuuren and van Dam, 2017).

Industry experts and researchers have long identified the role of HRM systems (HRMS) in organizational performance in various corporate and manufacturing sectors. However, considering the significance of the service industry, schools in the education sector, specifically in the current global economy, it is important to determine the HRMS-performance relationship in this labour-intensive industry (Paracha, Wan Ismail and Amin, 2014). In accordance with what Parcha et al argued, some interesting research in the area has also been done by researchers in the school sector.

Researchers have not only been interested in studying educational leadership as a significant factor in teacher and student performance but also increasingly gaining interest in strategic human resource management (SHRM) in the sector of education (Vekeman, Devos and Valcke, 2016). The correlation between HRM and organizational performance has been the major focus of SHRM researchers for over two decades (Paracha, Wan Ismail and Amin, 2014). The current study is a critical review of the research carried out in the field of SHRM in the school sector.

## 3. SHRM in Education Sector

Working on strategic leadership of independent schools in the United States, Beall (1997) explored the factors that the school leadership should consider in order to shape their organizations so as to attract and develop effective teachers. He worked on strategic leadership from the viewpoints of recruitment, compensation and teacher development. The researcher conducted both qualitative and quantitative studies and the teachers' responses to the questionnaire analyzed. Irrespective of the subject taught, it was found that perceived quality of teachers and students, learning environment of the school and autonomy to design curriculum and instruction were identified by the teachers as the most influential factors that attract them to work in

their schools. It was further found that teachers were least satisfied with their compensation and benefits. Beall argued it was a challenge to designing compensation, development and teacher evaluation programs in consistency with strategic goals and mission of the schools. His research concluded teachers working in schools that follow strict salary scales were more unlikely to perceive a connection between gender and compensation, compensation and teaching excellence, and had almost the same levels of satisfaction as teachers of schools not having salary scales. The researcher advocated knowledge-based pay to stress the significance of schools investing in the professional development of their teachers. Health-care benefits, tax remittance plan and tuition remittance to the teachers' children, opportunity to attend domain-specific conferences and workshops were rated highest by maximum number of teachers to attract them to continue in the same schools. A positive correlation was found between the budget allocated to professional development of the teachers and teachers' mean satisfaction. Relationship with the leaders, professional development and compensation were found to be crucial in affecting teachers' satisfaction.

The researcher found connecting teachers' evaluation and their professional development was one of the most difficult challenges of school leaders. Schools having evaluation processes with goals-setting, yearly evaluation, self-evaluation and course evaluations of students were found to have gained the highest levels of confidence among the teachers (Beall, 1997).

A 2002 study carried out at Vanderbilt university explored the concept of SHRM from a strategic human resource development (SHRD) context. Woodwick (2002) studied the competence, education and development required by SHRD practitioners. The researcher tested three hypotheses; the routing human resource development (HRD) practices as the design and implementation of training and development programs are insufficient to meet the current organizational complexities; the practitioners of SHRD need better skills set, knowledge, capabilities and attributes; to develop the concept of SHRD and practice it,

action is required. To bridge the gap between current and emerging HRD practices, Woodwick proposed enhancing practitioner readiness for strategic organizational roles. The key findings of this qualitative research are; it was unclear on the skills needed to facilitate SHRD; improvement and sophistication of HRD practice was impeded by various dilemmas including incongruence between theory and practice of principles; the course curriculum of HRD programs at undergraduate and graduate programs were not inclusive of SHRD. The researcher concluded that theoretical and practical models must be developed to enhance competencies to support and facilitate SHRD (Woodwick, 2002).

In Belgium Vekeman, Devos and Valcke (2016) studied the correlation between school principals' leadership styles and the configuration of different HR practices for primary education novice teachers. Vekeman et al worked on instructional and transformational leadership styles of school principals and their relationship with principals strategic and HR orientation in configuring HR practices for beginner teachers. The study was carried out to find answers to the following questions.

1. How do the school leaders put together a set of HR practices for beginner teachers?
2. What is the relationship between principals' leadership styles and the configuration of HR practices?

2a. How are the leadership styles of principals correlated to strategic orientation?
2b. How are the leadership styles of school leaders correlated to HR orientation?
2c. How do the different HRM types such as strategic, developmental, strategic-developmental and administrative HRM types differentiate the leadership styles of principals? The researchers used a mixed approach for data collection that included interviewing 75 principals and conducting an online survey of 1058 Flemish primary education teachers. Analysis of data collected through both qualitative and quantitative means was done through logistic regression and ANOVA. It was found that principals' leadership, both instructional and transformational, was associated with their strategic orientation. However, the principals' leadership style did

not reflect HR orientation. Vekeman et al concluded that both instructional and transformational leadership is significant for strategic management of new teachers. Further research in this area, including other attributes of principals that have an effect on HRM in the education sector, is recommended to fully understand the relationship between principals' leadership styles and HRM in schools (Vekeman, Devos and Valcke, 2016).

Lopez-Diaz (2012) studied SHRM practices of schools in Chile and provided evidence of correlation between HRM practices and outcomes of Chilean schools. He found HRM practices to be significantly related to achievement, discipline and satisfaction of students and parents. The researcher gathered data from the Chilean Education Ministry and also conducted surveys on teachers, students and parents to answer the following research questions.

- Does the way in which Chilean teachers are managed, as measured by their own responses to surveys, ultimately affect different measures of school productivity?
- If this is the case, are there identifiable individual "best practices" to organize teachers' work, or do these practices usually operate as bundles with some kind of synergetic interactions to significantly impact productivity?
- Are these individual or "bundles" of practices (depending on what is found) similar across all schools, or their impact varies depending on the average socioeconomic characteristics of the students attending the school and the type of school they attend?

The research findings showed evidence of effectiveness of management practices when they strategically complement one another. In other words, a horizontal fit of strategic human resource practices promote their effectiveness. The research also found relation of vertical fit by showing evidence of influence of contextual factors on HRM practices to affect productivity. For managing effective schools, the researcher took into account the relevance of both contextual and configurationally elements and concluded that schools should pay attention to both horizontal and vertical fit

while researching or implementing reforms in schools (Lopez-Diaz, 2012).

Paracha, Wan Ismail and Amin (2014) reviewed the literature on High Performance Work Systems (HPWS) - Performance relationship. Based on a critical assessment of the research done in this area, they suggested a comprehensive framework for schools to determine the HPWS-Performance relationship. Their model included HRM systems in the education industry, relative mediators, and contingent and performance factors. Their framework includes selection, training, performance appraisal, job definition, career planning, employee participation and compensation as the components of High-Performance Work Practices (HPWP), which directly affect school performance. The framework further mentions human capital and organizational commitment as the mediating links and student-teacher ratio and school location as the moderating links to HPWS-Performance correlation. Admitting the framework was yet to be empirically tested, Parcha et al, believed their conceptual model would be an important contributor to conduct future research in HRM systems and performance of the teachers in schools. They came up with the following propositions.

1. High performance work systems have a positive correlation with performance of the school.
2. a. Organizational commitment will mediate the relationship between HPWS. b. Human capital will mediate the relationship between HPWS and school performance and school performance
3. a. Student/teacher ratio will moderate the relationship between HPWS and school performance. b. Location will moderate the relationship between HPWS and school performance (Paracha, Wan Ismail and Amin, 2014).

Shen, Benson and Huang (2014) examined the role played by quality of working life (QWL) in relating high performance work systems (HPWS) with in-role performance and extra-role behavior of employees. They tested the following hypotheses.

Hypothesis 1: High-performance work systems will be positively related to quality of working life of teachers.

Hypothesis 2: QWL will partially mediate the relationship between HPWSs and teachers' in-role performance.

Hypothesis 3: QWL will partially mediate the relationship between HPWSs and teachers' extra-role behavior.

Shen et al collected data through questionnaire surveys from school teachers and their supervisors in Guangdong Province of China. They tested meso-mediation models through multilevel analysis and found that teachers' performance and behavior is directly and indirectly influenced by HPWS through the mediation of QWL. They concluded that QWL is a significant mediator that connects HPWS to employees' performance and behaviors.

More recently, Allui and Sahni (2016) explored universities in Saudi to understand the extent to which institutional strategies are integrated with HRM practices. The exploratory research used both qualitative and quantitative techniques. A survey questionnaire was administered to the teaching staff of higher education. The results showed that there was a strong awareness of SHRM at higher education level in Saudi universities. However, they faced the challenges with human capital development especially the teaching faculty. The researchers recommended paying more attention towards practicing SHRM with respect to recruitment and selection, performance appraisal and compensation systems to motivate and retain faculty members.

(Hamadamin and Atan, 2019) Another interesting study was carried out in Erbil city, Iraq to examine if SHRM practices had any influence on achieving sustainable competitive advantages by evaluating the role of human capital development as a mediating role and employee commitment. A questionnaire survey was conducted on 600 people and the data obtained was analysed through the techniques of structural equation modelling. The findings revealed that SHRM had a linear and positive influence on the sustainability of competitive advantages. It was also found that both human capital development and employee commitment were positively impacted by SHRM. Both these factors were found to be partially mediating the SHRM practices and in turn sustainable competitive advantage.

A cross-country comparative study was carried out in Chile that was focussed on identifying leadership practices of school and contextual characteristics that influenced student achievement. It was found that in Chile, the leadership practices of principals with respect to the teachers' work and professional development contributed to their performance. It was also found that the Chilean principals focussed more on the school teaching goals than the classroom work of teachers. This had a greater influence on teachers' professional practices and attitudes rather than teaching performance. The researchers argued the study results would imply educational research and policy making generally and more so in non-Anglo-american countries. (Marfan and Pascual, 2017)

Another interesting study carried out on Chilean education system by Weinstein, Raczynski and Peña (2018) analysed the trust relationship between teachers and principals of primary schools. The researchers used both qualitative and quantitative approaches in which a survey and a case study was carried out. It was found that the teachers and the principals have different approach with respect to trust. The school leaders confer this trust but the teachers earn it. While the principals are more critical of the staff and questioning their professional skills, teachers' trust is based on personal aspects. It was also found that neither principals nor teachers have any impact of individual traits on their relational trust. The research reinforces the significance of the educational context with respect to positional power and trust relationships in schools. (Weinstein, Raczynski and Peña, 2018).

The studies discussed above are summarized in the below table. Details are given with respect to the area of study, methodology, major findings, who did the research, in which year and country are given in the area.

**Table – 1**

| Researcher | Year | Area of Study | Methodology | Findings | Country |
|---|---|---|---|---|---|
| Beall | 1997 | Strategic leadership of independent schools in the United States | Both Qualitative and quantitative | Perceived quality of teachers and students, learning environment of the school and autonomy to design curriculum and instruction were identified by the teachers as the most influential factors that attract them to work in their school | United States |
| Woodwick | 2002 | The competencies, education and development required by SHRD practitioner | Qualitative study | It was unclear on the skills needed to facilitate SHRD; improvement and sophistication of HRD practice was impeded by various dilemmas including incongruence between theory and practice of principles; the course curriculum of HRD programs at undergraduate and graduate programs were not inclusive of SHRD | Tennessee, United States |
| Vekeman, Devos and Valcke | 2016 | Correlation of principals' leadership styles with their strategic and HR orientation in configuring HR practices for beginner teachers. | The researchers used a mixed approach for data collection that included interviewing 75 principals and conducting an online survey of 1058 Flemish primary education teachers. | Both instructional and transformational leadership were found to be significant for strategic management of new teachers. | Belgium |
| Lopez-Diaz | 2012 | SHRM practices of schools in Chile | The researcher gathered data from the Chilean Education Ministry and also conducted surveys on teachers, students and parents to answer the following research questions. | The research found empirical evidence of HRM practices to be significantly related to achievement, discipline and satisfaction of students and parents | Chile |
| Paracha, Wan Ismail and Amin | 2014 | Research review on relationship between High Performance Work Systems (HPWS) and Performance relationship | Critical assessment of the research done in this area, | The researchers suggested a comprehensive framework for schools to determine the HPWS-Performance relationship. Their model included HRM systems in the education industry, relative mediators, contingent and performance factors. | Pakistan |
| Shen, Benson and Huang | 2014 | The role played by quality of working life (QWL) in relating high performance work systems (HPWS) | Data was collected through questionnaire surveys from school teachers and their supervisors in | Research found teachers' performance and behavior is directly and indirectly influenced by HPWS through the mediation of QWL. It was concluded that QWL is a significant mediator that | China |

| | | | | | |
|---|---|---|---|---|---|
| | | with in-role performance and extra-role behavior of employees | Guangdong Province of China. They tested meso-mediation models through multilevel analysis. | connects HPWS to employees' performance and behaviors | |
| Allui and Sahni | 2016 | Integration of institutional strategies with HRM practices in Saudi universities | Exploratory research with both qualitative and quantitative techniques used. Literature was thoroughly reviewed and a survey questionnaire was administered to the teaching staff of higher education. | There was a strong awareness of SHRM at higher education level in Saudi universities. However, they faced the challenges with human capital development especially of the teaching staff. Paying more attention towards SHRM practices with respect to recruitment and selection and performance appraisal systems is recommended. | Saudi |
| Marfan and Pascual | 2017 | Cross-country comparative study focussed on identifying leadership practices of school and contextual characteristics that influenced student achievement. | Quantitative method through questionnaire survey. | Chilean principals focused more on school teaching goals than classroom work of the teachers. This had greater impact on teachers' professional practices and attitudes rather than teaching performance. The researchers argued the study results would imply educational research and policy on Anglo-American countries. | Chile |
| Weinstein, Raczynski and Peña | 2018 | Analysis of trust relationship between teachers and principals of primary schools in Chilean education system. | Both qualitative and quantitative approaches with a case study and a survey questionnaire being used. | Leaders and principals had different approach with respect to trust. The school principals confer the trust while the teachers earn it. Principals are critical of the teachers' professional skills and the teachers' trust is based on personal aspects. The relational trust did not have any influence of personal traits of both teachers and principals. | Chile |
| Hamadamin and Atan | 2019 | Influence of SHRM practices on achieving sustainable competitive advantages | Quantitative study through questionnaire survey. Data was analyzed through the techniques of structural equation modelling. | The findings revealed that SHRM had a linear and positive influence on the sustainability of competitive advantages. It was also found that both human capital development and employee commitment were positively impacted by SHRM. Both these factors were found to be partially mediating the SHRM practices and in turn sustainable competitive advantage. | Erbil city, Iraq |

## 4. Summary and Conclusion

The review of the research has found that SHRM has been an area of interest for researchers working in education sector since as early as 1990's. However, the area has gained momentum over the last two decades. Various studies on SHRM practices in schools

have been carried out across many countries from Europe, Asia and USA. SHRM practices with respect to strategic leadership, strategic HRD practices, HPWS and QWL (Quality of Work Life) have been the areas of research focus. While the schools were aware of the SHRM practices, it was unclear on the skills needed to implement SHRD. However, the schools that implemented SHRM practices were found to have sustainable competitive advantages.

## 5. Research Gaps and Recommendations for Further Studies

While some interesting research is done on the SHRM practices in the school sector, there still is a lot of scope for further research in this area. Such research gaps are identified and listed hereunder.

1. An interesting topic would be identifying the skills needed to implement SHRD practices in schools.

2. There is also scope of studying more on HPWS in education sector.

3. Understanding the skills needed to develop strategic leadership could be another research area. It is also important to study if there is any correlation between SHRM practices and student and school performance.

4. Various SHRM practices with respect to each of the HRM systems like recruitment and selection, training and development, performance appraisal, succession planning etc. should be studied.

5. The studies listed above should be repeated in schools offering education at different levels from various boards.

6. It is also important to consider the ownership of the schools and entrepreneurial perspective to understand if the results vary with such differences.

## References

1. Al Adresi, A. and Darun, M., (2017). Determining relationship between strategic human resource management practices and organizational commitment. International Journal of Engineering Business Management, 9, p.184797901773166.

2. Allui, A. and Sahni, J., (2016). Strategic Human Resource Management in Higher Education Institutions: Empirical Evidence from Saudi. Procedia - Social and Behavioral Sciences, 235, pp.361-371.

3. Beall, J., (1997). Strategic leadership of independent schools: the recruitment, compensation, and development of teachers. Doctoral Dissertation. Columbia University.

4. Becker, B. and Huselid, M., (2006). Strategic Human Resources Management: Where Do We Go From Here?. Journal of Management, 32(6), pp.898-925.

5. Boon, C., Den Hartog, D. and Lepak, D., (2019). A Systematic Review of Human Resource Management Systems and Their Measurement. Journal of Management, 45(6), pp.2498-2537.

6. Hamadamin, H. and Atan, T., (2019). The Impact of Strategic Human Resource Management Practices on Competitive Advantage Sustainability: The Mediation of Human Capital Development and Employee Commitment. Sustainability, 11(20), p.5782.

7. Hashim, MK . (2005) Small and medium-sized enterprises in Malaysia: Role in issues. UUM Press.

8. Hunt, A., (2019). Effective human resources leadership in k–12 public education: an expert perspective. Doctoral thesis. University of la verne.

9. Jiang, K., Lepak, D., Hu, J. and Baer, J., (2012). How Does Human Resource Management Influence Organizational Outcomes? A Meta-analytic Investigation of Mediating Mechanisms. Academy of Management Journal, 55(6), pp.1264-1294.

10. Knies, E., Boselie, P., Gould-Williams, J. and Vandenabeele, W., (2018). Strategic human resource management and public sector performance: context matters. The

International Journal of Human Resource Management, pp.1-13.

11. Kwan, P., (2009). Beginning teachers' perceptions of school human resource practices. Asia Pacific Journal of Education, 29(3), pp.373-386.

12. Lopez-Diaz, R., (2012). Strategic management of human resources in schools: testing horizontal and vertical fit hypotheses. Doctoral Dissertation. University of Pennsylvania.

13. Marfan, J. and Pascual, J., (2017). Comparative study of school principals' leadership practices: Lessons for Chile from a cross-country analysis. Educational Management Administration & Leadership, 46(2), pp.279-300.

14. McCourt, W. and Ramgutty-Wong, A., (2003). Limits to strategic HRM: the case of the Mauritian civil service. The International Journal of Human Resource Management, 14(4), pp.600-618.

15. Paracha, O., Wan Ismail, W. and Amin, S., (2014). The concept of HPWS-Performance relationship: Framework for Education Industry. Intangible Capital, 10(3), pp.664-695.

16. Paul, J. and Criado, A., (2020). The art of writing literature review: What do we know and what do we need to know?. International Business Review, 29(4), p.101717.

17. Shen, J., Benson, J. and Huang, B., (2014). High-Performance Work Systems and Teachers' Work Performance: The Mediating Role of Quality of Working Life. Human Resource Management, 53(5), pp.817-833.

18. Teo, S., (2002). Effectiveness of a corporate HR department in an Australian public-sector entity during commercialization and corporatization. The International Journal of Human Resource Management, 13(1), pp.89-105.

19. Vekeman, E., Devos, G. and Valcke, M., (2016). Linking educational leadership styles to the HR architecture for new teachers in primary education. SpringerPlus, 5(1).

20. Weinstein, J., Raczynski, D. and Peña, J., (2018). Relational trust and positional power between school principals and teachers in Chile: A study of primary schools. Educational Management Administration & Leadership, 48(1), pp.64-81.

21. Woodwick, A., (2002). Improving practitioner readiness for strategic organizational roles: an exploratory study of strategic competence and its role in human resource development practice. Doctoral Dissertation. Vanderbilt University.

22. Wright, P., (1998). Introduction: Strategic human resource management research in the 21st century. Human Resource Management Review, 8(3), pp.187-191.

23. Wright, PM, McMahan, GC. (1992) Theoretical perspectives for strategic human resource management. J Manage; 18(2): 295–320.

24. Ybema, J., van Vuuren, T. and van Dam, K., (2017). HR practices for enhancing sustainable employability: implementation, use, and outcomes. The International Journal of Human Resource Management, 31(7), pp.886-907.

# UNDERSTANDING THE ETHNOGRAPHIC RESEARCH- A CONTEMPORARY APPROACH

**S. Saraswati and U. Satyan**

School of Liberal Studies, Pandit Deendayal Energy University, Raisan, Gandhinagar, Gujarat
_____

## ABSTRACT

*Ethnographic research is known as a study of people and culture, but if we see its implications, it has a lot bigger role to play in our understanding of humanity and society. The culture, its relation and impact on people and people's behaviour, everything can be looked through the ethnographic researches. Over the years, it extensive use in totally different areas has shown its significance. Ethnographic research is known for helping us to understand other cultures, and cultural differences, but one sees from a different prospective it could also help to understand the person's self, the creation of other and idea of ethnocentrism. This paper is an attempt to understand the idea of ethnographic research. How it emerged, its meaning and usage, and its significance, everything is so crucial in understanding the idea of Ethnography. The relation of ethnography and culture is indispensable, in order to understand the engraphic researches, one has to look into the idea of culture, so issues related to culture will also be looked into. It is not just about the process of ethnographic research, but it also about how it evolved.*
_____

## Introduction

"Ethnography literally means 'a portrait of a people.' An ethnography is a written description of a particular culture - the customs, beliefs, and behaviour based on information collected through fieldwork."

(Marvin Harris and Orna Johnson 2000)

"When used as a method, ethnography typically refers to fieldwork (alternatively, participant-observation) conducted by a single investigator who 'lives with and lives like' those who are studied" (John Van Maanen, 1996)

Ethnography is a way of research where researcher relies not just on observation, heavily on personal experience and possible participation. This is an art, the art of ethnography, which researcher has to learn. David M. Fetterman (1998) sums up the whole idea when he says that "Ethnography is the art and science of describing a group or culture. The description may be of a small tribal group in an exotic land or a classroom in middle-class suburbia."

Before we go any further to look at what is the idea of ethnography, we must see why it is important and significant to look upon it. Ethnography is growing, there are new areas where ethnography is proving its significance.

For example, corporate ethnography is not just for innovation anymore, but it's central to gaining a full understanding of the customers. Intel has used ethnography very successfully many times, Intel analyses the latest buying patterns and customer surveys for useful data. But people often can't articulate what they're looking for in products or services. By understanding how people live, researchers discover otherwise elusive trends that inform the company's future strategies. Ethnographic research showed so much potential that Intel set up a business unit to concentrate on processors and platforms for home use. (Anderson 2009)

It is study of people in their natural surroundings. It is not to be confused with forest. Although ethnography has its roots planted in the fields of anthropology, and ethnographers used to go in *forest* areas to study natives. Here natural surroundings means that understating any kind of culture, in its natural surroundings, for example, if we are supposed to analysis a workplace environment, we need to go to the workplace, where employees live and work; where we can observe them in their natural habitat, their way of working, their office culture and working environment. In the end of the paper, we will discuss one such case study, an ethnography research on company employees.

## Emergence of the Ethnography

The interest into the 'idea of culture' was on its top in 20$^{th}$ century. Even in literature, the idea of culture, cultural criticism, and cultural studies got widespread in 20$^{th}$ century. The idea of Cultural Relativism also emerged in the same time. In simple words, Cultural relativism refers to not judging a culture, to our own standards of what is right or wrong, strange or normal. Instead, we should try to understand cultural practices of other groups in its own cultural context. Franz Boas is considered to be the father of cultural anthropology and ethnography. Boas stressed that *"cultural differences were the cause of the unique development of various societies. These developments weren't due to Western society."* Boas' idea of cultural relativism, was that every culture should be judged by its own premises (Robins 2011). There is a phenomenon book "The Predicament of Culture" by James Clifford, on how the ethnography emerged in 20$^{th}$ century. Clifford explored its origin in 18$^{th}$ and 19$^{th}$ century, and widespread in 20$^{th}$ century. The book discusses how ethnography was used to understand native, 'other' cultures, or the world of alien people.

"**Ethnography begins properly only with the twentieth century** with two entirely independent intellectual developments, one British, the other North American." says John Brewer (2000) in his book 'Ethnography'.

Let's look into both the movements. The first was the emergence of the classical tradition of social anthropology in Britain, with people like Malinowski, Boas, Radcliffe-Brown and Evans-Pritchard. Most of these were British or worked in Britain. It shows the association between social anthropology and British colonialism. And while social anthropology might no longer be the handmaiden of colonialism, its origins were tied to the needs of the British Empire to understand the cultures and groups it was seeking to rule. Once the period of colonial conquest was over and assimilation in the 'British family of nations', British Empire needed to know the other cultures more than before. This explains why it emerged at the beginning of the twentieth century rather than in the heyday of colonial conquest in the nineteenth century.

The second one is American. Researchers in America who belonged to the Chicago School in sociology, used observational techniques to explore groups on the margins of urban industrial society in the United States in the 1920s and 1930s; like prostitutes, drug dealers, street gangs, taxi drivers, dance hostesses, hobo, Polish immigrants, Jewish and slum people. (Brewer 2000). That is how we see that the shift from understanding natives, to understanding different cultural practices happened.

Beginning of ethnography is a kind of 'weird' in many ways, the study of exotic people, in their natural surroundings. In one way, it was used in colonialization, but it was also used, to understand non-Western peoples as they were, before they were erased by the Euro-American colonizing adventures. Well, there wasn't a single model for conducting an ethnographic research. As Nadar (2012) rightly mentions, "they (early ethnographers) were not governed by any one doctrine and did not adhere to a single model, yet they were all doing ethnography by most people's standards: they went, they observed, they stayed, they returned home and wrote ethnography. They were methodologically eclectic and included quantitative techniques

Malinowski (who is part of the British movement of ethnography) tries to give a new reflection upon the anthropologist as fieldworker-theorist, empathizing and presenting there, questioning, recording and interpreting. He was the gamechanger in the field of ethnography. Malinowski broke ground, with what today would be called multi-sited fieldwork, with a scientific approach. For example, Malinowski's description of Trobriand life changed the course of ethnography. He had the pretension of objectiveness of the presented facts and claimed to have come over the subjective creations. Although his methods (like haphazard) were was later criticized by Evans-Pritchard for not being bounded to a preliminarily set up theory. Malinowski tended to use narrative constructs and illusive dramatization, which caused problems of

verification and accountability, still his contribution in the field of ethnography is immense.

For Malinowski, participant observation did not mean merely hanging around or even just being there. It was more active than that. An ethnographer needs to have real scientific aims, and to collect data on as many facets of life as possible. This involved using statistical documentation and building statistical summaries and analyses from concrete evidence. It meant systematically documenting details from daily life. It meant documenting speech, habits, customs, as well as magic formulae, and myths; making lists, drawing maps, constructing genealogies and taking photographs. Above all one needs to take field notes, recording not only those occurrences and details that are prescribed by tradition, but also the actual actions that are observed as they occur, by the participants as well as the spectators. This insistence on the collection of facts and evidence reflects Malinowski's positivistic approach, but I will discuss this more later.

To sum up, its Malinowski who laid the foundation of the proper ethnography. He is the one who believed that the goals of ethnography are; firstly to use concrete statistical documentation to record the organisation of the tribe and the anatomy of its culture. Secondly to use minute, detailed observations to log the actual details of daily life, and lastly to collect ethnographic statements, narratives, utterances as documents of the natives.

### Culture Ethnology and Ethnography

The word **Ethnography** comes from a Greek word 'ethnos' which means "people or nation" and the 'grapho' means "to write". So as the name suggests, Ethnography can be called as "culture writing,". It is the systematic study of people and cultures. It can be referred to a type of documentation of culture. In this, the researcher observes society from the point of view of research of the cultural phenomena. So, it becomes more important to see what the idea culture is.

**Culture** is the beliefs, behaviours, and other characteristics shared by groups of people. Culture could be based on shared ethnicity, gender, customs, values, or even objects like artefacts, jewellery, or clothing. (Tracy 2016). In simple words, we understand culture as way of living, eating, and dressing.

Culture impacts an individual's personal growth as a human. Culture has an important role to play not just in an individual's life, but also in development of the society. Culture demonstrates the way a group thinks, their practices, or behavioural patterns, or their views of the world. "Culture is one of the two or three most complicated words in the English language", (Williams 1983). It has been a central issue for scholars for many years. Mary Douglas (1970) questions the cultural distinctions, and says that "(it is) vital for the functioning and performance of whole groups, as well as the means which contribute to the development of these distinctions". Whereas Peter Berger in his book 'The Social Construction of Reality' calls it "symbolic universes" by which he meant that our reality is socially constructed and by which we define our existence. As a cultural anthropologist, Douglas believed that culture works with 'its internal patterns'.

**Ethnology** is the comparative study of two or more cultures. Ethnology utilizes the data taken from ethnographic research and applies it to a single cross cultural topic. The ethnographic approach can be used to identify and attempt to explain cross cultural variation in cultural elements such as marriage, religion, subsistence practices, political organization, and parenting, just to name a few. Ethnology compares and contrasts various cultures. Anthropologists who focus on one culture are often called ethnographers while those who focus on several cultures are often called ethnologists. (Tracy 2016).

Boas explains Ethnology "as the study of human history through the means of such as language, the study of culture, and the study of bodily form…. The purpose of Ethnology is a critical analysis of the characteristics of each people" (Boas 1940). He goes on to talk about how ethnology is tied in to the history of culture and of their inseparability, he states, "In

order to understand and organism it is not sufficient to study it as a stable form, but it must be compared with all its ascendants and descendants." (Boas 1940). His book *Race, Language, and Culture*, he dedicated a whole section emphasizing the importance of looking at a group of people from multiple perspectives and on the scale of time as opposed to looking at them from a perspective of limited understanding at one point in time. (Robins 2011).

Coming back to **Ethnography**, it can be called as 'telling it like it is from the inside' As a researcher, goes inside and bring the data. John Brewer (2000) explains ethnography as below.

"Ethnography is the study of people in naturally occurring settings or 'fields' by means of methods which capture their social meanings and ordinary activities, involving the researcher participating directly in the setting, if not also the activities, in order to collect data in a systematic manner but without meaning being imposed on them externally." (Brewer, 2000, pg.11)

Laura Nader of University of California, Berkeley, describes ethnography as;

"Historically, doing ethnography involved living and talking with people, being there and participant observing, an attempt to understand how the people studied see and account for their world, which includes the anthropologist. Ethnography has also been commonly connected to the idea of holism; cultures are interconnected, not fragmented; they are whole systems, and therefore any description of them, to be complete, must tackle the whole. The reality of doing and writing ethnography has always been more complicated than simply assuming and even arguing the interrelatedness of cultural elements."

Ethnography that pays attention to wider structures and to the thoughts and feelings of agents, within the context of daily life and individual action, is an ideal approach to research the practice of social life, says famous author on ethnography, Ms Karen O'Reilly. In her words, "Ethnographic research is iterative-inductive. This is a practice of doing research, informed by a sophisticated inductivism, in which data collection, analysis, and writing are not discrete phases but inextricably linked." (O'Reilly 2012).

## Digging More into Ethnography

There can be two types of Ethnography. One which uses 'ethnography' as a synonym for qualitative research as a whole, and virtually describes any approach as ethnographic that avoids surveys as the means of data collection. This can be called 'big' ethnography or 'ethnography-understood-as-the-qualitative-method'. This kind of ethnography is represented by Wolcott (1973) who says that ethnography is really a perspective on research rather than a way of doing it.

The Other kind of ethnography, which is 'field research' or 'fieldwork', can be called 'little' ethnography or 'ethnography-understood-as-fieldwork'. In this definition, ethnography becomes one particular way of doing qualitative research. This 'way of doing things' is best explained by Burgess (1982), who says "Field research involves the study of real-life situations. Field researchers therefore observe people in the settings in which they live, and participate in their day to day activities" In this the data is collected and analysed (Quantitative research).

This second kind of ethnography is what we are discussing more in the paper. In this, researcher has to make judgements about: the object of the research, which is to study people in naturally occurring settings; the researcher's role in that setting, which is to understand and explain what people are doing in that setting by means of participating directly in it; and the data to be collected, which must be naturally occurring and captured in such a way that meaning is not imposed on them from outside. How one is going to decide on all these, for that there are a set of theoretical and philosophical framework, a methodology. ethnography uses several methods that access social meanings, observe activities and involve close association with, or participation in, a setting or 'field' (Brewer 2000).

| Features of Ethnographic Research |
|---|
| • People's behaviour is studied in everyday contexts rather than under unnatural or experimental circumstances created by the researcher |
| • Data are collected by various techniques but primarily by means of observation |
| • Data collection is flexible and unstructured to avoid pre-fixed arrangements that impose categories on what people say and do |
| • The focus is normally on a single setting or group and is small-scale. |
| • The analysis of the data involves attribution of the meanings of the human actions described and explained (Atkinson and Hammersley (1983) cited in Brewer 2000) |
| • Ethnography understands social life as the outcome of the interaction of structure and agency through the practice of everyday life; |
| • Ethnography examines social life as it unfolds, including looking at how people feel, in the context of their communities, and with some analysis of wider structures, over time; |
| • Ethnography also examines one's own role in the construction of social life as ethnography unfolds (O'Reilly, K., 2012) |

Before we go any further, it is important to mention the terms used for two positions of ethnographic researches (something similar to what we discussed in the beginning of the section.) These two are being contradicted with each other. The one is '**positivism'** and the other is '**naturalism'**. The first one means privileging quantitative methods, whereas the latter promoting ethnography as the central, as a social research method.

'Naturalism' is a term which is used in a variety of different, even contradictory, ways in the literature (Matza 1969). Here we have simply adopted the conventional meaning within the ethnographic literature. the second kind of methods this where there is participant observation, employed both 'case-study' and 'statistical' methods. This approach is called with the term 'positivism'. The term 'positivism' has become little more than a term of *abuse* among social scientists, and as a result its meaning has become obscured. Rancane (2015) explores the major idea of positivism. He feels that the methodological model for social research is physical science, conceived in terms of the logic of the experiment. While positivists do not claim that the methods of all the physical sciences are the same, they do argue that these share a common logic. This is that of the experiment, where quantitatively measured variables are manipulated in order to identify the relationships among them. This logic is taken to be the defining feature of science. Secondly, statistical laws as the goal for science. Positivists adopt a characteristic conception of explanation, usually termed the 'covering law' model. Here events are explained in deductive fashion by appeal to universal laws that state regular relationships between variables, holding across all relevant circumstances. However, it is the statistical version of this model, whereby the relationships have only a high probability of applying across relevant circumstances, that has generally been adopted by social scientists; and this has encouraged great concern with sampling procedures and statistical analysis, especially in survey research. Thirdly, the foundation for science is observation. Finally, positivists give priority to phenomena that are directly observable, or that can be logically inferred from what is observable. (Rancane 2015). So, to put in a nutshell, there are two main methodological approaches used in ethnographic research, in the beginning, we discussed it in simple words (small and big) and now with the terminology.

Grbich believes in a different kind of approaches to ethnography. According to him, there are **three main approaches of ethnographic** studies. These are, classical ethnography, critical ethnography and postmodern/post structural ethnography. *"The classical ethnography is predominately underpinned by theories of structural functionalism or interaction"* (Grbich, 1999). In this instance the researcher tries to be neutral in that he or she does not have a vested interest in the outcomes and seeks to have a minimal impact on the setting or the participants. The main objective of the researcher is to obtain a thorough observational analysis over time and

to make sound and reflective observations. This approach requires working on minimal a priori assumptions which is necessary for the success and execution of classical ethnography cases. Second one is Critical ethnography, which is based on the perspectives of Karl Marx. It requires the researcher to address the distribution of power and work on the assumptions that people have false ideologies regarding the hierarchies of power, secondly people in every society are dissatisfied, and third point is that society is dominated by certain powerful hegemonic practices which serve to maintain a specific world view (Grbich, 1999). The researcher's role is to be actively involved and critical during the research and while analysing the study. The third one is Postmodern or Post-structural ethnography which focuses on the dialogue of power relations within which both the researcher and researched have been constructed. Researchers do not speak for others but rather display participants' voices as well as their own, in revealing the setting's realities and complexities (Grbich, 1999).

## Types of Ethnography

Ethnography researches can be useful for a wide range of things. It's widespread shows its significance in the field of research.

| Few Types of ethnography |
|---|
| • Critical Ethnography – In this, the researcher focuses on the marginalized. (influenced by Marx ) |
| • Realist ethnography- It's the traditional approach used by cultural anthropologists. where the individual being studied. It's an objective study of the situation. It's composed from a third person's perspective by getting the data from the members on the site, by an ethnographer. |
| • confessional ethnography; |
| • life history ethnography; |
| • feminist ethnography |
| • visual, mobile, multi-sited, global, and virtual ethnography. |

One of the important areas, where ethnography is being used is corporate world. In **Business Marketing**, ethnography could play an important role understanding the consumers. The ethnography is so beneficial that it will spread widely, helping firms in every industry truly understand customers and adapt to fast-changing markets. As we already discussed that Intel set up a business unit to concentrate on processors and platforms for home use, based on ethnographic research (Anderson 2009) "Ethnography has proved so valuable at Intel that the company now employs two dozen anthropologists and other trained ethnographers, probably the biggest such corporate staff in the world." (Anderson 2009). We will discuss more in the section titled contemporary society

For example, if an insurance company wanted to re-design their system dealing with the processing of insurance claims. This system had evolved over many years and actually represented a patchwork of previous systems. The 'claim processing' supported by this 'system of systems' is itself a highly complex process. In this example, ethnographic research should probably be considered.

## The Process

Ethnography requires a careful research design. It needs a detailed and proper planning, how the research would be conducted. Research design is a strategic plan for the project. For a good ethnographic research, one should have these things planned beforehand;

• The outline of the topic, aims and objectives of the research

• Choosing the field, where sampling will be done

• Considering the resources available for the research, including money, time and manpower

- the time of sampling, which events to be experienced in the field;

- The method or methods of data collection,

- Taking prior permissions to access the field e.g. local administration or in case of office, the office authority

- Clearly defining the nature of the fieldworker's role that he/she will sollow when in the field- what to so if door is locked.

- and when interacting with informants;

- the form of analysis to be used, e.g. whether qualitative or computer based

- withdrawal from the field When and at what point.

### Collecting Data

The most useful ways of gathering the data for an ethnographic research, are participant observation, in-depth interviews, group interviews, and the collection of relevant documents. Observations and interview's data is collected by the researcher in the form of field notes and audio-taped interviews, which are later transcribed for use in data analysis. There is also some qualitative research being done with photographs and video-taped observations as primary sources of data.

### The 'Field'

Data collection is crucial for any kind of ethnographic research, it is all based data one collects. Data is being collected from 'field'. The 'field', which Brewer (2000) defines as a naturally occurring setting, is these days as likely to be a hospital, school playground or street corner as a peasant or rural community.

It is difficult, to have a perfect field and perfect situation, one has to make the best out of every situation. Fieldwork depends on purpose of the study, the nature of the setting, and the skills, interests, needs, and point of view of the observer. There are few ideas which Michael Genzuk of 'University of Southern California' gave on how an ethnographer should conduct his research.

- Be descriptive in taking field notes.

- Gather a variety of information from different perspectives.

- Cross-validate and triangulate by gathering different kinds of data. Example: observations, interviews, program documentation, recordings, and photographs.

- Use quotations; represent program participants in their own terms.

- Capture participants' views of their own experiences in their own words.

- Select key informants wisely and use them carefully. Draw on the wisdom of their informed perspectives, but keep in mind that their perspectives are limited.

- Be aware of and sensitive to the different stages of fieldwork.

- Build trust and rapport at the entry stage. Remember that the researcher-observer is also being observed and evaluated.

- Stay alert and disciplined during the more routine middle-phase of fieldwork.

- Focus on pulling together a useful synthesis as fieldwork draws to a close.

- Be disciplined and conscientious in taking detailed field notes at all stages of fieldwork.

- Be as involved as possible in experiencing the observed setting as fully as possible while maintaining an analytical perspective grounded in the purpose of the fieldwork: to conduct research.

- Clearly separate description from interpretation and judgment.

- Provide formative feedback as part of the verification process of fieldwork. Time that feedback carefully. Observe its impact.

Include in your field notes and observations reports of your own experiences, thoughts, and feelings. These are also field data.

"Fieldwork is a highly personal experience. The meshing of fieldwork procedures with individual capabilities and situational variation is what makes fieldwork a highly personal experience. The validity and meaningfulness of the results obtained depend directly on the observer's skill, discipline, and perspective. This is both the strength and weakness of observational methods." (Genzuk 1999)

### Observation

Observation is a key term for ethnography. An ethnographic research is based on observation

of the researcher. If we see observation is fundamental not just to ethnographic researches, but also to every research, molecules are observed in test tubes, behaviour of rats are observed, changes in chemicals are observed.

Ethnography from its origins in classical British anthropology and Chicago School in sociology, involves in data gathering by means of participant observation in the daily life of informants in their natural setting. Watching, observing, and talking to them in order to discover their interpretation social meanings and activities. (Brewer 2000)

There can be different kind of personal observations, one is when researcher tries to understand the world as seen by those who are in it, bring out the everyday truth. It is called pure participant observation. The second is 'conversation analysis' where it is based on the conversation only. Different scholars have developed different models of participant observation, sometimes they even use more than one model of participant observation in a study.

Observation is perhaps the data collection technique most closely associated with ethnographic research. But "constant concern associated with ethnographic research is the matter of representation whereby the data is seen as a product of the researcher's perception instead of a factual observation of the domain." Grbich, (1999). There have been many cases where an area of study was undertaken by two researchers with completely different outcomes. A famous disagreement is that of Oscar Lewis and Robert Redfield, who both studied a Mexican town with contrasting accounts of observation. Another example is that of Margaret Mead and Reo Fortune who disagreed over the male role in the Arapesh community of New Guinea. (Genzuk 1999)

There are many such instances in recent times of two people studying the same phenomenon have disagreements. The disagreements noted above demonstrate that an ethnographic study places a great deal of responsibility, trust and power at the fingertips of the researcher who needs to be extremely careful about the interpretation of the data. It is very important with any ethnographic study for the researcher to allow issues to arise in their due course

rather than attempt to control any proceedings for the sake of proving or disproving a predetermined hypothesis.

## Interview

Interview is a way of data collection. Interview is the verbal interaction between the interviewer and the interviewee. Hitchcock (1989) stresses that 'central to the interview is the issue of asking questions and this is often achieved in qualitative research through conversational encounters.' Consequently, it is important for the researchers to familiarise themselves with questioning techniques before conducting interviews. Dr. Michael Genzuk (University of Southern California) gave guidelines for Questioning techniques in ethnographic research.

1. Ask clear questions
The questions should be clear. It is important to use words that make sense to the interviewees, words that are sensitive to the respondent's context and world view. To enhance their comprehensibility to the interviewees, questions should be easy to understand, short, and devoid of jargon.

2. Ask single questions
Genzuk (1999) quotes Patton (1987) and points out that interviewers often put several questions together and ask them all as one. He suggests that researchers should ask one thing at a time. This will eliminate any unnecessary burden of interpretation on the interviewees.

3. Ask truly open-ended questions
Researcher should ask open-ended questions, should not ask something with pre-determine the answers. One should allow a room for the informants to respond in their own terms. For example, "What do you think about your English?" "How do you feel about the method of English teaching in India?" "What is your opinion of English Speaking Courses?"

4. Ask experience/behaviour questions before opinion/feeling questions
Start with experience or behaviour questions before asking questions about opinions or feelings as this helps establish a context for the informants to express the latter. For example,

asking "What happened?" before "How do you feel now?" (Genzuk 1999)

5. Sequence the questions

This kind of questioning technique is called 'Funnelling', which means asking from general to specific, from broad to narrow.

6. Probe & follow-up questions

The purpose of probing is to deepen the response to a question, to increase the richness of the data being obtained, and to give cues to the interviewee about the level of response that is desired. This can be done through direct questioning of what has just been said, for example, "Could you say something more about that?"; "Can you give a more detailed description of what happened?; "Do you have further examples of this?"

7. Interpret questions

Throughout the interview, the researchers should clarify and extend the meanings of the interviewee's statements to avoid misinterpretations on their part. E.g. 'Is it correct that you feel that……?"; "Does the expression….. cover what you have just expressed?" to allow the interviewees to confirm or disconfirm what has been interpreted by the researchers.

8. Avoid sensitive questions

It is advisable to avoid deep questions which may irritate the informants, possibly resulting in an interruption of the interview. Cicourel (1964) agrees that 'the respondent may well feel uneasy and adopt avoidance tactics if the questioning is too deep.'

9. Encourage a free rein but maintain control

The researchers should be prepared to let the interviewees 'travel' wherever they like, but a rough checklist of ideas or areas the former want to explore is useful. Genzuk (1999) cites Palmer (1928) and suggests that proficient interviewers should be always in control of a conversation which they guide and bend to the service of their research interest.

10. Establish rapport

The interviewing process has two specific purposes; to gather experiential material to be used in narrative so as to gain a better understanding of a phenomenon, and to create a conversational relationship with the interviewee. If the researcher is able to establish trust with the participants, it is more likely the interview will resemble a normal conversation, tapping into the participants' personal experiences.

These were the key points given by Michael Genzuk (University of Southern California). He gave these points because he believes that "Individuals vary in their ability to articulate their thoughts and ideas. With good questioning techniques, researchers will be more able to facilitate the subjects' accounts and to obtain quality data from them." (Genzuk 1999)

Babbie (1998) highlights many advantages of using interviews such as better response rate than written surveys, respondent willingness to participate, enhanced opportunity to address all questions, and very importantly, the opportunity to explore issues as they arise. Although Babbie (1998) does acknowledge that while there may be some concerns with reliability, validity is enhanced with personal interviews, particularly if coding is meticulously done and analysis is conducted in an orderly manner that allows for checks to be in place.

**Analysis**

The analysis of the findings will vary depending on the method that has been used to gather the insights. In any cases, the research was to obtain an in-depth view of the users and how they go about completing tasks which are under review. Researchers will look for patterns and themes from the data. They will look for the challenges and barriers that users encountered and how this effected different users. The primary data will be looked and examined; will be compared with the secondary data. Statistical analysis can also be done, which itself a whole area of study. The analysis is the last part of any research. Analysis itself is a huge topic, and can be discussed in detail, but here we will look it briefly as paper's focus is more on understanding the idea of ethnography.

E.g. Analysing the data through the use of an affinity diagram. This method allows researcher to take all the observations from the research and group them together so that you can begin looking for patterns. Researchers will put all their key points onto Post-It notes

and then categorise these into groups which relate to the same topic.

## Contemporary Ethnography

Contemporary ethnography is a lot different from what ethnography used to be in 19th century. Still the essence is same, understanding human being. Even now the same rules apply, which Malinowski and Whyte gave like the close study, over time, using participation and observation, of a group of people, with the emphasis on obtaining the insider view. We already discussed few points in the beginning.

- **Ethnography and Corporate world**- this has been a very important area where ethnography could play a key role. Right from marketing a product to understating a consumer, ethnography is crucial. It could be very important in understanding the workplace environment. In this paper, we will be looking one such thesis closely which examines a workplace environment . E.g. Intel Ethnographic researches

- **Ethnography and Society**- Ethnography could play a key role in understanding the contemporary society and its problems, for example O'Reilly cited an ethnographic research titled 'Michael's Study of Young People and Drug Use'.

- **Education and Ethnography**- it is an interesting as well as important field where ethnographic researches are being done in the field of education. In order to understand children and young adults, coursework, teaching pedagogy, social interaction influenced by culture, different approaches like cultural studies, critical, and feminist approaches; are just to name a few areas. E.g. Ethnography for Education by Pole and Morrison (2003)

- **Ethnography of Healthcare**- Ethnographies within the field of health and medicine have increased rapidly in recent years. There is a book devoted to Ethnography in Nursing Research (E.g. Roper and Shapira, 2000) E.g. Goffman's Asylum's 1961.

- **Geography and Ethnography**- Ethnographic methods are increasingly embraced within human geography, alongside a growing interest in qualitative geography. "the notion of landscape as social construction, perception, and imbued with multiple meanings, and these often employ ethnographic techniques" E.g. The Sage Handbook of Qualitative Geography, by Dydia DeLyser (2010).

## Advantages and Disadvantages of Ethnography

Ethnography's main benefit is generally considered to be its ability to deliver a detailed and faithful representation of users' behaviours and attitudes. Because of its subjective nature, an ethnographic study (with a skilled researcher) can be very useful in uncovering and analysing relevant user attitudes and emotions. "One of the main advantages associated with ethnographic research is that ethnography can help identify and analyse unexpected issues. When conducting other types of studies, which are not based on in-situ observation or interaction, it can very easy to miss unexpected issues. This can happen either because questions are not asked, or respondents neglect to mention something. An ethnographic researcher's in-situ presence helps mitigate this risk because the issues will (hopefully) become directly apparent to the researcher." Says Weaston (2017).

When it comes to disadvantages, it can be said that ethnographic studies take a lot of time. Although ethnographic studies do not always require a long period of time, but still this consideration is nonetheless valid that this research takes time. An ethnographic study will tend to take longer to generate and analyse its data than many other methods. Because there is a greater insight into the user it takes much longer to generate and analyse all the findings. Short studies may not get a user acting naturally as they are aware of the researchers present. The cost of conducting ethnographic studies is typically much higher.

## A Case Study

Looking closely into an ethnographic research, will allow us understand it better. Ethnographic Research has big role to play in understanding of the people. A student at Australian Catholic University, did an ethnographic research of a

work environment of an organisation. It very good study, which shows how important ethnographic research can be in understanding working culture. Pauline Abboud (2010) 's thesis focuses to explore the cultural milieu of an aid organisation by examining the distinctive work environment at 'World Vision Australia' and the extent to which its work practices are in line with its mission. She also interviewed workers' reactions to the values and mission of World Vision Australia, tried to understand why they chose and continue to work at World Vision Australia.

Her thesis is titled as **"An Ethnographic Study of the Work Environment of An Aid Organisation".** She asks that the working environment of an aid organisation generally has fewer benefits than in the commercial sector, so why do well trained and presumably well qualified people work for an aid organisation rather than a corporation which could provide them with better remunerations and a more comfortable work environment? What is it about the work environment of an aid organisation that attracts them? The focus of her study was to answer these questions. Ten World Vision Australia employees were interviewed and asked about various aspects of their work environment focussing on the interaction between themselves and their work milieu. This included an analysis of their views on management style and practices, conflict resolution, policies of World Vision Australia, and their reasons for applying for a position and continuing to work at World Vision Australia. Her analysis provided a picture of the World Vision Australia work environment which was further enhanced by examining research literature into the importance of "culture" in the workplace and employee well being. An important factor to emerge from the literature was the concept of "solidary", which encompasses an employee's desire to subscribe to a particular collective or group identity. Solidary explains how some shortfalls of a work environment are overlooked for the sake of more important aspects of it. The interviews revealed that some aspects of the work environment of World Vision Australia are healthy and productive, while others require diligence from management particularly as it responds to the changing demands placed on

the International Aid sector. World Vision Australia has a low staff turnover which indicates that employees choose to stay at World Vision Australia despite non-competitive monetary rewards. The results from the analysis indicate that the work environment is healthy and accommodates the emotional, ethical and familial needs of employees. The specific culture that is engendered by management is a key element in the satisfaction of employees, with "solidary" being an important factor in this. (Pauline Abboud's thesis 2010).

- She took 10 participants, 5 male and 5 females with ages ranging from 18 to 60 in this study. They hold varying positions and responsibilities at World Vision Australia.

- Many of the employees were from diverse ethnic groups such as Indian, Sri Lankan, South African, Italian, and English. All has worked for at least a year while some had been there for 5 years and more.

- The researcher took Ethics approval, from the Australian Catholic University; and visited the company (it's an NGO kind of organisation).

- As it is done in native ethnography, here also employees were not taken away from their natural occurring, instead the researcher visited the company to observe them in their natural status. The interviews were conducted for the purpose of this study, but it did not appear to disturb the "natural state" of the World Vision Australia work environment.

- Responses of participants were taped and transcribed and the tone of the voice and visual nuances were noted and interpreted.

- The questions were about the work place environment. These were mostly open-ended questions that allowed participants to describe their experiences in the way they saw fit. These centred on a few themes such as personal satisfaction with the work environment, issues with management and/or colleagues, cause/lack of motivation at work, religion at work, as well as harmony within the work environment.

- These are some questions which she asked in her interviews, The interview began by seeking the opinion of workers about the

work environment in general and then as the interview progressed more detail was sought about their experiences.

1. In what ways does working at World Vision Australia differ from previous work places that you've been at?
2. How are the values and policies of World Vision communicated to you?
3. What first drove you to work at World Vision Australia or to apply for a position at World Vision Australia?
4. How do you believe tensions and conflicts are resolved here at World Vision Australia?

- The participants provided rich descriptions of their experiences at World Vision Australia and of their perceptions of its working environment.

- E.g. One response by an employee named 'Brian' was like this, "After 9 years of working for this organisation there's not 1 day where I had to work and I've felt I don't want to go in. I actually look forward to coming to work... In this department I believe the management team, my direct superiors are very understanding, very accommodating, very supportive, they give me the freedom I need to do my job but are supportive when I need their assistance. It's a beautiful place."

- Now it was the time of analysis, it has to be analysed in a way that would make it possible to discover the meanings underlying their accounts of working in an aid organisation and to find interpretations which were congruent with their perceptions. The analysis sought to discover the similarities or differences in how workers understood and gave meaning to their work experiences and to examine the impact that World Vision Australia had on these experiences. It also sought to examine the match between the stated aims of the organisation and their application in the workplace.

- She used thematic analysis because it was most appropriate to analyse the data that was collected. It was all narratives. The aim was to discover what reoccurring themes the employees presented in regard

to their work environment and their satisfaction or dissatisfaction with it.

- Now the collected data was analysed, into different heads, like

1. Satisfaction level in employees
2. Emotional Safety
3. Ideological Factors
4. Collegiality
5. Vocation

- The last step was to conclude, and to see how these where the organisation stands in terms of above written issues. Are employee find the organisation satisfying, do they believe in organisation's values, how they feel about the organisation's culture, its relation to its employees, how is the relation between the employees, why staff members wanted to work at World Vision Australia and chose to stay working at this organisation despite lower pay and less salubrious conditions.

- The answers were quite fascinating, the researcher concluded "From the interviews, I ascertained that there is a shared perception about 'World Vision Australia' being a friendly, caring, and supportive environment. All the results are positive in nature, result are being explained thoroughly in the last section of the thesis.

- Although everything was positive, still few issues were mentioned which can be improved. Results suggest that there are other areas where 'World Vision Australia' might focus its attention in order to further enhance its work environment like;

1. "being a good corporate manager in respect to finance and time management,
2. Reviewing practices and policies with the intention of examining the different requirements of staff within the work environment taking note of gender issues, life stage and family requirements as well as ideological views.
3. Re-assessing the practices and policies that are designed to challenge employees in their work environment to increase productivity while avoiding monotony.
4. Adhering to a commitment to maintain a good staff relation."

- With this study titled "An Ethnographic Study of the Work Environment of An Aid

Organisation", we came to know a lot about the Organisation and its employees and working culture.

## Conclusion

Ethnography is a deep subject, and has the capacity to do much more than just analysing data. If we see, the idea of ethnocentrism, and the idea that western society is more evolved, was challenged by the ethnographic researches.

It could help us to understand the deep nature of human, culture's impact on human, how culture develops, how one creates the idea of self, how one creates and sees the 'other'. There are million possibilities to explore, and ethnography could play an important play it.

## References

1. Abboud, Pauline. (2010) "An Ethnographic Study of the Work Environment of an Aid Organisation." Thesis at Australian Catholic University.
2. Anderson, Ken. (2009 ) "Ethnographic Research: A Key to Strategy." Harvard Business Review, hbr.org/2009/03/ethnographic-research-a-key-to-strategy
3. Assin, CA Didier. "WHY ETHNOGRAPHY MATTERS: On Anthropology and Its Publics." Princeton University (Institute for Advanced Study) , pdfs.semanticscholar.org/deb2/04f05177220cfc0bfbdecbd86d84dab11d2a.pdf
4. Babbie, Earl R. (1998) Survey Research Methods. Wadsworth.
5. Berger, Peter L, and Thomas Luckmann.( 1967) The Social Construction of Reality: A Treatise in the Sociology of Knowledge. Garden City, N.Y: Doubleday, Print.
6. Berry, R.. (1999 ) "Collecting Data by in-Depth Interviewing." University of Leeds, Education-Line, 28 Sept., www.leeds.ac.uk/educol/documents/000001172.htm
7. Eriksen, T. H. (2017) What Is Anthropology? Pluto Press. JSTOR, www.jstor.org/stable/j.ctt1pv89ct.
8. Evans, Tracy, and Santa Ana College. "Cultural Anthropology." Lumen Learning, Lumen Learning, courses.lumenlearning.com/culturalanthropology/chapter/ethnography/.
9. Fetterman,. (1998) Ethnography, 2nd ed., Thousand Oaks, CA: Sage Publications. Print.
10. Douglas, M. (1970) Natural Symbols: Explorations in Cosmology. New York: Random House. Print.
11. GENZUK, MICHAEL. (1999) "A SYNTHESIS OF ETHNOGRAPHIC RESEARCH." University of Southern California, www-bcf.usc.edu/~genzuk/Ethnographic_Research.html.
12. Grbich, C.u (1999) Qualitative Research in Health. Sydney: Allen & Unwin. Print.
13. Griffin, Gabriele, editor. (2013) Research Methods for English Studies. NED - New edition, 2 ed., Edinburgh University Press, www.jstor.org/stable/10.3366/j.ctt1g0b4xz.
14. Hammersley, M., & Atkinson, P. (1995) Ethnography: Principles In Practice. London: Routledge, Print.
15. Harris, M. & Johnson, O. . Cultural Anthropology, (5th ed.), Needham Heights, MA: Allyn and Bacon. 2000. Print.
16. LeCompte, Margaret D., and Judith Preissle Goetz. (1982) "Ethnographic Data Collection in Evaluation Research." Educational Evaluation and Policy Analysis, vol. 4, no. 3, pp. 387–400. JSTOR, JSTOR, www.jstor.org/stable/1164068
17. Maanen, J. Ethnography. In: A. Kuper and J. Kuper (eds.) (1996).The Social Science Encyclopedia, 2nd ed., pages 263-265. London: Routledge.
18. O'Reilly, Karen. (2012) Ethnographic Methods. Routledge, Print.
19. Palen, Melanie.( 2018) "Why Ethnography Is Important." Owlcation, Owlcation, 13 Sept., owlcation.com/social-sciences/Why-Ethnography-is-Important.
20. Patton, M.Q. (1987) How to Use Qualitative Methods in Evaluation. Newberry Park, CA: Sage Publications, Print.

21. Quinn Patton, M. (2002) Qualitative Research & Evaluation Methods (3rd ed.). California: Sage Publications, Print.

22. Reason, Peter. (2004) "Critical Design Ethnography as Action Research." Anthropology & Education Quarterly, vol. 35, no. 2, pp. 269–276. JSTOR, JSTOR, www.jstor.org/stable/3651406.

23. Rees, Damian. (2018) "What Is Ethnography Research?" Experience UX, www.experienceux.co.uk/faqs/what-is-ethnography-research/.

24. Robins , Parker. (2011) "Boasian Anthropology: Historical Particularism and Cultural Relativism." Theory / Boasian Anthropology: Historical Particularism and Cultural Relativism, anthrotheory.pbworks.com/w/page/29518607/Boasian Anthropology: Historical Particularism and Cultural Relativism#footnote-1.

25. Rancane, Asnate. (2015) "Book 'Ethnography' Atkinson and Hammersley." LinkedIn SlideShare, 9 Feb., www.slideshare.net/asnaterancane/book-ethnography-atkinson-and-hammersley.

26. Rosenberg, Bernard. (1969) Analyses of Contemporary Society. Crowell, Print.

27. Weston, Danny. (2017) "Ethnography: When and How to Use It." Spotless, 16 Oct., www.spotless.co.uk/insights/ethnography-when-and-how/.

# ASM: ADAPTIVE SEQUENTIAL MODELLING BASED RECOMMENDATION SYSTEM

## S. Singh[1*] and K. Srivastava[2]

[1]D.J .Sanghvi College of Engineering, Mumbai
[2]Department of Computer Engineering, D. J .Sanghvi College of Engineering, Mumbai
sona12sing@gmail.com

_____

## ABSTRACT

*In the last few decades, there is a huge increase in the amount of information available online. This causes information overload problems making it complex for the users to make decisions. The recommender system plays a vital role in every individual's life and helps them in taking decisions without exploring physically. Broadly there are two types of recommender systems: Content-based and Collaborative filtering. Content-based approaches depend on the user's previous history. Collaborative filtering finds various hidden patterns by finding a similar group of users. Traditional recommender system algorithms face challenges to provide an accurate result when the user's interest changes over time. In this research work, a deep learning-based recurrent neural network-based model (RNN) is presented which captures changing preferences of users on the movie Len's dataset. The comparison of traditional and proposed methods based on Root Mean Square Error (RMSE) and Mean absolute error (MAE) is discussed.*

_____

## Introduction

Recommender systems have changed the way people interact with many services. User's feedbacks and evolving technologies are used to provide personalized suggestions to the users for better experience. It considers independent flow of information provided by user by considering the user's feedback.

Recommender system are used to provide recommendations based on user's choice for a particular product which user might like or dislike. In this era of internet recommender system plays a great role in influencing people's choices. Recommender system is acting like a friend which helps user to make a decision to get product of their choice from the dearth of options.

Broadly recommender system is divided into three main groups known as content-based filtering, collaborative filtering and hybrid filtering method. Content-based filtering is used to provide recommendations to user based on user's past history only. Collaborative filtering is an approach in which similar group of people are determined who have same choice as of user for a particular product. Hybrid filtering is a combination of both contents based and collaborative filtering, where user's past history and common user group information are considered for providing recommendations. These filtering methods takes two types of feedback. Explicit feedback which is collected from the users as their previous choices. Implicit feedbacks are collected by browsing history.

Even though traditional recommender systems are used most widely, they do not perform well when user's interest get changed. For example, a user watches some action movies before and then he watched some horror Movies. Traditional recommender system will provide new movie recommendations based on action movies only, since user's preference has changed afterwards. In simple words, algorithm will not be able to differentiate whether user watched action movies first or horror movies. In this case, the recommendations become unreasonable as user's interest has changed. This paper proposes a recurrent neural network (RNN) based recommendation model which gives importance to sequence of information's and provide appropriate recommendations.

The rest of the paper is organized as follows. Detailed literature review is discussed in section 2. Proposed algorithm is explained in section 3. Data description, evaluation parameters and experimental results are presented in section 4. Concluding remarks are given in section 6.

## Literature Survey

Davidson, James et al. has mentioned how YouTube provides their recommendations using neighbourhood collaborative filtering approach based on user's past history. KNN considers only last behaviour of user and recommends the next item which are more similar to previous one where similarity is calculated using cosine similarity. The author has explained that the shortcomings of K-nearest neighbour that it scales poorly when data increases as everyone is becoming dependent on internet for decision making. Recommender system focus on modelling the relationship between user and item based on historical feedback, user's feedback can be implicit or explicit. Modelling implicit feedback can be challenging due to ambiguity of hidden data. Matrix Factorization (MF) methods can be used to uncover latent dimensions to represent user -item embedding's interactions through inner product. Netflix has built recommender system based on single value decomposition (SVD) which has performed better than KNN. SVD++ is an extension of regular single value decomposition algorithm (SVD) which not only considers the implicit but also explicit feedback and performs better than SVD[10].

Hinton proposed deep learning-based model on structured data for providing recommendations using Boltzmann machine and neural networks. Spotify music platform uses deep learning to analyze the music style and recommend according to the style of the song. Google used deep learning based model for mobile app store recommender system which uses cross product to make embedding vector and give suggestions based on it . Many deep learning based recommendation models uses approaches to generate higher order terms which can handle sparse features, they are capable of handling wide, deep and cross networks. These all networks sum up the results from their specialized and Multi-perceptron model passing through a linear layer and sigmoidal activation function to produce results.

Despite the success of traditional recommender system approach several limitations has been identified. Content based recommender system suffers with popularity biasness. Collaborative filtering approach KNN is not able to handle the data sparsity.SVD is able to deal with it but it does not consider the implicit feedback. SVD++ is able to deal with this problem but there is a need of deep learning-based approach to build recommender system which can provide some quality recommendations.

**Table 1: Analysis of Literature Survey**

| Existing Methods | Scaling Ability | Efficiency | Sequencing Information |
|---|---|---|---|
| Neighborhood based methods | Poor | Fair | No |
| Matrix Factorization method | Poor | Fair | No |
| SVD | Poor | Fair | No |
| SVD++ | Fair | Fair | No |
| Boltzmann Machine | Good | Good | No |
| Neural Network | Good | Good | No |

The existing methods for recommender systems are analyzed on three factors considered very important in the evaluation. First is efficiency of the algorithm which explains how many users have actually considered the suggestions provided by the system. Second is scaling ability. This is a very important factor in upgrading the recommender system. If the system is not scalable then it will not allow new data experience to be included in the suggestions. Third is the uses of complete user experience in data modelling. Table 1

shows the comparison of various methods on these parameters. Based on the existing studies few gaps are identified in the field of recommender systems. These gaps are:

- The recommender system uses a subset of user experience and provides suggestions. The input data is not a complete representation of user experience.
- Existing system works in a static manner which considers available data and model the system. Most of the systems are not

adaptable to keep adding new data and update the suggestions.

## ASM: Adaptive Sequential Modelling based Recommender System

As discussed in the previous section existing recommender system algorithms do not perform well when user' interest changes over time. The reason to this is that these algorithms do not consider user's changing preference in account in their decision-making process. Hence, there is a need for new recommendation technique which considers sequence of interests. The proposed ASM architecture considers the limitations of existing methods, considers sequence of information and adapt to newly produced data.

## ASM Architecture

In this section, complete structure and modules of ASM (Adaptive Sequential Modelling) based recommender system is been discussed in detail. The scope of proposed recommender system is limited to movie recommendation use case and accordingly data parameters are used for modelling. The broad architecture is divided into three modules: Input layer, RNN layer and Output layer as shown in figure 1.

**Input layer:** Firstly, the data gets loaded from the dataset and then pre-processing is performed to get quality data. This step checks for missing values, duplicate values and noisy data values. Duplicate values are removed, and mean value is replaced with missing values. Incorrect data are also corrected by replacing with mean values. Two vector matrixes of P, Q are formed based on user and movie. User id, movie id is passed as an input which will return the latent factor vectors for the user and movie respectively**.**
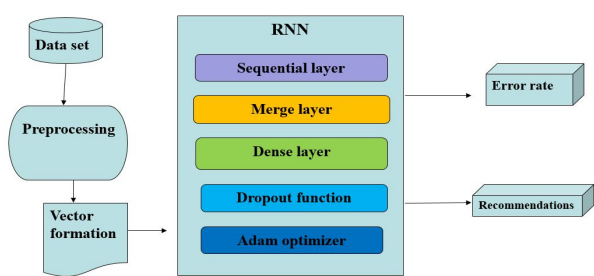


Figure 1. Model Architecture of Proposed Algorithm

**Recurrent Neural Network layer (RNN):** Recurrent neural network is a type of neural network where the output from previous step is used as input. RNN has a memory through which they remember the value of input. This is the base of ASM design as the focus is on sequence of user preferences which needs to be stored for building the recommendation system. Pre-processed data is loaded from the use case specific dataset to the RNN layer.

In this recurrent neural network (RNN) model multiple hidden layers are used. All hidden layers are combined into a single recurrent layer, so they are acting as a single unit. Merge layer is used here to find the dot product of user and movie vector matrix, to perform final latent vector matrix. Dropout layer is used here to discard all unwanted data to prevent model from over fitting. Next, fully connected layer is used so that all other layers can get connected with each other so that the flow of information will be available between all present layers.

First the dataset gets loaded and it's been sorted according to the time of rating. For every user u, sequence has been captured based on movie id, rating and movie category. Now this sequence has been prepared for every user in the similar manner. After this, this data has been supplied as a input to first layer of RNN (Recurrent neural network) that is the first layer.

After being supplied to the first layer, it's then applied to RNN layer where it's been pass through the different hidden layer for further preprocessing. Finally output will be getting the recommendations of movie based on given input at the output layer.

Following is the equation to calculate the current state

$$h_t = f ( h_{t-1}, x_t ) \qquad (1)$$

Where $h_t$ is current state, $h_{t-1}$ is previous state and $x_t$ is input state. After calculating the current state, next the activation function will be applied on this as follows

$$h_t = \tanh (W_{hh} h_{t-1} + W_{xh} x_t )$$

(2) Based on the activation function current state value will be updated in the back propagation network.

Final output will be calculated as follows

$$y_t = W_{hy} h_t \qquad (3)$$

## Result Analysis

In this section various methods of recommender system are discussed in comparison with proposed ASM model. Comparison is done based on error metrics: Root Mean Square Error (RMSE) and Mean Absolute Error (MAE). Both this error is used to find correctness of predicted result by comparing it with actual value. In the following subsequent subsection first datasets are described in detail then experimental setup is presented and finally results are discussed in detail.

### a) Dataset Description:

Two different datasets from Kaggle, namely Movie lens 100k and movie lens 1million are used for data modelling. Movie lens 100k dataset has 100,000 ratings (1-5) from 943 users on 1682 movies and each user has rated 20 movies. It also consists of demographic information of user related to age, gender, occupation and zip.

Movie lens dataset which has 1 million information's with details of user, movie and rating. The dataset has 1,000,209 ratings of 3,900 movies which has been given by 6,040 users. User details consist of user id, age, gender, occupation and zip-code. All demographic information's are collected from the people having age between 1 to 56 years. Movie details consist of movie id, title and genre. Different types of genres have been used here which includes action, adventure, comedy, thriller, drama, horror, fantasy, romance, sci-fi, war, documentary. Rating details are made on the scale of five which is provided by individual user for specific movie.

### b) Experimental Setup:

Mainly train test split procedure is used to estimate the performance of algorithm when they are used to make prediction on data which is not used to train model. Normally random splitting has been used for analysis purpose where dataset is randomly divided into samples but here, we have tested it based on both random and fixed splitting.
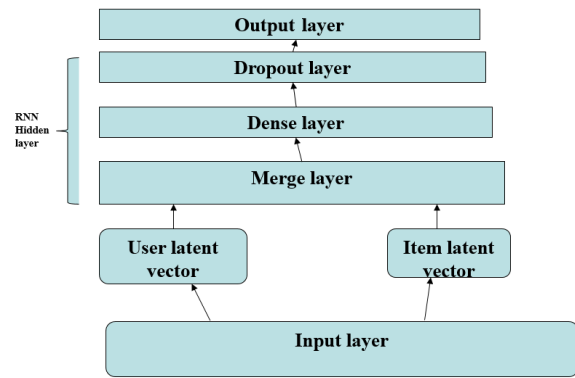


Figure 2. Experimental Setup

Here the algorithms are applied on movie lens (1million) dataset consist of 1 million ratings from 6000 users on 4000 movies. Experimental setup is shown in figure 2.

a. User Rates movies, next pre-processing is performed to do data cleaning by replacing all NA values to zero.

b. A matrix with user, movies and the respective ratings is created.

c. These two latent vectors are then supplied to the merge layer where the dot product of these two vectors is getting calculated and final vector matrix will be produced.

d. Final vector is applied to the dense layer which is acting like a fully connected layer where each neuron from previous layer is connected with all other neurons of other layers.

e. Dropout layer is used here to remove all unwanted data from the network so that model will not get over fitted which affects the final outcome.

f. Algorithms are applied to make predication of most preferable movie for targeted user by considering latent features. Based on target user's rating for movie is predicted by comparing it with another similar user.

g. Here dataset splits the initial dataset into training and testing with 60-40 criteria. Next evaluation metrics are used for performance evaluation of algorithms.

### c) Evaluation Measures:

In this paper, different evaluation measures have been used to evaluate the quality of proposed recommendation system approach.

a. Root mean square error (RMSE)

Root mean square error (RMSE) is a prediction

error which is used to find the difference between predicted and actual value. The lower rmse value is considered as a best fit and its range lies between 0 to 1000.

$$\text{RMSE} = \sqrt{\frac{1}{T}\sum_{u,i \in T}(r_{ui} - \hat{r}_{ui})^2} \qquad (4)$$

b. Mean absolute error (MAE)

It is averaged squared difference between actual and estimated value .it is basically used to capture how accurate model has given result. Lower value considered as best fit.

$$\text{MAE} = \frac{1}{T}\sum_{u,i \in T}|r_{ui} - \hat{r}_{ui}| \qquad (5)$$

**d) Performance Evaluation**

In this section, various experiments have been conducted to evaluate the ASM model for recommender system. In these experiments ASM is compared with KNN, SVD and SVD++ based recommender systems. As explained in the previous section first experiment was performed using MAE evaluation method and as show in table 2. The results show that performance of MAE for 1m dataset is approximately 0.04% improved but for 100k dataset it is approximately 0.02% decreased. So, there was a need to evaluate the model on other parameters.

**Table 2: Comparison of various models of recommender system based on MAE**

| Models | Movie lens(100k) | Movie lens(1m) |
|--------|------------------|----------------|
| KNN    | 0.7823           | 0.7512         |
| SVD    | 0.7755           | 0.7434         |
| SVD++  | 0.7615           | 0.7234         |
| ASM    | 0.8012           | 0.7234         |

Second experiment was performed on another parameter named as RSME. The method is same as the previous experiment. All four models are evaluated based on RSME for both the datasets. As shown in table 3, in this experiment RSME values have shown improvements in ASM model as compared to other models. Approximately 0.03% for 100k dataset and 0.05% for 1m dataset.

**Table 3: Comparison of various models of recommender system based on RSME**

| Models | Movie lens(100k) | Movie lens(1M) |
|--------|------------------|----------------|
| KNN    | 0.9912           | 0.9646         |
| SVD    | 0.9842           | 0.9601         |
| SVD++  | 0.9723           | 0.9342         |
| ASM    | 0.9634           | 0.9234         |

Though RSME parameters shows improvement in ASM for both the datasets but it is necessary to analyze the difference in the values of MAE and RSME values for both the datasets. Ideally the difference should not be much.
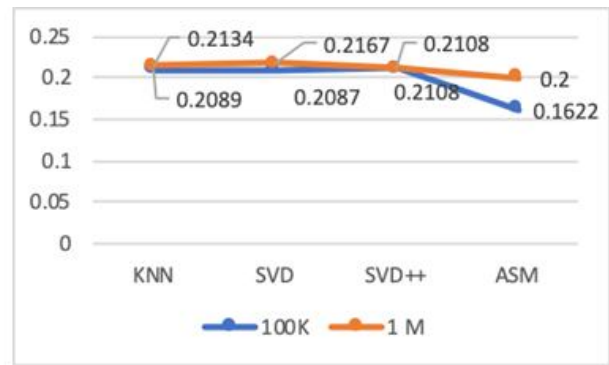


Figure 3: Difference in MAE and RSME values for both the datasets

As shown in figure 3 the difference value of ASM model for 100k dataset is the lowest as compared to another model. Similarly, the difference value of ASM model for 1M dataset is also the lowest. For 100k dataset the ASM is approximately 0.05% and for 1M dataset it is 0.3% better as compared to other models.
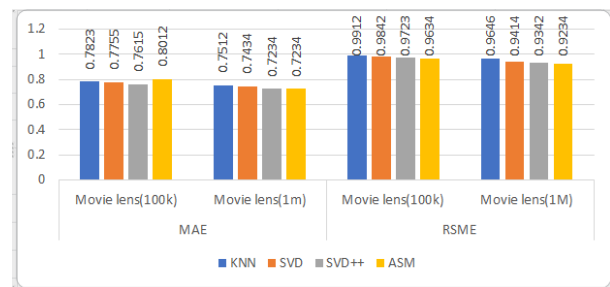


Figure 4: Result analysis on RMSE and MAE for both the datasets

In the fourth experiment just to have confidence in the final conclusion a comparison of all the models for both the parameters and both the datasets are done. As shown in figure 4 out of four groups three of them shows better performance of ASM model.
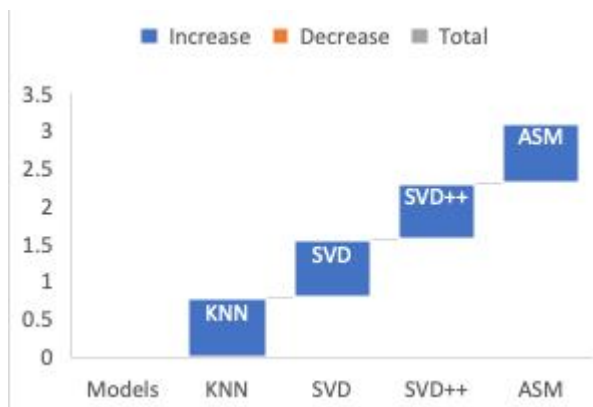
5: Comparison of KNN, SVD, SVD++ and ASM



Figure 6. Comparison of loss v/s validation loss

In the fifth experiment a total comparison of all the models keeping the oldest model KNN as the base was performed. As shown in the waterfall chart in figure 5 SVD shows improvement as compared to KNN but not better than SVD++ and ASM. SVD++ shows improvement when compared with KNN and SVD but not better than ASM. Hence with experiment five it could be concluded that ASM is better than other models.

When the model gets trained it either suffers from an over fitting or under fitting problem. Over fitting is a scenario when the model performs well on trained data but performs poorly on unseen data. This means that model has memorized the data instead of learning relationships between new features. As experiment six model performances are also evaluated based on given conditions:-

A. if loss > validation loss, then model is under fitting

B. if loss<validation loss, then model is over fitting

C. if loss == validation loss, means if there is very minor difference then model fits perfectly.

Based on the above given conditions 18 epochs were performed. As shown in figure 6, ASM model performed well because there is statistically insignificant difference between actual loss and validation loss.

## Conclusion

Traditional recommender system approaches are most widely used in providing recommendations for a particular product, but they faces challenges when user's preference gets changed. In this paper, a recurrent neural network based deep learning model has been introduced for recommendation system to capture the changing preferences of user. Proposed algorithm has been tested on two different dataset, based on the observation it has been stated that proposed algorithm is performing better with large dataset as compare to other data set.

Based on experimental result it can be stated that proposed model is performing better than all other algorithms.

## References

1. Davidson, James et al. (2010). "The YouTube Video Recommendation System". In: Proceedings of the Fourth ACM Conference on Recommender Systems. RecSys '10. event-place: Barcelona, Spain. New York, NY, USA:ACM, pp. 293–296.
2. Elkahky, A.M., Song, Y., He, X. (2015) : A multi-view deep learning approach for cross domain user modeling in recommendation systems. In: International World Wide Web Conferences Steering Committee, pp. 278–288
3. F. Ricci, L. Rokach, B. Shapira, and P. Kantor, (2011) Recommender systems handbook. Springer US.
4. Greg Linden, Brent Smith, and Jeremy York. (2003). Amazon.com recommendations: item-to-item

collaborative filtering. IEEE Internet Computing 7, 1, 76–80.

5. Guorui Zhou, Na Mou, Ying Fan, Qi Pi, Weijie Bian, Chang Zhou, Xiaoqiang Zhu, and Kun Gai. (2018) Deep interest evolution network for click-through rate prediction. arXiv preprint arXiv:1809.03672,.

6. Guorui Zhou, Xiaoqiang Zhu, Chenru Song, Ying Fan, Han Zhu, Xiao Ma, Yanghui Yan, Junqi Jin, Han Li,and Kun Gai.( 2018) Deep interest network for click-through rate prediction. In Proc. of the 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, pages 1059–1068. ACM.

7. Hinton, G.E. (2007): Learning multiple layers of representation. Trends Cogn. Sci. 11(11),428–434

8. Hinton, G.E., Osindero, S., Teh, Y.W. ((2006): A fast learning algorithm for deep belief nets. Neural Comput. 18(7), 1527

9. Hinton, G.E., Salakhutdinov, R.R. (2006): Reducing the dimensionality of data with neural networks. Science 313(5786), 504–507

10. Huifeng Guo, Ruiming Tang, Yunming Ye, Zhenguo Li, and Xiuqiang He. DeepFM (2017): a factorizationmachine based neural network for CTR prediction. arXiv preprint arXiv:1703.04247.

I. Portugal, P. Alencar and D. Cowan, (2018) The use of machine learning algorithms in recommender systems:A systematic review, Expert Syst.Appl.,vol. 97,pp. 205–227.

11. Jianxun Lian, Xiaohuan Zhou, Fuzheng Zhang, Zhongxia Chen, Xing Xie, and Guangzhong Sun. xDeepFM (2018) :Combining explicit and implicit feature interactions for recommender systems. In Proc. of the 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, pages 1754–1763. ACM.

12. M. J. Pazzani and D. Billsus, ''Content-based recommendation systems,'' in The Adaptive Web. Berlin, Germany: Springer, 2007,pp. 325–341.

13. Oord, A., Dieleman, S. (2013): Deep content-based music recommendation. In: Neural Information Processing Systems Conference, Harra 2013, pp. 2643–2651. MIT Press, Massachusetts

14. Ruoxi Wang, Bin Fu, Gang Fu, and Mingliang Wang. (2017) Deep & cross network for ad click predictions. In Proc. ADKDD, page 12.

15. S. Rendle, C. Freudenthaler, Z. Gantner, and L. Schmidt-Thieme, (2009) "BPR: bayesian personalized ranking from implicit feedback," in UAI.

16. Sarwar, Badrul, George Karypis, Joseph Konstan, and John Riedl (2000a). "Analysis of Recommendation Algorithms for e-Commerce", pp. 158– 167.

17. X. Su and T. M. Khoshgoftaar, (2009 )''A survey of collaborative filtering techniques,'' Adv. Artif. Intell., vol. 2009, Aug., Art. no.421425.

18. Y. Hu, Y. Koren, and C. Volinsky, (2008 ) "Collaborative filtering for implicit feedback datasets," in ICDM,.

19. Y. Koren and R. Bell, (2011) "Advances in collaborative filtering," in Recommender Systems Handbook. Springer.

# AUTOMATIC SOL-GEL TECHNIQUE BASED ANALYSIS ON OPTICAL PROPERTIES IN ZNO THIN FILMS

## M. Manvizhi[1], S. Murugan[2] and R. Selvaganapathy[3]
[1,2]A.V.C. College (Autonomous), Mayiladuthurai, Tamil Nadu, India
[3]Annamalai University, Chidambaram, Tamil Nadu, India
maanuadhi@gmail.com

_____

## ABSTRACT

*In this manuscript, the analysis on optical properties has been carried out through ZnO thin films which were placed onto the glass substrate employing automatic sol-gel technique, instead of ordinary sol-gel technique. Experimental analysis has been carried out using ethanol, zinc acetate, diethanolamine and de-ionized water, ZnO films were organized and produced by fluctuating the number of coatings (2-5 dipping iterations) for zinc acetate concentrations of 1.0 mol/L. The films were decayed at $300^{\circ}C$ for one hour and once the final coating is completed the entire setup has to be annealed at $500^{0}C$ for 2 hours. Using UV/Visible spectrometer at 200 to 900 wavelengths, the Optical transmittance measurements of the deposited films have been carried. Highly transparent visible range can be obtained fromthe prepared ZnO films. Results found to be suitably declared that the average transmittance of ZnO films for 2 coatings are finally 92% in the visible range with high absorbance in the UV-region, whereas direct bandgap is 3.21 eV and indirect allowed band gap has been found to be 3.08eV respectively.*

_____

*Keywords:* Zno thin-films, Zinc Acetate, Automatic sol-gel, Optical properties, UV region, Band gap

## Introduction

Among different functional materials, metal oxide films are exceptionally appealing for some applications because of their great electrical and optical properties. Presently a days, zinc oxide (ZnO) has drawn a lot of consideration of the scientists as one of the most encouraging semiconducting materials for its adaptable applications in blue and bright light producer, varistors, substance and gas sensors, surface acoustic gadgets, spintronic gadgets, optoelectronic gadgets and piezoelectric transducers. Many examination bunches are attempting to accomplish p-type conductivity and just as to control inadvertent n-type conductivity of ZnO. It is notable that, ZnO takes shape in the wurtzite hexagonal construction with c-pivot direction that upgrades the anisotropic designs development. Yet, the accessibility of ZnO as an enormous mass single precious stone is the huge benefit of ZnO over GaN that likewise takes shape in the wurtzite structure. Besides, band hole of ZnO is 3.37 eV at room temperature, while that of GaN is 3.44 eV. Once more free-exciton restricting energy in ZnO is 60 meV and that of GaN is 25 mev. Lower band hole and higher exciton restricting energy makes ZnO a most encouraging material for application in optoelectronics and excitonic impacts based optical gadgets over GaN. Moreover, the electron versatility of ZnO (115-155 $cm^2$ $V^{-1}$ $s^{-1}$) at room temperature is higher than that of TiO2 ($<10^{-5}$ cm $2V^{-1}s^{-1}$). Accordingly, with comparative band hole of TiO2, ZnO nanoparticles are in effect generally utilized in the Grätzel-type PV cells. To wrap things up, ZnO or In/Al-doped ZnO are as of late being utilized as straightforward conductive oxide (TCO), because of high straightforwardness in apparent reach, as an option of ITO (F:SnO2) and FTO (F:SnO2) on the grounds that they are expensive. Electrical and optical properties of ZnO thin films are incredibly reliant upon the testimony procedure applied. Up until this point, different affidavit procedures have been utilized to get ready ZnO thin films, for example, RF magnetron sputtering, molecular beam epitaxy, spray pyrolysis, hydrothermal growth, pulse laser deposition, chemical vapor deposition and sol-gel method. However, the sol-gel method offers brilliant homogeneity, decision to utilize both natural and inorganic antecedents, effortlessness, minimal expense, great films on enormous region substrate or more all, climate well disposed. This work is the continuation of our past work, where ZnO thin films were effectively saved on glass substrate utilizing a custom made length controlled programmed solgel measure. In past

work, it was just shown that the planned programmed framework can store slender films effectively be that as it may, the pre-arranged films were not portrayed with any properties. The current work provides details regarding the examination of optical properties automated sol-gel inferred ZnO thin films that have been stored on glass substrate with different number of coatings.

## Experimental Methodology

Fig. 1 inclusively depicts the homemade automatic sol-gel system for deposition of thin films. The entire experimental set-up is organized on a wooden base arrangement. The fundamental highlights of the framework are engine, plastic strip, damper weight, cut, measuring glass base and a keyboard. Clip is connected to a plastic lace like a ribbon another finish of which is looped on the engine shaft. A damper weight has been connected with the ribbon to keep it straight and to wipe out the swing and vibration on the grounds that the lace is too thin to even consider having nonstop swing in the normal breeze and presented to vibration while the engine pivots. To get a fine wavelength, six keys on the keyboard has to be placed by comparing to six distinct lengths (2cm, 3cm, 4cm, 5cm, 6cm and 7cm), and a power switch.
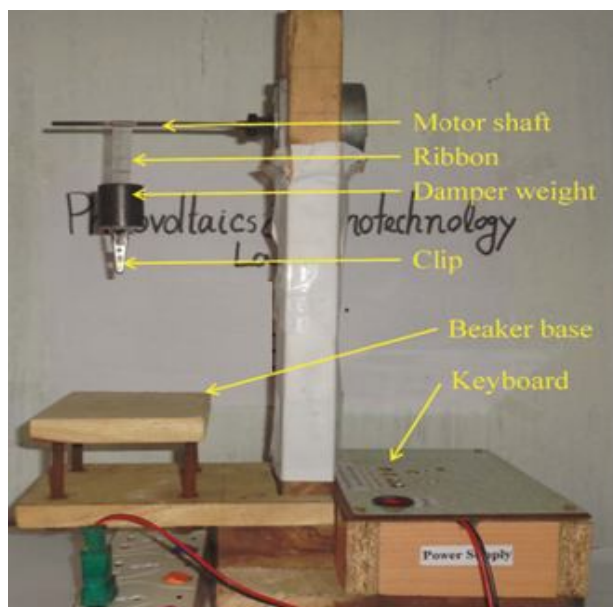


Fig.1 Experimental set-up: Automatic Sol-gel Technique

Once the precursor solution is prepared, the beaker base and the substrate has to be kept

idle and hanged to the top of the clip. Through the motor shaft, the length of the ribbon has to be adjusted or varied such that the bottomized portion of the substrate must touch with the precursor solution. Now, the power switch is turned-on simultaneously any one of the six-keys has to pressed according to the desired length of the substrate where the thin-films has to be deposited. Immediately, when the motor starts to rotate the ribbon has to be disconnected from the motor shaft where the substrate starts to dip into the precursor solution at a constant rate of 1cm/min. As soon as within 10 secs the motor stops its rotation, when the required length of the substrate is fully immersed into the solution. At the same rate of dipping 1cm/min, the substrate has to be withdrawn from the solution by making the motor again for starting to rotate in opposite direction so that the ribbon is coiled through the motor shaft. Finally, heat treatment has to be carried out when the substrate is fully withdrawn from the solution.

### A. Chemical Reagents

ZnO precursor solution was prepared ethanol ($M$=46.07, $CH_3CH_2OH$, EtOH) as so di-hydrate ($M$=219.50, $Zn(CH_3COO)_2.2H_2O$, ZAD) precursor, diethanolamine ($M$=105.14, $[CH_2(OH)CH_2]_2$ as chelating agent and de-ionized water.

### B. Preparation of ZnO Films

In this work, ZnO films were saved for zinc acetic acid derivation grouping of 1.0 mol/L with different number of coatings (2-5 plunging cycles). ZnO forerunner arrangement was set up in the accompanying manner. From the outset, 5.488g of zinc acetic acid derivation was disintegrated in 25 ml of outright ethanol to yield 1.0 mol/L centralization of forerunner arrangement and afterward was attractively blended for 30 min. A smooth arrangement was gotten where with a molar proportion of DEA/ZAD as 1:1, 4.823 ml of DEA and with a molar proportion of de-ionized water/ZAD as 2:1, 1.8 ml de-ionized water was added into the emulsion. The arrangement was again blended and an unmistakable arrangement was acquired after a specific period. In the mean time, a homogeneous blender of total ethanol and de-

ionized water was set up with a volumetric proportion of 8:2. At last, the antecedent arrangement was hydrolyzed with drop by drop expansion of arranged blender of ethanol and de-ionized water holding the arrangement under persistent mixing. Glass miniature slides were utilized as substrate for testimony of ZnO films. The substrates were cleaned ultrasonically, first in ethanol and in this way in particle traded refined water for 15 min each at 500C. After that solvents from the outside of substrate were cleared away by utilizing an air blower and kept in a broiler at 800C for 10 min. At that point 2cm length of the perfect substrate was covered with the pre-arranged sol utilizing programmed sol-gel measure. The plunging and pulling out rate was 1cm/min and stretch between resulting plunging and pulling out was 10s. The covered movies were dried at room temperature for 24 h and afterward warmed at 3000C in air for 1 h to break down the forerunner film to ZnO. After that another testimony cycle was done. In the wake of finishing the necessary affidavit cycles, the movies were strengthened at 5000C at a warming pace of 100C/min and left at 5000C for 2 h. The optical properties of the deposited films were measured by UV/Visible spectrometer at 200-900 nm wavelengths using reference substrate. From transmittance spectra absorbance was determined using Beer-Lambert Law and optical band gap was found using Tauc relationship.

## Results and Discussion

Fig. 2 illustrates the pictorial view of automatic sol-gel produced as ZnO films for different numbers of coatings with zinc acetate concentration of 1.0 mol/L. The observance has been made that the all films are likely to be transparent as visual and the transparency decreases with the increase of number of coatings which indicates ZnO films with 5 coatings reveals greater absorbance than the films as reduced number of coatings.

The reason for this as, when coating number increases obviously the film thickness also has been increases with high absorbance in ZnO as routed in when compared with that of ordinary sol-gel derived ZnO films.

The optical transmittance of ZnO films for 2 coatings in the wavelength varies from 300 to 900nm. Observance also made that electromagnetic spectrum with average transmittance of 92% with 400nm as wavelength as in visible region. A sharp UV also present in 360nm. This transmittance value is greater than the earlier mentioned in transmittance value of ZnO films. Transmittance extents to its concentrated value at greater wavelength.
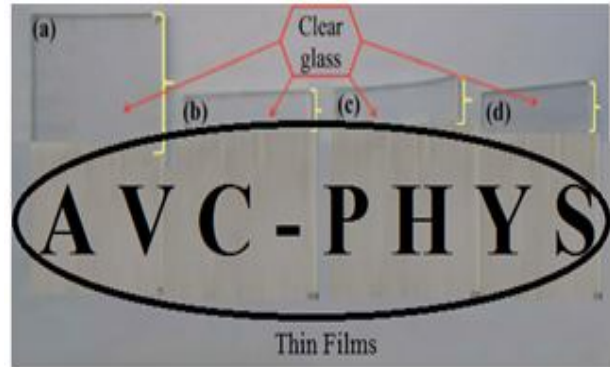


Fig. 2 Images of ZnO films for zinc acetate concentration of 1.0 mol/L with (a) 2, (b) 3, (c) 4, and (d) 5 coatings

Fig. 4 shows the retention range of automatic sol-gel determined ZnO for 2 coatings. It is unmistakably seen that the movies have a low ingestion at straightforward district and high assimilation at bright area. The assimilation worth of the pre-arranged ZnO films at bright locale is lower than recently revealed information. This is a direct result of the more modest thickness of ZnO films as just 2 coatings have been given.

The immediate and aberrant permitted optical advances among valance and conduction groups can be assessed by fitting a straight line in solid retention otherworldly area utilizing the Tauc relationship. As per Tauc law reliance of ingestion co-effective (a) on photon energy (hv) can be given by [22]

$$(\alpha h\nu) = A(h\nu - Eg)^{r} \qquad (1)$$

Where a is the absorption co-efficient, A is the edge width parameter, and hv is the photon energy, and r is a constant, for direct allowed transition r equals ½ and for indirect allowed transition equals 2.
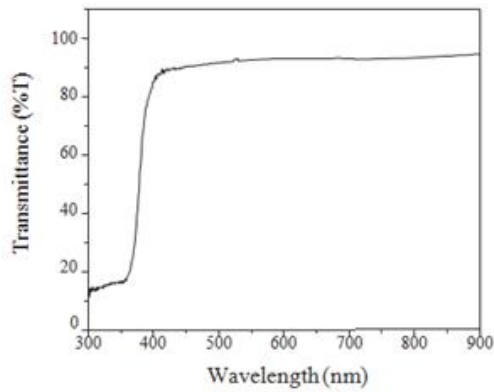
Fig. 3 Optical transmittance ZnO thin films
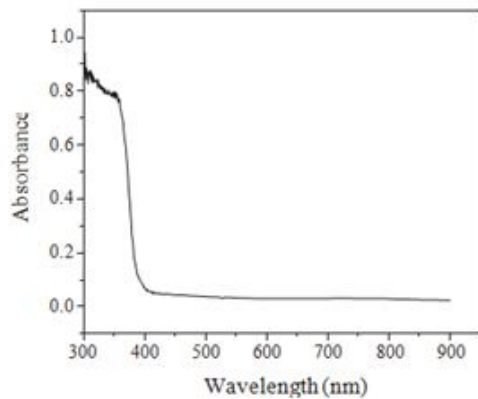


Fig.4 Optical absorbance of ZnO thin films

The optical band gap for direct allowed transition of the films have been determined from the extrapolation of the linear portion of $(ahv)^2$ vs. hv at a= 0. Direct transition band gap is found to be of 3.21eV. Although this value is smaller than the bulk value of 3.37 eV but still it is in good agreement with previously reported data of ZnO thin films.

Fig. 6 shows the plot of (ahv) 1/2 vs. hv of ZnO films for 2 coatings and band gap for indirect allowed transition has been determined by extrapolating the straight line portion of the spectrum at a= 0. The indirect allowed band of prepared ZnO thin films with 1.0 mol/L and 2 coatings has been found to be of 3.08 eV which is greater than the previously reported indirect allowed band gap of 3.0 eV for ZnO films.
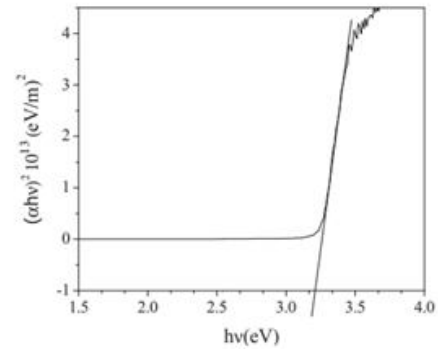


Fig. 5 Plot of $(ahv)^2$ vs. hv of ZnO thin films.
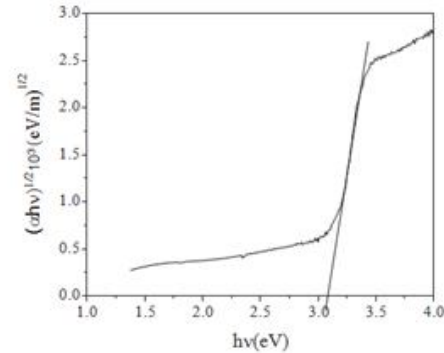


Fig. 6 Plot of $(ahv)^{1/2}$ vs. hv of ZnO thin films.

## CONCLUSION

Finally, a good credit of preparation on ZnO made on glass substrate with the help of eco-friendly sol-gel technique as a precursor - zinc acetate. A sample of concentration (1.0 mol/L) has initially been taken to prepare the ZnO thin films trailed with various number of coatings as zinc acetate been a concentrator. ZnO: A crystal structure has been obtained when deposited films treated with annealing process at $550^0C$ for two hours. A greater transparent at visible region (92%) of ZnO has been obtained using automatic sol-gel technique. Results reveals that, during direct and indirect bandgap with nominal values. Greater transmittance in the visible region and greater absorption in the UV-region has made the films potentially able for optical window applications and also as Transparent Conductive Oxide (TCO).

## References

1. F. E. Ghodsi and H. Absalan, (2010 ) "Comparative study of ZnO thin films prepared", Acta Physica Polonica A, vol. 118, no. 4, pp. 659-664.
2. F. K. Shan, B. I. Kim, G. X. Liu, Z. F. Liu, J. Y. Sohn, W. J. Lee, B. C. Shin, and Y. S. Yu, (2004) "Blueshift of near band edge emission in Mg doped Zno thin films and aging," Journal of Applied Physics, Vol. 95, No. 9, pp. 4772-4776, Feb.

3. G. Sberveglieri, S. Groppelli, and G. Coccoli, (1988 )"Radio frequency magnetron sputtering growth and characterization of indium-tin oxide (ITO) thin films for NO2 gas sensors", Sensors and Actuators, vol. 15, no. 3, pp. 235–242, Nov.

4. H. Endo, M. Sugibuchi, K. Takahashi, S. Goto, S. Sugimura, K. Hane, and Y. Kashiwaba, (2007 ) "Schottky ultraviolet photodiode using a ZnO hydrothermally grown single crystal substrate," Appl. Phys. Lett., vol. 90, no. 12, pp. 121906(3pp), March.

5. J. H. Lee and B. O. Park, (2003 ) "Transparent conducting ZnO:Al, In and Sn thin films deposited by the sol-gel method," Thin Solid Films, vol. 426, no. 1-2, pp. 94-99, Feb.

6. Janotti and C. G. V. d. Walle, (2009 ) "Fundamentals of zinc oxide as a semiconductor", Rep. Prog. Phys., vol. 72, no. 12, pp. 126501(29pp), July.

7. K. C. Yung, H. Liem, and H. S. Cho,( 2009) "Enhanced redshift of the optical band gap in Sn-doped ZnO free standing films using the sol–gel method", J. Phys. D: Appl. Phys., vol. 42, no. 18, pp. 185002(5pp), Sept..

8. L. Xu, X. Lu, Y. Chen, and F. Xu, (2011 ) "Structural and optical properties of ZnO thin films prepared by sol-gel method with different thickness," Applied Surface Science, vol. 257, pp. 4031-4037, Feb.

9. M .F. Hossain, Z. H. Zhang and T. Takahashi,( 2010) "Novel micro-ring structured ZnO photoelectrode for dye-sensitized solar cell," Nano- Micro Lett., vol.2, no.1, pp. 53-55, Apr..

10. M. F. Hossain, S. Biswas, M. Shahjahan, and T. Takahashi, (2009 ) "Study of sol-gel derived porous ZnO photoelectrode for the application of dye – sensitized solar cells," J. Vac. Sci. Technol. A, vol.27, no.4, pp.1047- 1051, Jul/Aug..

11. M. F. Hossain, T. Takahashi, S. Biswas, (2009 )"Nanorods and nanolipsticks structured ZnO photoelectrode for dye-sensitized solar cells", Electro. Commu., vol. 11, pp. 1756-1759, July.

12. Muthuvinayagam, N. Melikechi, P. D. Christy and P. Sagayaraj, (2010) "Investigation on mild condition preparation and quantum confinement effects in semiconductor nanocrystals of SnO2", Phys. B, vol. 405, no. 4, pp. 1067-1070.

13. N. Naghavi, A. Rougier, C. Marcel, C. Gueary, J. B. Leriche and J.M. Tarascon, (2000 ) "Characterization of indium zinc oxide thin films prepared by pulsed laser deposition using a Zn3In2O6 target," Thin Solid Films, vol. 360, no. 1-2, pp. 233-240, Feb.

14. N. Shakti, P. S. Gupta,( 2010) "Structural and optical properties of sol-gel prepared ZnO thin film", Applied Physics Research, vol. 2, no. 1, pp. 19-28.

15. Ohtomo, M. Kawasaki, T. Koida, K. Masubuchi, H. Koinuma, Y. Sakurai, Y. Yoshida, T. Yasuda, and Y. Segawa, (1998 ) "MgxZn1-xO as a II-VI widegap semiconductor alloy," Applied Physics Letters, vol.72, no.19, pp. 2466-2468, March.

16. S. Ilican, Y. Caglar, M. Caglar and B. Demerci, (2008 ) "Poly-crystalline Indium-doped ZnO thin films: preparation and characterization," Journal of Optoelectronics and Advanced Materials, vol. 10, no. 10, pp. 2592-2598.

17. S. Paul, D. M. F. Hossain, M. H. Islam, M. F. Ali, and U. Shaha, (2013 ) "Synthesization of ZnO thin films by length controlled automatic sol- gel process", Int. Conf. Inf. Elec. Vission, vol. 1, pp. 85, May.

18. S. S. Shariffudin, M. Salina, S. H. Herman, and M. Rusop, (2012 ) "Effect of film thickness on structural, electrical and optical properties of sol-gel deposited layer-by-layer ZnO nanoparticles," Transactions on Electrical and Electronic Materials, vol. 13, pp. 102-105, April.

19. W. R. Saleh, N. M. Saeed, W. A. Twej, and M. Alwan, (2012 ) "Synthesis sol-gel derived highly transparent ZnO thin films for optoelectronic applications", Advances in Materials Physics and

Chemistry, vol. 2, no. 01, pp. 11-16, March.

20. Wacogne, M. P. Roe, A. T. Pattinson, and C. N. Pannell, (1995 ) "Effective piezoelectric activity of zinc oxide films grown by radio-frequency planar magnetron sputtering," Applied Physics Letters, vol. 67, no.12 , pp. 1674-1676, July.

21. Y. Tsay, M. C. Wang, and S. C. Chiang, (2008 ) "Effects of Mg additions on microstructure and optical properties of sol-gel derived ZnO thin films",

Materials. Transactions., vol. 49, no .5, pp. 1186-1191, April.

22. Z. Liu, J. Li, J. Ya, Y. Xin, and Z. Jin, (2008) "Mechanism and characteristics of porous ZnO films by sol-gel method with PEG template". Materials Letters, vol.62, no. 8-9, pp. 1190-1193, March.

23. Z. Liu, Z. Jin, W. Li, J. Qiu, (2005) "Preparation of ZnO porous thin films by sol–gel method using PEG template", Materials Letters, vol. 59, no. 28, pp. 3620-3625, Dec.

# CHOICE BASED CREDIT SYSTEM IN INDIA: A CRITICAL REVIEW OF LITERATURE

**F. Lalrinzuali and R.P. Vadhera**
Department of Education, Mizoram University, Mizoram, India
lalrinzualifanai@gmail.com

_____

## ABSTRACT

*The University Grants Commissions have introduces many plans and policy for the effective functioning of higher education. As CBCS is a new system there are many challenges such as drafting the entire new syllabus, defining the credit system, motivating and training teachers, staff and students for smoother implementation, encouraging students' to stay involved throughout the term and improving attendance, and continuous evaluation. The teachers will also face many challenges. The academic committees in the universities will have to play an important role to overcome these challenges and help in preparing the new syllabus in a definite time. This change in the curriculum of higher education, however, has faced a lot of criticism from educationists, policy makers, teachers and students from across the country as they find Choice Based Credit System to be impractical in the Indian education scenario. Many of the higher education institutions of India are still in the pursuit to resist the implementation of the CBCS while others have welcomed the same, seeing it as an avenue for internationalizing the Indian system of education. The objective of the following paper is to critically review literature on Choice Based Credit System in India. Based on the analysis of the review, this paper will look into the benefits, challenges and what are the problems that stand in the way for the successful implementation of CBCS in higher education.*

_____

*Keywords: Choice Based Credit System, flexible curriculum, open electives, student's mobility, credit system.*

## Introduction

University Grants Commission has come up with the Choice Based Credit System (CBCS) programme in which the students have a choice to choose from the prescribed courses, which are referred as core, elective or minor or soft skill courses, and they can learn at their own pace and the entire assessment is grade-based on a credit system. The basic idea is to look into the needs of the students so as to keep up-to-date with development of higher education in India and abroad. CBCS aims to redefine the curriculum keeping pace with the liberalization and globalization in education. CBCS allows students an easy mode of mobility to various educational institutions spread across the world along with the facility of transfer of credits earned by students. The CBCS imminently fits into the emerging socio-economic situations, and could effectively respond to the educational and occupational aspirations of the upcoming generations. Aided by modern communication and information technology, CBCS has a high probability to be operated efficiently and effectively - elevating students, institutions and higher education.

## Objectives

1. To critically review literature on Choice Based Credit System in India.
2. To find out the problems faced for the successful implementation of Choice Based Credit System in higher education institutions of India.
3. To make suggestions for effective implementation of Choice Based Credit system.

## Review of Related Studies

A very limited number of researches have been done in this area as CBCS in the Indian context is something new which have been proposed in the 11th Five Year plan of India for academic reforms in higher education, now that the UGC has made it mandatory to implement CBCS in all the central universities across the country, some articles can be seen online and in recent journals, but still, not much empirical research has been taken up on the various provisions relating to CBCS, so the scholar could review only few empirical researches and theoretical articles undertaken between 2012-2021.

**Barla (2012)** in his study '*Nuances of Choice Based Credit System for Education and Career Development*' conducted on a stratified convenience sample of 500 students' at RG Kedia Colleges, ST. Mary`s Group of Institutions and Osmania University Campus Hyderabad, for the purpose of making an empirical evaluation of students'` perceptions on CBCS system . The principal Null Hypothesis was that students' do not perceive the CBCS system as a mechanism for enhancement of learning and career development. Data analysis disproved the Hypothesis. It was also found that female students' understand the CBCS system better than male students' and are readily willing for a change over from the next academic year itself.

In a study conducted by **Roy et al., (2013)** on 'Attitude towards choice based credit system of PG level students' in higher education: A study on Assam university', has taken the sample from PG level Arts and Science students' of Assam University. The sample size is 56 out of which 28 are from Science and 28 from Arts department. Again, from each discipline equal number of boys and girls students' were selected i.e. 14 boys and 14 girls, the major findings are: a) Boys are having the highest level attitude towards CBCS in comparison to the Girls Students' of Assam University. b) Science Students' are having the highest level attitudes towards CBCS in comparison to the Arts Students' of Assam University. c) There is no significant difference between Arts and Science Students' of Assam University in their attitudes towards CBCS. d) There is no any significant difference between Boys and Girls Student of Assam University in their attitudes towards CBCS.

**Kelkar and Ravishankar (2014)** in their study '*Choice-based credit system: boon or bane?*' concluded that teachers' being an integral part of the system and valuable stakeholders, it is essential to understand their perspective and opinion about the CBCS. Their study analysed teacher's opinions, problems faced and recommended suggestions for better implementation of the CBCS. In response to the problems faced by teachers' in the implementation of the credit system, the following points we re-evaluated: class size, teaching hours, maintenance of records, time spent on evaluation, work load, stress levels and preparation time. Their Study revealed that students' felt that the increased in class size was a major hurdle in the successful implementation of the credit system.

**Raghvan (2015)** in her article '*Choice based credit system: A SWOT analysis*' further stated that the premise behind CBCS is that one cannot compartmentalize disciplines/subjects in today's knowledge society and if we provide such system that students' will be benefitted the most. It will give the student an opportunity to abreast himself/herself about the developments taking place in the field and acquire knowledge on it and apply the knowledge in his/her discipline. Moreover, it also helps the students' to develop a taste in other fields and if possible go for innovation in his/her interested field. In western countries, it is very common that students' studies inter-disciplinary subjects at graduate and post graduate level which help students' to give better insight about the relevance of one subject in other allied fields. The universities have the flexibility and freedom in designing the examination and evaluation methods that best fits the curriculum, syllabi and teaching–learning methods, there is a need to devise a sensible system.

**Hasan & Parvez (2015)** extensively discuss the pros and cons of CBCS. They found the percentage based evaluation system as a barrier for students' mobility, making the higher education system rigid. They strongly believe that CBCS has makes education learner centered , promotes an interdisciplinary and intra-disciplinary approach , boosts development of professional skills , encourages multifaceted development of personality, mandates uniformity in evaluation and encourages a system of teaching learning. They , however , also realize that implementation of CBCS suffers from certain issues like – increase workload on the teachers , lack of infrastructure , maintenance of student records , compatibility of the main papers , lack of content mastery among the students and subjectivity in evaluation .

In a study conducted by **Chaliha (2015)** on "*Scholastic Achievement of the Post-Graduate Students' of Dibrugarh University: A study of*

*some Associated Variables."* The differences between the Post-Graduate students' of Dibrugarh University studying through Choice-Based Credit System (CBCS) and Non Choice-Based Credit System (Non-CBCS) mode with reference to their Scholastic Achievement, Intelligence, Anxiety, Attitude towards Higher Education, Socio-Economic Status was taken up, the major findings are as follows: it seems that the students' studying through Non-CBCS mode are good achievers than the post-graduate students' studying through CBCS mode. The students' studying through CBCS mode opined that they have more work load in comparison to Non-CBCS mode students' because internal assessment marks is increased in CBCS mode from earlier 25% (Non-CBCS mode) to 40% of the total marks in each course. The study reveals no significant difference between the postgraduate students' of Dibrugarh University studying through CBCS and Non-CBCS mode with reference to their intelligence. It also reveals no significant difference with reference to their anxiety. It also shows that they differ significantly in their attitude towards higher education. As the difference is in favor of the post-graduate students' studying through Non-CBCS mode, it seems that the students' studying through Non-CBCS mode have more favorable attitude towards higher education than the post-graduate students' studying through CBCS mode. As the students' studying through CBCS mode opined that the courses in CBCS mode are very comprehensive and require more time to complete. The increased mark of internal assessment also makes them busier throughout the sessions. Over work load, less free time, negative experiences from different dimensions of higher education etc., creates unfavorable attitude of the students' studying through CBCS mode towards higher education. It was found that the students' studying through Non-CBCS mode have better socio-economic status than the post-graduate students' studying through CBCS mode.

**Sumitha, Krishnamurthy & Winfred (2016)** in their study on '*An Empirical Study to Measure the Perception of Management Students' Towards Choice Based Credit System (CBCS): A Case Study*' which was designed in management programme of AIMIT, St.

Aloysius College Mangalore. The study was conducted targeting management students' of size 150. Findings of their study highlight to the fact that education is not the end of process but an integral part of educational spiral and a well-designed system of evaluation is a powerful educational device. CBCS is essential for Higher Education as this system increases the sincerity among the students' as they preferred to learn the subjects of their choice.

**Howlader (2021)** the study investigate to find out attitude towards choice based credit system (CBCS) of under-Graduate students in relation to their academic achievements. Results reveal that there exists significant difference of attitude towards CBCS between boys and girls students. It is also said that there exist no significant relationship between attitude towards CBCS and academic achievement of total boys and girls students.

### Critical Analysis of the Literature

Only few serious empirical research has been taken up on the various provisions relating to CBCS, yet when the UGC made it mandatory to implement CBCS in all the central universities across the country there has been many debates, protests and strikes, so many articles and comments have appeared in the print and non- print media, many of them being criticisms about CBCS, so the investigator have highlighted all the relevant related studies on CBCS that can be seen so far, this is a clear indication that there is a very limited study about CBCS in India. There are many more aspects of CBCS that needs to be identified and studied more thoroughly. Here are the important areas relating to successful implementation of CBCS.

### a) Common Minimum Syllabi for the programmes in all parts of the country

One of the salient features of CBCS is that there will be a uniform grading system which will facilitate seamless mobility of students' across institutions, in India and abroad, regarding this uniform grading system, it is very difficult for all Universities across the country to follow the same pattern, With the implementation of CBCS, comes uniformity of curriculum and evaluation system, this requires all the institutes of higher education to function

under the UGC. This includes central universities as well as public universities. This further implies loss of autonomy of many universities. Though this looks like a major step towards equalizing education throughout the country, this might not go down easily with many universities as sudden loss of power means massive changes in the functioning, administration and management of the institutions. This is an issue that needs to be looked into seriously, discussed and debated to find a solution – a way between complete loss of autonomy and complete bureaucratization.

### b) Lack of Infrastructure

Lack of infrastructure seems to be a huge problem in almost all higher institutions in India**.** The most important aspect of CBCS, which is Open electives, cannot be implemented fully, and student's mobility is not possible. The students could not get their first choice and in some case not their second or third choice of open electives because of lack of seats in that department. So, proper planning and designing on the part of the stakeholders is required in this matter.

### c) Increase in work Load of the Teacher

There is a general perception in the university that with the introduction of CBCS the workload of academic departments has increased to a great extent, as it demands too much involvement of the department in testing and evaluation, compiling of results and other clerical work. The teachers, under CBCS will have to be continuously involved in preparing lectures for the different papers, maintain records of the students and evaluate and assess students, their papers, their projects and their continuous growth. Therefore, with the implementation of Continuous and Comprehensive evaluation (CCE), under CBCS, the teachers will be continuously under excessive pressure, which will leave them with no time for personal professional development.

### d) Consultations with Potential Employers

One of the features of CBCS is that it will help potential employers, and will make the process easier when they have to assess the performance of students'. Many Universities in the country while planning and developing courses/syllabi/curriculum for its various PG programmes under CBCS, has not consulted the potential employers of its manpower; therefore it will not be easy for them to assess the performance of students'.

### e) Cafeteria Approach in Selection of Courses

The salient feature of CBCS relating to cafeteria approach, wherein students' will be able to pick courses of their choice has been partially implemented in many of the universities in India as: a) Students' admitted in a PG Course shall take the choice based open elective courses offered by the Departments/Faculties, Sometimes due to lack of infrastructure and limitation in number of faculty the students' cannot opt for the OE courses of their first choice.

### f) Investment of Time in Learning, Not In Teaching

One of the objectives of CBCS is based on the investment of time in learning, not in teaching, but in many Universities is given more importance even in the classrooms. Under the CBCS, adopted many Universities, the time spent on Lectures (L), Tutorials (T) and Practical/Practicums (P) is reflected separately under L, T and P in the Course Structure of every discipline. Continuous and comprehensive evaluation of students'; which includes class tests, assignments, and seminars etc.; is done under C1 and C2 that relate to the first half and second half of the semester, respectively. And C3 relates to the end semester examination carrying 60 per cent weightage, the time taken for learning and preparation for examination are not taken into consideration.

### g) Self-paced Learning

The CBCS adopted by the Mizoram University does not support the self-paced learning as it is not much different from its traditional system (Non-CBCS) in terms of its provisions on self-paced learning. All students' of a particular department or school are required to undertake the same number of credits. The provision to not repeat all the courses in a given semester if a student fail in one or more courses was also there in the non-CBCS.

### h) Transferring of Credits

CBCS offers the opportunity to study at different times and in different places. Credits earned at one institution can be transferred to another. Unfortunately, none of the universities in the country has yet implemented this salient feature of the CBCS. As of now the students' are supposed to earn all their credits from their parental institution. Absence of this the provision of transfer of credits from/to other institution has killed the basic spirit or philosophy of CBCS. In some universities where MOOCs have been introduced the students will be able to earn extra credits.

### i) Amalgamation of Skills Development Courses in the Curricula

Another important objective of CBCS is amalgamation of Skills Development Courses in the Curricula. Since most of the FCs, CCs, SCs and OEs offered by various departments are theoretical in nature, therefore, it can be said that the CBCS adopted by Universities has not focused on the amalgamation of skills development courses in the Curricula. It is such that it will not be able to meet the needs of national and international employment market which requires individuals with extraordinary skills, vast knowledge and strong moral values; as such components have not been incorporated in it.

### Suggestions

In the light of the analysis of the review, the researcher makes the following suggestions:

1. As CBCS has many new unique features, orientation programmes and workshops should be organized for teachers', students and academic staff to understand the details about grading, semester, credit system, credit transfer etc. by inviting and involving resource persons with appropriate expertise.

2. Another issue is that there is a cafeteria of choices in CBCS but the question is on how one knows which combination works best, so there is a need for Academic Adviser in each department who will assist the students' in their selection of courses and they should play their role in assisting the students' in selection of their courses.

3. CBCS puts the focus on the 'learner', thus there is a need to give students' the flexibility to choose a mix of courses and encouraging interdisciplinary studies. To resolve this problem the intake capacity of the academic departments for Open Electives should be increased so as to meet the demands of the students'.

4. CBCS allows 'seamless mobility' across higher education institutions and transfer of credit earned by students'. Yet there is no clarity on how students' movement will take place. So until and unless all the universities and colleges follow the same grading system and syllabus this is not possible. Universities all over the country should aim at uniform grading system which will facilitate seamless mobility of students' across institutions in India and abroad.

5. As CBCS focuses on the employment of students', open electives offered by academic departments should be skill oriented.

6. According to UGC guidelines, in the new system there is a shift in focus from teacher-centric to learner-centric education. Emphasis is on learning and not on teaching, with the learner being at the centre stage of all academic transactions. So the university has to change its system so that the students' can move in their pace and style.

7. CBCS encourages teaching through projects and case studies. By enabling students' to access and critically review research papers and projects online, and effectively use them for self-study, teachers' will end up providing students' with critical thinking skills. This requires moving away from the traditional classroom and textbook based approach but our universities do not have adequate infrastructure to facilitate this, including smart boards, projectors, access to computers and Internet. So, measures have to be taken to have the required infrastructure for effective implementation of CBCS.

## Conclusion

The University Grants Commission have come up with many new policies and changes in higher education which aims to bring efficiency and excellence in the higher education system in India, right from the curriculum to the teaching-learning process, to examination and evaluation systems. Looking at the objectives of Choice Based Credit System, it can also be regarded as the right step for quality education. However, looking at the present scenario of different universities across the country, the differences between Central University, State University and Colleges in terms of efficient teachers, academic environment, infrastructure etc., following uniform grading system and maintaining harmony is going to be a huge task which will require lot of handwork on the part of all stakeholders and close watch have to be kept for effective implementation of CBCS.

## Refereces

1. Barla, V. (2013). Nuances of Choice Based Credit System for Education and Career Development. Retrieved October 18, 2016, from https://eltweekly.com/2013/05/nuances-of-choice-based-credit-system-for-education-and-career-development-by-dr-v-barla/

2. Chaliha, A. (2015). Scholastic Achievement of the Post-Graduate Students' of Dibrugarh University: A study of some Associated Variables. Accessed and Retrieved on 6th. July. 2017 from http://shodhganga.inflibnet.ac.in/bitstream/10603/32764/12/12_chapter%206.pdf

3. Chaubey, A. K., & Vishwavidyalaya, H. G. (2015). Choice Based Credit System (CBCS): A Better Choice in Education System. International Journal of Creative Research Thoughts. 3(6), June 2015. Retrieved on 1st Nov. 2016. from http://ijcrt.net/UploadedArticle/176.pdf

4. Deuri, C. (2015). Attitude towards Choice Based Credit System of Post Graduate Level Students' in Higher Education: A Study on Guwahati University. International Journal of Interdisciplinary Research in Science Society and Culture (IJIRSSC). 1(2), (December Issue), 2015. Retrieved on 16th. April. 2016. from http://www.academia.edu/20119082/Attitude_towards_Choice_Based_Credit_System_of_Post_Graduate_Level_Students'_in_Higher_Education_a_Study_on_Gauhati_University

5. Hasan, M. & Parvez, M. (2015). Choice-Based Credit System in India: Pros and Cons. Department of Education, Aligarh Muslim University, Aligarh- UP. India. Journal of Education and Practice. 6(25), 2015. Retrieved on 17th. April. 2017 from www.iiste.org

6. Howlader T (2021) Attitude towards Choice Based Credit System (CBCS) of under- Graduate student's in Relation to their Academic Achievements. https://www.ijcrt.org/papers/IJCRT2102086.pdf

7. Kelkar, A. S., & Ravishankar, L., (2014). Choice-based credit system: boon or bane?. Current Science. Guest Editorial. 107(8).

8. Roy, N. R., Khanam., U. K., & Devi, T. (2013). Attitude towards choice based credit system of PG level students' in higher education: A study on Assam university. Scholarly Research Journal for Interdisciplinary studies, I (1), 1198-1208.

9. Sumitha, P.V., Krishnamurthy, M. G., & Winfred, B. R. (2016). An Empirical Study to Measure The Perception Of Management Students' Towards Choice Based Credit System (CBCS): A Case Study. IOSR Journal of Business and Management (IOSR-JBM), 56-65.

10. U.G.C. (2008). Guidelines on Adaptation of Choice Based Credit System. University Grants Commission. Bahadurshah Zafar Marg New Delhi. 110 002.

# DECEPTIVE SUBLIMINAL STRATEGIES IN ADVERTISING: A SEMIOLOGICAL STUDY ON THE SUBLIMINAL STRATEGIES IN ADVERTISEMENTS OF MCDONALD'S VALENTINE'S DAY PRINT CAMPAIGN.

**Gopakumar AV[1], Renjini T[2] and Sudheer S S[3]**
[1]Department of Media Studies, Kristu Jayanti College, Bengaluru, India
[2]Department of Psychology, Govt. College for Women, Thiruvananthapuram, India
[3]Department of Film Studies, Thunchath Ezhuthachan Malayalam University

_____

## ABSTRACT

*The paper focuses on subliminal strategies used in McDonald's Valentine's Day print campaign created by TBWA - Thailand. The Semiological review of the print advertisements revealed that the advertisers have adroitly used subliminal strategies of Dr.Wilson Bryan Key's -Figure-Ground Reversal, Embedding, Double entendre, and Low-intensity lighting. Furthermore, researchers also could find appropriate viewing patterns, design principles like emphasis, techniques like texture segregation, eye gaze, cross-cultural references, and subjective shots to enhance the qualities of subliminal messages in the campaign. These creative strategies of the advertisers can tap into the vulnerabilities surrounding the subconscious and unconscious minds of the viewers, manipulating and controlling them to bring in persuasive buying behavior.*

_____

## Introduction

Today we live in a highly consumerist society where the consumer is king. There is intense competition among companies to reach out to consumers and persuade them to buy products. It is here that advertising plays a major role. Advertisers use every method available to draw attention to the product, convince and persuade people to buy the product. Often many techniques deployed in the field of advertising are borrowed from concepts in Psychology like attention, perception, illusion, persuasion, etc. The one technique often used but which advertisers do not acknowledge is that of subliminal perception,i.e., perception below the threshold level. This is in contrast to supraliminal stimuli or perception above the threshold.

Functional MRI studies have shown that subliminal stimuli trigger definite regions of the brain regardless of participants being unaware (Brooks et al., 2012). Visual stimuli may be rapidly flashed before an individual can perceive them or flashed and then masked, thereby disturbing the processing of the brain (Krosnick et al., 1992). The efficiency of subliminal messaging has been authenticated to prime individual responses and stimulate mild emotional activity (Bar et al., 1998). For example, audio stimuli may be played below normal human audible volume range or masked by another audio stimulus. Advertisers use these techniques to manipulate and control us in many ways. Despite being unethical it is often difficult to prove the use of subliminal advertising. Therefore authorities often become helpless in bringing legislation to curb it. It has been demonstrated through studies that subliminal messages can stimulate mild emotional activity but these messages can trigger action subliminally only if the person intends to perform the specific action.

The word "subliminal advertising "was first coined by James Vicary in 1957. He claimed in a study on forty-five thousand moviegoers that when the message 'eat popcorn drink Coca-Cola" was flashed briefly on the screen, sales increased by 57%. Though controversies are surrounding the authenticity of the study, new studies in this area claim that subliminal advertising is a reality. A study by psychologist Hawkins has proved increased thirst ratings following subliminal exposure to Coco-Cola advertisements and that subliminal advertising can affect consumer behaviour. Alison Motluck of *New Scientist* showed in a study how when thirsty participants who were exposed to subliminal advertising of Lipton Ice were prone to choose the drink afterward.

Follow-up studies of Hawkins could not find convincing results. There have been arguments against the concept of subliminal advertising and studies have tried to prove that subliminal advertising does not exist. Rebecca Clay's article in American Psychological Association gives cases of psychologists like Esther Thorson, who are giving insights about this art of persuasion and the strategies behind the making of subliminal messages. It is also believed that subliminal messages are most likely to affect individuals who believe that such messages will alter their behaviour. An action can be triggered subliminally only if the person has a predisposed mindset to perform this specific action (Key, 1976).

Vance Packard has distinguished consciousness into three levels namely conscious –rational, preconscious, or subconscious, and unconscious. In the conscious rational level, one is aware of what is going on and is even able to tell why. At the preconscious level, the person has a vague awareness of what is going on with his feelings attitudes, etc. but is not able to tell why. It is at this level one's fears, desires prejudices, etc. operate. The third level or unconscious is where we are not aware of our feelings which are repressed and we cannot discuss them. The target of advertisers, especially in subliminal advertising is the second and third levels of consciousness. In other words, at the conscious level or the visible level, a safe, neutral, or naturally appealing ad is presented, but they are targeting the subject's desires fears, etc. at the subconscious or even unconscious level (Key, 1973).

According to Wilson Bryan Key, subliminal advertising is a double-edged sword. At the conscious level, the message does not create anxiety and prevents perceptual overload. At the same time, the processing is taking place at the subconscious level and unconscious level and these events influence behavior (Key, 1973).

When subliminal messages use images of sex or fear, the defense mechanisms block the explicit message but the unconscious mind perceives it. Therefore processing still happens in the unconscious mind with the message and product and later the sight of the product at the store may lead him to buy it. With the advancements in graphics and technology, several tools are available with advertisers to expertly hide subliminal messages. Through this study, researchers try to explore the subliminal strategies in advertisements of McDonald's Valentine's Day print campaign created by TBWA-Thailand.

## Methodology

The research method followed is a qualitative study, using techniques of content analysis and Wilson Bryan Key's subliminal strategies with semiology. Content analysis is typically called quantitative as it involves counting and summing phenomena, to even support studies of more qualitative nature. Krippendorff (1980) calls it primarily a symbolic method as it is used to investigate symbolic material, conducting many interpretative works, relying on a good knowledge of the texts under examination. This method of textual analysis is frequently combined with other methods in qualitative research. Here, a combination of semiotic analysis, syntagmatic as well as paradigmatic analysis of the print advertisements is used considering them as discourses of a continuous nature. Furthermore, to study the three print advertisements as a part of McDonald's Valentine's Day print campaign created by TBWA-Thailand, researchers have specifically used Wilson Bryan Key's -Figure-Ground Reversal, Embedding, Double entendre, Low-intensity key lighting, and other subliminal techniques in the advertisements (Key, 1980). The advertisements were created by TBWA Thailand, published in February 2020, and posted to McDonald's Thailand's social media channels to mark Valentine's Day

## Figure-Ground Reversal in McDonald's Valentine's Day Print Campaign

When three advertisements were analyzed with semiotics, researchers could see that campaign created by TBWA – Thailand brings romance to the campaign and uses burgers as a sign to signify the facial parts (lips and nose) of an individual. Every perceived image has a figure (foreground, subject) and ground (background, environment), which is differentiated by our perceptual defense mechanism to protect the brain from sensory overload (Key, 1980).

Therefore, viewers consciously notice the figure whereas the ground undulates around it unless it's not triggered to the foreground through some design elements. Perceptual psychologist Dr. E. Rubin created his famous Rubin's Profiles to explain this concept. His profiles, the faces and vases, old women and young women, duck, and rabbit, are syncretistic (two-sided) illusions (Rathus, 2011). Viewers who notice only one set of features will miss the other and construe different meanings, and advertisers take advantage of this to create subliminal messages into the picture's background. These images created as subliminal are usually cultural taboos, making it even tougher for the viewers to perceive it

In this ad campaign, one can see a man/woman attempting to engage in a lip lock kiss in the background and in the foreground man/woman trying to bite a burger, making it a convincing example of Figure-Ground Reversal for embedding subliminal message.

Furthermore, advertisers have used textual segregation to differentiate the foreground and background. In images, texture can be the optical grain of a surface, and one unconsciously unifies objects into regions that are confined by an abrupt change in texture. Here, in the three advertisements, researchers have noticed a smooth colored background and a grainy foreground. Moreover, through texture segregation, the foreground can be separated from the background. The association between figure and ground is a prerequisite for perceiving shapes and eventually identifying objects. In addition to this, texture perception also presents spatial information by providing cues for depth perception (Gibson, 1986). Considering these design intricacies, graphic designers manipulate these individual properties to convey meaning. In the three advertisements chosen for study, texture simulates surface qualities to help us identify and recognize the human faces in the ad copy.

## Double Entendre in McDonald's Valentine's Day Print Campaign

Many images, phrases, and slogans have concealed double meanings even when it appears normal. This is called double entendre. Symbolism also comes under this category.

Furthermore, their hidden meanings have sexual connotations. For example, the McDonald's slogan "I'm loving it," when taken out of context, has sexual implications. According to Key, double meanings appear to strengthen the significance in virtually any symbolic stimuli. This unconsciously perceived information of a socially objective nature ensures a deep emotional response and continued memory (Key, 1980). Moreover, the slogan is conveniently placed within the sexually instigating visual to trigger the subconscious mind of the viewer.

The three advertisements suggest that the experience of eating the product is somehow equivalent to sex. This is the metaphorical part of the food-sex connection, maybe because both food and sex are part of the basic needs namely the physiological needs in Abraham Maslow's hierarchy of needs (Mangal, 1990) A psychoanalytically inclined observer might believe that this kind of association is also a feature of some people's actual experiences of sexuality. (Patterson & Kim, 1991). Another aspect noticed by the researchers is the positioning of this slogan in the lower half of the advertisements, that too close to the bottom borderline. Research shows that objects in the top half of a picture are considered to be more active, dynamic, and potent than what is placed in the bottom half (Niekamp, 1981). Another study found that viewers spend more time viewing areas appearing on the left and upper half of the field than on areas located on the right and lower half (Goldsmith, 1984).

In this campaign, two out of three advertisements, the slogan is placed in the lower right portion and one on the lower right portion of the ad copies, and this varying the position of the slogan in a frame changes its impact on the observer by creating signs for conscious, subconscious and unconscious levels but predominantly for subconscious and unconscious levels for signifying the subliminal message.

## Embedded technique in McDonald's Valentine's Day Print Campaign

Embedding is a complex process of masking one image in the form of another in subliminal advertising. According to Key, these embedded components improve the perceptual experience

of the images, and this suppressed information stays in our memory system for a longer duration, even for a lifetime (Key, 1980). Private body parts are widely used for embedding, and graphic artists with expertise bring in these images in an implicit manner to cater subliminally. In this Campaign, the logo 'M' resembles female breasts, and the shape of the letter 'M' subconsciously arouses appetite and conforms to the oral stage of Sigmund Freud's psychosexual stages. This logo was made with the suggestion of psychologist Louis Cheskin in 1962.



According to Freud, personality develops in five psychosexual stages, and of these, the first three stages happen before puberty. The first stage is the oral stage i.e. from birth to about eighteen months. At this stage, the mouth is the pleasure zone where the infant gets pleasure in feeding and the mouth is the erogenous zone. Fixation occurs if the needs at any of these stages are under met or overly met. In the oral stage, fixation happens when the child is dissuaded too early or late i.e. even after infancy. Freud believed that many of the personality manifestations can be traced back to childhood and if the fixation happens at the oral stage the person goes on to develop habits with pleasure-seeking through the mouth. He believed that smoking, alcohol abuse, nail-biting, and overeating can be explained in this manner (Ellis et al., 2009). Subliminal female breasts in the logo target the subconscious and unconscious minds of adults who are experiencing fixation in the later stage. Moreover, this sign also elicited appetite in such people and leads to junkie food habits.

## Low-intensity lighting Technique in McDonald's Valentine's Day Print Campaign

It's a subliminal strategy and refers to any image with a predominance of shadowy areas. In Subliminal advertising, graphic artists make indistinct subliminal images below the conscious threshold of perception but beyond the unconscious perception threshold (Key, 1980). In this campaign, the advertisers intentionally underplay the image of a burger by masking with silhouettes and redirects the sexual image hidden as a figure-ground reversal to the subconscious mind to trigger their buying desires.

Furthermore, low-intensity lighting is creating the silhouette of a burger in the three advertisements, and they typically depict a form through the outline of its shape, an interior without detail or texture, and a fill of uniform color often within a flat pictorial space. In this campaign, burger silhouettes promote quick perception and speedy comprehension of human faces. Graphical artists' creative play offers many possibilities in silhouette for expression, and can quickly convey a sense of mystery, representing a shadowy world devoid of detail. A well-designed silhouette is a solid expression of compacted information that can be understood with a minimum of cognitive effort (Malamed, 2009). To avoid perceptual ambiguity, advertisers have given a formless region for the background and differentiate the figure with a well-defined boundary or color contrast. Besides these, advertisers have decreased the size of the Burger as compared to the explicit human faces in these advertisements, for the reason that smaller shapes tend to be perceived as the figure rather than the ground.

This creative effort of the advertising company also allows the viewers to perceive sexuality in the form of a lip lock kissing in the image with top-down processing, where visual awareness is driven by the viewer's memories, expectations, and intentions.

## Viewer Navigation in Advertisement and its Emphasis on Subliminal Elements.

The three selected advertisements taken for the study are following the Z-pattern layout, and

the eye route tracks the letter 'Z'. That means viewers will start in the top-left region, then move horizontally to the top-right portion of the image and then diagonally to the bottom-right portion of the image before finishing with another horizontal movement to the bottom-right portion (Lidwell et.al, 2010) The advertisers have chosen this pattern as it is good for simple designs with a few key elements that require to be seen. In the three advertisements selected for study, there are only a few key elements like a human face, burger, logo, and slogan, and this pattern easily persuades the viewer to go in that direction to help them perceive the intended message of the advertisers. According to Caleb Gattengo, a graphic artist will lose control if the viewers are permitted to wander at will through the work (Malamed, 2009).



Furthermore, this 'Z' pattern layout connects all the major elements in a hierarchical order by keeping the logo and human faces on the prominent space, i.e. the upper half and the other elements like burger and slogan in the comparatively less significant lower half, giving space for the subconscious and unconscious mind to draw the subliminal message.

Directing the eyes serves two principal needs, one to steer the viewer's attention along a track according to the planned ranking order and to capture the viewer's attention to precise elements of importance. With the design principle "emphasis', the designer can give relative dominance to one element and can direct the eyes around that graphic. In this campaign, explicit human faces are given super dominance through their bigger size. Rudolf Arnheim in his book Art and Visual Perception notes that when all other factors are equal, the visual weight of an element is most dependent on its size (Malamed, 2009). Moreover, this super dominant element becomes the primary

focal point and signifies intense passion with closed eyes, opened mouth, and a leaning face. Another connecting aspect with this is the 'eye gaze', which draws viewers to people, as human brains have a specialized mechanism for recognizing human faces. Irrespective of whether the face appears as a photograph, a painting, a sketch, or a simple schematic figure, definite neural networks are triggered in the brain upon perceiving anything configured as a human face (Malamed, 2009). Another intriguing characteristic of facial awareness is that viewers automatically shift their eyes in the direction where the face in the image is looking, and many studies have proved that the eye gaze is used to orient a viewer's attention (Jason, 2002).In this campaign, advertisers craftily guide the viewers to the burger which is subtly imaged like another face through the dominant human faces in the advertisements and it signifies a passionate lip kissing act.

In addition to this, human faces in the advertisement campaign are captured through subjective shots and this creates an image's simulation of someone's visual experience. Subjective shots can be taken as critical examples of iconicity, and the iconicity of visual images serves this process by making it possible for images to draw associated emotions to which we are already attuned through our interactions with our social and natural environments. Additionally, the explicit human faces used in the campaign have cross-cultural references as the advertisers have used the images of Caucasian and Mongoloid faces to have a global effect (Messaris, 1997). Kernan and Domzal (1993) in an article entitled "To globalize, visualize," opines that the powerful global advertisements are never verbose as verbal advertisement requires the consumer to understand the complexities of language in which it is communicated, whereas as visually predominant advertisements give flexibility to the consumer to interpret the advertisement theme in an individualistic manner because of its universality. Here in this campaign, facial expressions of human faces in the advertisement copies, gestures, postures, cultural references, are capable of simulating a sexual experience in the viewers who have experienced or repressed this kind of feeling in their memory. These expressions, gestures,

postures act as subliminal stimuli to evoke the feelings of sexuality in the subconscious and unconscious.

## Conclusion

Caleb Gattengo said the vision is quick, complete, analytical, and comprehensive. It uses very little energy to complete at the speed of light. It allows human thought to receive and store an unlimited amount of information elements in a fraction of a second. (Malamed, 2009). This design concept works effectively in subliminal advertising. Subconscious elements are misleading in nature because consumers will not perceive them at a normal level of consciousness and therefore cannot control their acceptance or rejection of information. Unlike normal advertising, subliminal advertising cannot be curbed by legislation as it's not operating at the conscious level. Advertisers take benefit of the susceptibilities in our subconscious and unconscious minds, using graphical imaging, and they have immense resources to manipulate each image to target a specific weakness in people. Furthermore, a picture is more than a two-dimensional surface, it reflects the designer's intent and signifies there is information to be communicated. The created graphics is a result of creative play and thoughtful decisions, evoking a visual experience. Above all, designers decide how to see a graphic in an orderly sequence and alter viewer's perceptions and interpretations of a picture. In this study, researchers could find appropriate viewing patterns, design principles like emphasis, techniques like texture segregation, eye gaze, cross-cultural references, and subjective shots to enhance the qualities of subliminal messages in the campaign.

Besides these, researchers found prevalent usage of subliminal advertising strategies in McDonald's Valentine's Day print campaign, when they analyzed the three advertisements of campaigns, they found Wilson Bryan Key's subliminal strategies like -Figure-Ground Reversal, Embedding, Double entendre, Low-intensity key lighting in the campaign selected for the study. The most interesting fact is that all these subliminal techniques are operating at the subconscious and unconscious levels. These operating platforms will allow advertisers to reject any such strategy and claim that if you look long enough, you will find it. But the most important evidence is that these advertisers spend billions of dollars each year on research and subliminal advertising. Therefore, the way out here is that advertisers should be ethically accountable to the consumer, and from the consumer side, they should not buy a product merely based on advertising and packaging.

## References

1. Bar, M.; Biederman, I. (1998). "Subliminal Visual Priming". Psychological Science 9 (6): 464–469.
2. Brooks, S.J.; Savov V, Allzén E, Benedict C, Fredriksson R, and Schiöth HB. (2012). "Exposure to subliminal arousing stimuli induces robust activation in the amygdala, hippocampus, anterior cingulate, insular cortex, and primary visual cortex: a systematic meta-analysis of fMRI studies." NeuroImage 59 (3): 2962–2973.
3. Ellis, A, Abrams, M & Abrams, L. (2009) Personality Theories: Critical Perspectives, London: Sage Publications.
4. Gibson, James J. (1986). The Ecological Approach to Visual Perception (Mahwah, NJ: Lawrence Erlbaum, 1986.
5. Goldsmith, Evelyn (1984) Research into Illustration: An Approach and a Review. Cambridge: Cambridge University Press.
6. Kernan, J. K., & Domzal, T. J. (1993). International advertising: To globalize, visualize. Journal of International Consumer Marketing, 5(4), 51-71.
7. Key, B. W. (1973). Subliminal seduction. NJ: Prentice-Hall.
8. Key, B. W. (1976). Media sexploitation. N J: Prentice-Hall.
9. Key, B. W. (1980). The clam-plate orgy and other subliminal techniques for manipulating your behavior. N J: Prentice-Hall.
10. Krippendorff, K. (1981). Content Analysis; An Introduction to its

Methodology, Beverly Hills, CA: Sage Publication

11. Krosnick, J. A.; Betz, A. L.; Jussim, L. J.; Lynn, A. R. (1992). "Subliminal Conditioning of Attitudes". Personality and Social Psychology Bulletin 18 (2): 152

12. Lidwell, W., Holden, K. & Butler, J. (2010) Universal Principles of Design, Revised and Updated: 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions. Beverly: Rockport Publishers

13. Malamed, Connie (2009) Visual Language for Designers: Principle for creating Graphics that people understand, Beverly: Rockport Publishers.

14. Mangal, S.K. (1990) General Psychology. New Delhi: Sterling Publishers Pvt. Ltd.

15. Messaris, Paul (1997). Visual Persuasion – The Role of Images in Advertising, London: Sage Publications.

16. Niekamp, Walter (1981) "An Exploratory Investigation into Factors Affecting Visual Balance," Educational Communications and Technology 29 (1981): 37–48. (Niekamp, 1981)

17. Patterson, J., & Kim, P. (1991). The day America told the truth. New York: Plume.

18. Rathus, L. F. (2011) Foundations of Art and Design: An Enhanced Media Edition San Francisco, CA: Cengage Learning

19. Tipples, Jason (2002)"Eye Gaze Is Not Unique: Automatic Orienting in Response to Uninformative Arrows," Psychonomic Bulletin & Review 9 (2002): 314–318. (Jason, 2002)

# DEEP LEARNING FOR SENTIMENT ANALYSIS: A REVIEW

**A. Save* and N. Shekokar**

Computer Engineering Department, University of Mumbai, India

*ashwini.save@gmail.com

_____

## ABSTRACT

*The intriguing challenges of performing sentiment analysis has kept the researchers on their toes. Because of this sentiment analysis has been a very active area of research in the present times. And, the other reason why analyzing user sentiments has been an active area of research in recent times is the varied applications it has in the corporate sector. In fact, it would not be wrong to say that many businesses have flourished and prospered only on analysis of sentiments. Consequently, many techniques have been experimented for undertaking effective sentiment analysis. Techniques such as Natural Language Processing, and Machine Learning techniques have been employed for performing intuitive sentiment analysis. The recent successes of Deep Learning techniques in many different domains have mandated its experimentations in the sentiment analysis domain as well. Even in the sentiment classification tasks, deep learning techniques have shown promising results. The paper performs a detailed and critical review of recent experimentations carried out for sentiment classification using various deep learning techniques..*

_____

*Keywords: Sentiment Analysis, Deep Learning, RNN, CNN and RCNN*

## Introduction

The number of people logging onto the internet has been growing at an unprecedented rate, especially in the past decade. Also, with the advent of smart phone technology and incremental growth in new network technology have played a very crucial role in lending a helping hand in this exponential growth in the internet user base.

With the rapid innovation in new networking technologies the cost of accessing and using the internet has reduced considerably. On the other side the internet speed has gone up exponentially as well. In the present times most of the people have smart phones and a high speed internet connection to go along with it.

As a matter of fact, from Fig. 1 it can be seen that in the year 2020 more than 4.79 Billion people are using internet, which is around 61.4% of the world's population . With India alone accounting for more than 566 Million.

This exponential growth in the internet users has led to an unprecedented growth of data generated on the internet. This data is useless if relevant information is not extracted and used in decision making process. And, extraction of relevant information is very crucial for corporations who are in the retail business space. The reason for this is, it has been observed that people are exceedingly sharing their experiences on the products that they have bought.

So, it becomes extremely important for these companies to scan these reviews and extract actionable intelligence from these reviews from the customers. Extracting relevant information from the thousands and thousands of reviews which are written daily manually is tedious task and prohibitively expensive.

Hence, a method or technique is required which can automatically scan through these reviews and extract actionable information. One such method which can be used for extracting relevant information is the field of Data mining, especially sentiment analysis. Sentiment analysis is a field of study which tries to identify the emotions or sentiments from the reviews of the customers.

Recent times has seen detailed research being carried out in the field of sentiment analysis. Even though sentiment analysis is specifically an application of Natural Language Processing, the popularity and effectiveness of using Machine Learning and Deep Learning techniques for conducting analysis of sentiments has mandated a deeper study and research into the use of these learning techniques for sentiment analysis.

Deep learning is a specialisation of machine learning. Deep learning techniques have been found to be very effective for texts, images and videos. So, this paper proposes to conduct a detailed critical review of deep learning

methods used for performing sentiment analysis.



Fig. 1: Worldwide social media users [1]

## 1.  Review of Deep Learning Techniques For Sentiment Analysis

One of the important advantage of deep learning techniques over conventional machine learning techniques is that deep learning techniques can extract deeper intuition information in much better manner. This is probably the reason why deep learning techniques have proved to be popular for performing research in sentiment analysis. This is because, proper feature extraction plays a key role in sentiment classification accuracy. And, as deep learning techniques perform feature extraction on their own and can extraction features with deep intuition, these techniques have generally produced very good sentiment classification results.

While working with deep learning techniques the architecture of the technique used, the type of dataset used and the type of word embedding technique employed plays an important role in determining the efficiency of the proposed system. So, among other things, the critical review has been carried out keeping this in mind.

All the different papers on sentiment analysis for deep learning can be categorized into five types as under.

### 1.1     Recurrent Neural Network and its Variants

One of the most important deep learning technique used for sentiment classification has been the Recurrent Neural Network and its variants, Long Short Term Memory and Gated Recurrent Unit. Qi Wang, et. al. propose to experiment with these different variants of recurrent neural network. The paper proposes to experiment with all the different variants of recurrent neural network, including long short term memory and gated recurrent unit.

The paper proposes to make use of the IMDB movie review dataset for experimentation. Also, the paper makes use of GloVe for converting the text into word vectors. After experimenting with the variants of recurrent neural network the paper then proposes to experiment with using convolution layer as a feature extraction layer. The paper claims that a combination of convolution layer and bi-directional long short term memory produces the highest accuracy of around 89%.

Lee Jun Sheng, et. al. propose develop a Gated Recurrent Unit based Recurrent Neural Network for Chinese texts. In order to do this the paper propose to develop dataset which would contain reviews on electronics items in the Chinese language. The paper then performs manual labelling of this dataset.

Before applying the gated recurrent unit the paper performs a few natural language processing tasks like tokenization and removal of stop words. The word embedding technique used has not been mentioned in the paper. The paper claims to produce an accuracy of 87.6%.

On the other hand, Chayapol Piyaphakdeesakun, et. al. aims to perform sentiment analysis for opinions mentioned in Thai language. In order to perform sentiment analysis the paper proposes to experiment with different combinations of deep learning techniques. After experimentations the paper concludes that for the developed dataset the accuracy result produced by Bi- Gated Recurrent Unit based Recurrent Neural Network are better at 91.85%, compared to other techniques.

The paper proposes to develop a dataset on its own by taking reviews from social media platform. Which social media platform has been primarily used for this data extraction has not been mentioned in the paper. Also, the paper claims that different deep learning techniques have been experiment with but, the details about the implementation has not been

provided as well. The type of word embedding technique has not been mentioned either.

S.Anbukkarasi and S. Varadhaganapathy propose to analyse sentiments texts expressed in Tamil language. For this purpose the paper makes use of Bi-directional Long Short Term Memory based recurrent neural network. The paper performs experimentation on simple Long Short Term Memory and Bi-directional Long Short Term Memory, it does not mentioned if any other deep learning model has been experimented with.

The paper mentions the importance of word embedding but, does not mention the word embedding technique used in the proposed system. The Tamil scripted reviews for sentiment classification has been collected and manually labelled for the experimentation purpose. The paper claims to have achieved an accuracy of 86.2%.

On a similar lines even Rahma M. Alahmary propose to experiment with simple Long Short Term Memory and Bi-directional Long Short Term Memory for sentiment classification. The difference is that the paper tests the effectiveness of Support Vector Machine as well. Also, the paper performs sentiment analysis for Saudi dialect.

The paper proposes to collect reviews from Twitter and create a dataset which would contain texts in Saudi dialect. The paper gives a lot of attention at the creating of the dataset, while also performing normalisation and removing stop words. The paper makes use of continuous bag of words for word embedding and claims to have an accuracy of 94%.

Whereas, Piyumal Demotte, et. al. are of the view that using state information will be beneficial for proper sentiment classification. So, the paper proposes to use State- Long Short Term Memory for binary classification of Sinhala text. The paper performs experiments on other deep learning techniques as well but, in the end shows that state- Long Short Term Memory performs better for Sinhala text.

The paper proposes to use the word frequency based word embedding technique. Word frequency is one of the most basic form of word embedding technique, the paper should have gone with more state of the art word

embedding technique. The paper claims to have produced an accuracy of 87.86% for the said deep learning model.

Ru Ni, and Huan Cao are of the opinion that both the Long Short Term Memory and Gated Recurrent Unit have different advantages which can be used appropriately. So, the paper propose to perform sentiment classification on IMDB dataset using these two techniques in series that is, forst the Long Short Term Memory units have been employed and then its output is fed to the Gated Recurrent Unit.

The paper claims to have achieved an accuracy score of 87.1% by using the proposed model with GolVe word embedding technique. It also rather interesting to note that the same paper mentions that simple Long Short Term Memory produced an accuracy of 87.16% which is higher than the proposed model. If this is true then it defeats the whole purpose of the system proposed in the paper.

Apart from the implementation of vanilla recurrent neural networks, long short term memory and gated recurrent are implimented. The reason for choosing these variants is the training speed. Some of the papers have implemented the bi directional versions of the same, one of the main reason for going for this is the ability of bi directions versions to retain contextual information over a large context.

## 2.2 Convolution Neural Network

Nguyen KhaiThinh, et. al. are of the opinion that convolution layer with the gated recurrent unit produces better results. The paper proposes to experiment with a combination of different deep learning techniques for sentiment analysis on the IMDB movie review dataset.

The paper claims that after detailed experiments it observed that using of convolution layer before the gate recurrent unit produces sentiment accuracy of 90.02%. The paper does not mention the type of word embedding technique used of the said experimentations. It can be assumed that the different use of word embedding is the only reason for higher classification accuracy.

On the other hand, Fang Wan proposes to experiment with effectiveness of using Deep

Neural Network in sentiment classification. Even though the paper pledges to experiment with deep neural network, instead the paper makes use of Convolution Neural Network for performing sentiment classification.

The paper focuses in the development of self-trained word2Vec for word embedding. For this paper proposes to make use of around 40000 reviews. The paper claims to have experimented with convolution neural network and produced a sentiment classification accuracy of 89.3%. But, the paper does not mention the dataset used for the experimentation.

The reason for specifically highlighting this is, in machine learning and deep learning the type and form of dataset plays a very important role in determine the accuracy of the system. This is because, a deep learning model's architecture will have to be tweaked in order to produce better results.

There are very few papers which have experimented with convolution neural network for sentiment analysis. One reason for not going for convolution neural network is that it cannot hold on to contextual information as much as recurrent neural network can. But, on the other hand it is faster than recurrent neural network, this is the main reason because of which in the next category recurrent neural network and convolution neural network.

### 2.3    Recurrent Neural Network and Convolution Neural Network

Mehmet Umut Salur and Ilhan Aydin propose to develop a hybrid system which makes the best of both the worlds, that is, the paper proposes to make use of both a full-fledged convolution neural network and a recurrent neural network in parallel. The paper proposes to perform feature extraction at the character level using the convolution neural network. And, feature extraction at the word level using the bi-directional long short term memory based recurrent neural network.

The paper proposes to perform these two tasks in parallel. Then, both the features extracted are concatenated and classification is performed. For the experimentation the paper makes use of the twitter reviews about mobile network operators in Turkish language. The paper claims to have experimented with different variants of recurrent neural network and for a combination of Convolution Neural Network and Bi-directional long short term memory in parallel the highest accuracy of 82.14% was achieved.

Similarly, even Siddhartha Mukherjee propose to work with a hybrid of Long Short Term Memory based Recurrent Neural Network and Convolution Neural Network in parallel. The main aim of the paper though is to work with data which contains Hindi and English codes in a same dataset. So, the paper proposes to develop a dataset which would contain Hindi and English code for the training purpose.

The paper proposes to make use of long short term memory and convolution neural network in parallel. After this, the extracted features are concatenated for sentiment classification. The paper mentions that word embedding has been used by taking Devnagari script and the English text but, does not mentioned which technique has been employed to train the word embedding model. Also, the paper fails to mention the dataset used for experimentations. Finally, the paper claims an accuracy of 69.85%.

Similarly, even Li Yang, et. al. propose perform sentiment analysis of reviews written in the Chinese language. In order to perform sentiment analysis the paper proposes to apply Convolution Neural Network and Bi-directional Gated Recurrent Unit based Recurrent Neural Network in series. First, the Convolution Neural Network has been applied. The result of this layer has been given to the Bi-directional Gated Recurrent Unit. After both these deep learning techniques finish operation classification task has been performed.

The paper mentions that the e-commerce reviews has been developed and used but, the domain and the source of the dataset has not been mentioned in the paper. The paper claims to have achieved an accuracy of around 93%.

It can be observed that when compared to only convolution neural network, when it is combined with recurrent neural network the

results obtained are comparatively higher.

### 2.4 Deep Learning and Machine Learning

Punit Dubey, et. al. propose make use of Deep Neural

Network and Support Vector Machine for sentiment analysis. The paper proposes to make use of deep neural network as the feature extraction step and the support vector machine technique has been used as a classification step for sentiment classification.

The paper makes use of continuous bag of words for embedding of the words. The paper claims to have experimented with the said architecture but, it does not mention the dataset used for the experimentation. Also, the paper claim to have good results but, does not mention the accuracy obtained. Because of this, there is no way to ascertain the effectiveness of the proposed architecture.

On the other hand, Yogesh Chandra and Antoreep Jana propose to make use of machine learning technique, a polarity based technique and also, deep learning technique, all in parallel. The paper is of the opinion that different dataset will have different characteristics and in some cases these characteristics are better handled by one of the mentioned technique and not by other, and in some other cases it will be other way round. So, in order to cover all the scenarios the paper proposes make use of all these three techniques.

The paper claims to have achieved an accuracy of 97%. But, even though the paper mentions the use of machine learning and polarity based technique it does not give the details about the actual technique employed in the proposed system. Only in with respect to the deep learning aspect the paper mentions that Long Short Term Memory has been used in the proposed system.

Machine learning have also been independently used, like or the. The results produced, for their respective dataset, ranges from 70s to 80s. But, it can be said that the introduction of deep learning techniques increase the accuracy scores.

The combination of machine learning technique and deep learning Technique has also produced good results. Most of the times the Deep learning techniques are used as a feature extraction step in machine learning predictions.

### 2.5 Hybrid Techniques

Siwei Lai, et. al. are of the opinion that while performing sentiment analysis the understanding of the contextual information by the learning is very important for more accurate classification. And, it is known that recurrent neural network can hold on to the contextual information over a longer period compared to convolution neural network, which doesn't deal with contextual information. But, it is also true that the performance of convolution neural network is better than recurrent neural network.

So, the paper proposes to make use of both these techniques. The paper proposes to remove convolution layer in the convolution neural network and replace it with bi-directional recurrent unit. By doing this the paper claims to not only hold on to the contextual information but also maintain the efficiency of a convolution neural network.

The paper performs experimentations on different datasets to check the efficiency of the proposed model and claims to have produced good accuracy scores. The highest accuracy score achieved is 96.46% for 20News dataset. This is one of the highest results received even when used on multiple testing data.

### 2. Analysis of Deep Learning Techniques in Sentiment Analysis

The papers reviewed can be generally categorised into five distinct categories, as shown in the Fig. 2. The first and most popular category is the Recurrent Neural Network and its variants. In this categories all the different variants of recurrent neural network has been included including the Long Short Term memory and Gated Recurrent Unit, with their respective bidirectional forms. The other categories include convolution neural network, recurrent neural network and convolution

neural network applied in series, a combination of deep learning and machine learning techniques and a hybrid model.

It can be observed that the recurrent neural network and its variants seem to be quite popular, and have been extensively used and researched for the purpose of sentiment analysis. One of the important reason for this can be attributed to the retention of context in recurrent neural network. For longer reviews understanding of the context plays an important in determining the actual user sentiments.

On the other side, while understanding and retention of the contextual information is very important, it is also true that the recurrent neural networks and its variants are take a lot of time for processing as the recurrent process is a linear process. In order to mitigate this drawback and speed up the processing convolution neural network have also been experimented with. But, convolution cannot retain contextual information.

A solution to the problem of slow speed of recurrent neural networks and non-retention of contextual information has been found out by paper which proposes a hybrid model. This hybrid model of applying the bi-directional recurrent structure layer in place convolution layer speed up the processing while retaining the contextual information as well.

Experimentations have been carried out by applying different algorithms together, like done by the papers applying recurrent neural network and convolution neural network in series or by the papers who have used both the machine learning and the deep learning algorithms.

**RNN and Variants**
- Sentiment Analysis of Reviews Based on Deep Learning Model [3]
- Sentiment Analysis of Chinese Product Reviews using Gated Recurrent Unit [8]
- Thai Comments Sentiment Analysis on Social Networks with Deep Learning Approach [10]
- Analyzing Sentiment in Tamil Tweets using Deep Neural Network [12]
- Sentiment Analysis of Saudi Dialect Using Deep Learning Techniques [13]
- Sentiment Analysis of Sinhala News Comments using Sentence-State LSTM Networks [14]
- Sentiment Analysis based on GloVe and LSTM-GRU [15]

**CNN**
- Sentiment Analysis Using Residual Learning with Simplified CNN Extractor [4]
- Sentiment Analysis of Weibo Comments Based on Deep Neural Network [5]

**RNN + CNN**
- A Novel Hybrid Deep Learning Model for Sentiment Classification [6]
- Deep Learning Technique for Sentiment Analysis of Hindi-English Code-Mixed Text using Late Fusion of Character and Word Features [7]
- Sentiment Analysis for E-Commerce Product Reviews in Chinese Based on Sentiment Lexicon and Deep Learning [9]

**DL + ML**
- Sentiment Analysis Using SVM and Deep Neural Network [11]
- Sentiment Analysis using Machine Learning and Deep Learning [16]

**Hybrid**
- Recurrent Convolutional Neural Networks for Text Classification [17]

Fig. 2: Categories of Deep Learning Techniques for Sentiment Analysis

The a deeper analysis of the above mentioned papers has been carried out in Tables 1, 2 and 3 on the basis of the type of deep learning technique used, the dataset used in the paper for experimentation, word embedding technique used, the number classes included for sentiment classification and finally the accuracy of the system claimed in the paper.

**Table 1: Analysis of deep learning techniques in sentiment analysis (A)**

|  | Sentiment Analysis of Reviews Based on Deep Learning Model [3] | Sentiment Analysis Using Residual Learning with Simplified CNN Extractor [4] | Sentiment Analysis of Weibo Comments based on Deep Neural Network [5] | A Novel Hybrid Deep Learning Model for Sentiment Classification [6] | Deep Learning Technique for Sentiment Analysis of Hindi-English Code-Mixed Text using Late Fusion of Character and Word Features [7] |
|---|---|---|---|---|---|
| Technique Used | Convolution layer and Bi-directional Long Short Term Memory | Convolution Neural Network | Convolution Neural Network | Convolution Neural Network and Bi-directional Long Short Term Memory in parallel | Long Short Term Memory |
| Dataset used | IMBD | IMDB | Not Mentioned | Self-created Turkish mobile network twitter dataset | Not mentioned |
| Word embedding technique used | GloVe | Not mentioned | Word2Vec | Word2Vec | Not mentioned |
| Number of Classes | 2 | 2 | Not mentioned | 3 | Not mentioned |
| Accuracy | 89% | 90.02 | 89.3% | 82.14% | 69.85% |

The title must be in 14 pt bold and be centered over both columns; the title should have 0 pts space above and 12 pts below. ery word in a title must be capitalized except articles, prepositions, and conjunctions.

**Table.2. Analysis of deep learning techniques in sentiment analysis (B)**

|  | Sentiment Analysis of Chinese Product Reviews using Gated Recurrent Unit [8] | Sentiment Analysis for E-Commerce Product Reviews in Chinese Based on Sentiment Lexicon and Deep Learning [9] | Thai Comments Sentiment Analysis on Social Networks with Deep Learning Approach [10] | Sentiment Analysis Using SVM and Deep Neural Network [11] | Analyzing Sentiment in Tamil Tweets using Deep Neural Network [12] |
|---|---|---|---|---|---|
| Technique Used | Gated Recurrent Unit | Convolution Neural Network and Bi-directional Gated Recurrent Unit | Bi-directional Gated Recurrent Unit | Deep Neural Network and Support Vector Machine | Bi-directional Long Short Term Memory |
| Dataset used | Self-created electronics dataset in Chinese | Self-created e-commerce dataset in Chinese | Self-created | Not mentioned | Self-created dataset from Twitter |
| Word embedding technique used | Not mentioned | BERT | Not mentioned | Continuous Bag of Words | Not mentioned |
| Number of Classes | 2 | Not mentioned | 2 | Not mentioned | Not mentioned |
| Accuracy | 87.6% | 93% | 91.85% | Not mentioned | 86.2% |

**Table.3. Analysis of deep learning techniques in sentiment analysis (C)**

| | Sentiment Analysis of Saudi Dialect Using Deep Learning Techniques [13] | Sentiment Analysis of Sinhala News Comments using Sentence-State LSTM Networks [14] | Sentiment Analysis based on GloVe and LSTM-GRU [15] | Sentiment Analysis using Machine Learning and Deep Learning [16] | Recurrent Convolutional Neural Networks for Text Classification [17] |
|---|---|---|---|---|---|
| Technique Used | Bi-directional Long Short Term Memory | State- Long Short Term Memory | Long Short Term Memory and Gated Recurrent Unit in series | Machine Learning, Polarity based method and Long Short Term Memory | Recurrent Convolution Neural Network |
| Dataset used | Self-created dataset from Twitter in Saudi dialect | News comments in Sinhala | IMDB | First GOP Debate, Bitcoin Tweets, and Live Twitter Data | 20News, Fundan, ACL and SST |
| Word embedding technique used | Continuous Bag of Words | Word frequency | GloVe | Not mentioned | Word2Vec |
| Number of Classes | Not Mentioned | 2 | 2 | 2 | |
| Accuracy | 94% | 87.86% | 87.1% | 97% | 96.49% |

From the review it can be understood that almost all the paper have performed multiple experimentations on different deep learning methods, this shows experimentations with dataset is important. But on the other hand, hardly any paper gives details about the architecture of the deep learning model developed. They do not mention the details about the number of layers nor do they divulge any details about the hyper parameters values used.

Also, either only two classification classes have been used for experimentation or the paper do not mention the number of classes taken at all. As the number of classes increases more there is more strain on the deep learning model and the accuracy score is adversely affected. Even though word embedding is an essential and an important task before applying any deep learning technique, it has been observed that not much importance has been given to word embedding technique. This is because, most of the paper do not mention the technique used of word embedding at all. It should be noted here that the same model will produce different accuracy scored for different dataset. A model performing on one dataset might fail miserably on another dataset.

## 3. Conclusion

Deep learning techniques like the recurrent neural network, convolution neural network and their variants have played a very promising role in the field of sentiment analysis. These techniques improved the efficiency of the systems while performing analysis of sentiments.

Understanding the importance of these deep learning techniques in sentiment analysis, a critical review has been carried out in this paper. From the detailed study it can be concluded that in sentiment analysis the understanding and storing of contextual information plays a very crucial role in determining the efficiency of the system in classifying the sentiments.

Even then, it can be seen that quite a few papers so not fully appreciate the importance of the model having the contextual information of the text under consideration for sentiment classification. Basic recurrent neural network, long short term memory and gated recurrent unit do hold contextual information but, this information is lost over a large text. It is also true that these variants of recurrent neural network takes a lot of time for training and testing that is, they are not efficient. So, it can be said that the paper

which proposes to not only hold contextual information but also, produce results in an efficient manner with very good accuracy across different dataset is an important contribution in the field of sentiment analysis.

## References

1. C. Piyaphakdeesakun, N. Facundes, and J. Polvichai, "Thai Comments Sentiment Analysis on Social Networks with Deep Learning Approach", IEEE 34th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC), 2019.

2. Editors, "Key Internet Statistics to know in 2020 (Including Mobile)" [Online]. https://www.broadbandsearch.net/blog/internet-statistics, Last accessed in 20th July, 2020.

3. F. Wan, "Sentiment Analysis of Weibo Comments Based on Deep Neural Network", IEEE International Conference on Communications, Information System and Computer Engineering (CISCE), 2019, pp. 626-630.

4. L. J. Sheng, D. Zuba and P. Yan, "Sentiment Analysis of Chinese Product Reviews using Gated Recurrent Unit", IEEE Fifth International Conference on Big Data Computing Service and Applications (BigDataService), 2019, pp. 173-181.

5. L. Yang, Y. Li, J. Wang, and R. S. Sherratt, "Sentiment Analysis for E-Commerce Product Reviews in Chinese Based on Sentiment Lexicon and Deep Learning", IEEE Access, Vol. 8, 2020, pp. 23522-23530.

6. M. H. Abd El-Jawad, R. Hodhod and Y. M. K. Omar, "Sentiment Analysis of Social Media Networks Using Machine Learning", IEEE 14th International Computer Engineering Conference (ICENCO), 2018, pp. 174-176.

7. M. Rumelli, D. Akkuş, Ö. Kart and Z. Isik, "Sentiment Analysis in Turkish Text with Machine Learning Algorithms", IEEE Innovations in Intelligent Systems and Applications Conference (ASYU), 2019, pp. 1-5.

8. M. U. Salur and I. Aydin, "A Novel Hybrid Deep Learning Model for Sentiment Classification", IEEE Access, Vol. 8, 2020, pp. 58080-58093.

9. N. KhaiThinh, C. H. Nga, Y. S. Lee, M. L. Wu, P. C. Chang, and J. C. Wang, "Sentiment Analysis Using Residual Learning with Simplified CNN Extractor", IEEE International Symposium on Multimedia (ISM), 2019, pp.335-338.

10. P. Demotte, L. Senevirathne, B. Karunanayake, U. Munasinghe, and S. Ranathunga, "Sentiment Analysis of Sinhala News Comments using Sentence-State LSTM Networks", IEEE Moratuwa Engineering Research Conference (MERCon), 2020, pp. 283-288.

11. P. Dubey, A. Mishra and B. K. Saha, "Sentiment Analysis Using SVM and Deep Neural Network", IEEE Third International Conference on Computing Methodologies and Communication (ICCMC 2019), 2019, pp. 952-957.

12. PTI. (2019, Mar 06). Internet users in India to reach 627 million in 2019: Report [Online]. https://economictimes.indiatimes.com/tech/internet/internet-users-in-india-to-reach-627-million-in-2019-report/articleshow/68288868.cms?from=mdr, Last accessed 16th Oct, 2019.

13. Q. Wang, L. Sun and Z. Chen, "Sentiment Analysis of Reviews Based on Deep Learning Model",IEEE/ACIS 18th International Conference on Computer and Information Science (ICIS), 2019, pp. 258-261.

14. R. M. Alahmary, H. Z. Al-Dossari, and A. Z. Emam, "Sentiment Analysis of Saudi Dialect Using Deep Learning Techniques", IEEE International Conference on Electronics, Information, and Communication (ICEIC), 2019.

15. R. Ni, and H. Cao, "Sentiment Analysis based on GloVe and LSTM-GRU", IEEE 39th Chinese Control Conference, 2020, pp. 7492-7497.

16. S. Anbukkarasi and S. Varadhaganapathy, "Analyzing Sentiment in Tamil Tweets using Deep Neural Network", IEEE Fourth International Conference on Computing Methodologies and Communication (ICCMC 2020), 2020, pp. 449-453.

17. S. Hemalatha and R. Ramathmika, "Sentiment Analysis of Yelp Reviews by Machine Learning", International Conference on Intelligent Computing and Control Systems (ICCS), 2019, pp. 700-704

18. S. Lai, L. Xu, K. Liu, and J. Zhao, "Recurrent Convolutional Neural Networks for Text Classification", Twenty-Ninth AAAI Conference on Artificial Intelligence, 2015, pp. 2267-2273.

19. S. Mukherjee, "Deep Learning Technique for Sentiment Analysis of Hindi-English Code-Mixed Text using Late Fusion of Character and Word Features", IEEE 16th India Council International Conference (INDICON), 2019.

20. Y. Chandra and A. Jana, "Sentiment Analysis using Machine Learning and Deep Learning", IEEE 7th International Conference on Computing for Sustainable Global Development (INDIACom), 2020, pp. 1-4.

# OPTIMIZED 2DOF-PIDN CONTROLLER BASED AGC SYSTEM OF A MULTI SOURCE THERMAL-HYDRO-WIND INTERCONNECTED RESTRUCTURED POWER SYSTEM

## E. Prakash and  I.A. Chidambaram
Department of Electrical Engineering, Annamalai University, Annamalainagar, Tamilnadu, India
elamprakash@gmail.com

_____

## ABSTRACT

*This paper proposes the two degree of freedom Proportional-Integral-Derivative with derivative Filter (2DOF-PIDN) controller based Automatic Generation Control (AGC) of a two-area multi-source thermal-hydro-wind interconnected restructured power system. A two degree of freedom controllers provides an output which is difference between a reference signal and a measured output of system and performs better in set point tracking and provides better regulation for disturbance input as compared with single degree of freedom controllers. The fundamental points of interest of the Proportional-Integral-Derivative (PID) controller are that a derivative mode improves the stability of the system. However, the derivative term will create the awkward size of control inputs to the plant. Also, it produces/propagates noise along with the control input signal resulting in large plant input signals. The practical solution for these issues is to put the first-order filter on the derivative term and tune its pole so that the controller response does not produce noise since it attenuates high-frequency noise. In this examination, a 2DOF-PIDN controller are designed with filter in the derivative term and implemented as supplementary controller of AGC loop of a two-area thermal-hydro-wind interconnected restructured power system. The control parameters of the 2DOF-PIDN controller are tuned using Buzzard Optimization Algorithm (BUZOA) and its performance is compared with PI and PIDN controller. Further, this study has been carried out to evaluate power system Ancillary Service Requirements (ASR) indices based on the AGC assessment are processed relies upon the dynamic response of the control input deviations and change in power generation of Gencos of each area. Simulation results show that the proposed BUZOA tuned 2DOF-PIDN controller improves the dynamic output response of the test system in terms of less peak deviation and settling time of area frequencies and tie-line power oscillations of the a two-area multi-source thermal-hydro-wind interconnected restructured power system as compared with PI and PIDN controller and guarantee to improved ASR indices so as to upgrade the system stability.*

_____

*Keywords:  AGC, Buzzard Optimization Algorithm, PI, PIDN, 2DOF-PIDN controller*

## 1. Introduction

The essential responsibility of Automatic Generation Control (AGC) is used to maintain the system frequency associated with tie-line power deviations. These deviations are the roots of deviations with generation and load demand. On this occasion the deviations are kept unnoticed, at that point, it might prompt severe undesirable impacts. In the current situation, the power system course of action comprises the mass of generating utilities interconnected together through tie-lines. The advanced power system usually comprises of various interconnected subsystems with tie-lines. For each part of the subsystem is necessitates to incorporating the matching system generation with system load used to control the system frequency. Restoration of system frequency used with ostensible value needs supplementary control action which regulates the load reference set point through the speed changer mechanism. Therefore, the

problem of AGC can be classified into fast primary control and slow secondary control modes. The fast primary control (governing mechanism) mode tries to reduce the frequency deviations along with the time constant in the order of seconds. But, primary control does not assure the zero steady-state error. The slow secondary control channel (supplementary control), with time constants in the order of minutes, normalizes the generation to gratify some loading requirements and contractual tie-line loading agreements. The best performance of the AGC in any power system stands on the proper design of both primary and secondary control loops.

The AGC action is synchronized by the Area Control Error (ACE) with the aid of system frequency and tie-line flows. In every zone, AGC monitors the system frequency and tie-line flow and works out the net change in the generation required based on the change in demand along with the changes in the set position of the generators within the area used

to keep the time average of the ACE at a low value. In this manner, ACE is described as a linear combination of power net-exchange and frequency deviations considered as the controlled output of AGC. As the ACE is headed to zero by the AGC, frequency and tie-line power errors will be compelled to zeros. The regular AGC two-area interconnected power system is altered to consider the activity of AGC in an open market power system. Open transmission with other socialized companies for generation, transmission, and distribution affects the design of the AGC problem to house the new constraints along with the territorial functionality of each company. So the usual AGC two-zone interconnected power system is manipulated in accordance with the effect of bilateral contracts on the dynamics.

In perspective on the bilateral transactions, a distribution company (Disco) has the chance to contract with any open generation company (Genco) in its own one of a kind or another control zone. In this manner, the idea of the physical control region is supplanted by Virtual Control Area (VCA). The limit of a VCA is adaptable and encases the Gencos and the Disco related to the agreement. These examinations endeavor to correct the usual AGC system used to reflect on the impact of bilateral contracts on the dynamics, improve the dynamic and transient response of the system under different working conditions. Each control territory has its very own AGC and is in charge of following its own load and respecting tie-line power trade contracts with its neighbors. Starting at now, these trades are done under the supervision of the Independent System Operator (ISO). There can be distinctive combines the understandings between each Disco and available Gencos, on the other hand, each Genco can contract with various Discos. With the development of the Disco Participation Matrix (DPM) the visualization of contracts can be made easier. DPM is represented as an asymmetrical matrix constructed by the number of rows equal to the number of Gencos and the number of columns equal to the number of Discos in the system. Each element in the matrix is referred to a fraction of a total load contracted by a Disco (Column) towards a Genco (Row). The sum of all the entries in a column of this matrix is

unity. DPM proves the participation of a Disco in a contract with Genco.

The nominal operating point of a power system transforms from its predetermined value subjected to any disturbance due to the deviation made by the operating point in the ostensible system frequency and scheduled power trade to different areas which is unfortunate. Thus, an AGC scheme primarily integrates a suitable control system for an interconnected power system having the ability to bring the frequencies of every area and the tie-line power back to unique set point values or very closer to set point values successfully after the load change. Robust secondary controllers are important to retain a flat frequency profile. Several advanced controller structures and techniques have been proposed in the literature for AGC. Among the choice of secondary controllers, the most commonly employed is the conventional Proportional plus Integral (PI) controllers. These PI controllers are still popular in the power industry for frequency regulation even in any change in system operating conditions, new gain values can be computed easily even for multi-area power system. The PI controller is very simple for execution and gives a better dynamic response, but their performances deteriorate when the complexity in the system increases due to the natural impact of the disturbances. The fundamental downside of this PI controller is doesn't capable to predict the future errors of the system, can't eliminate steady-state oscillations and reduces settling time. Consequently, the overall stability system is relatively low.

The fundamental points of the Proportional plus Integral plus Derivative (PID) controller, a derivative mode improves the stability of the system and facilitates to increase in proportional gain and decreases in an integral gain which thusly expands the speed of the controller response. When the input signal has sharp corners, the derivative term will deliver unreasonable size control inputs to the plant. Additionally, any noise in the input signal will bring about enormous plant input signals that lead to confusion in pragmatic applications. The practical solution for this issue is forcing the first-order filter on the derivative term and

tunes its pole so that the chattering due to the noise does not occur since it attenuates high-frequency noise. A Proportional Integral Derivative with derivative Filter (PIDF) controller had been considered in that study. From literature survey the enhancement of power system performance not only depends on the control structure but also on the well-tuned controllers. This paper proposes the two degree of freedom Proportional-Integral-Derivative with derivative Filter (2DOF-PIDN) controller based Automatic Generation Control (AGC) of a two-area multi-source thermal-hydro-wind interconnected restructured power system. A two degree of freedom controllers provides an output which is difference between a reference signal and a measured output of system and performs better in set point tracking and provides better regulation for disturbance input as compared with single degree of freedom controllers. The control parameters of the 2DOF-PIDN controller are tuned using Buzzard Optimization Algorithm (BUZOA) and its performance is compared with PI and PIDN controller. Buzzard Optimization Algorithm (BUZOA) is one of the modern heuristic algorithms and has a great potential to solve complex optimization problems.

## 2. Design of 2DOF-PIDN Controllers Using Buzzard Optimization Algorithm

## 2.1 Control structure of 2DOF-PIDNcontroller

The degree of freedom of a control system is defined as the number of closed-loop transfer functions that can be adjusted independently. While designing a control system various performance criteria are to be satisfied so a two-degree-of-freedom control system naturally has advantages over the conventional single degree of freedom control system. The 2-DOF controller produces an output signal based on the difference between a reference signal and a measured system output. It computes a weighted difference signal for each of the proportional, integral and derivative actions according to the specified set point weights. The controller output is the sum of the proportional, integral and derivative actions on the respective difference signals where each action is weighted according to the chosen gain parameters. The structure of proposed parallel 2-DOF PIDN controller is shown in Fig.1, where $R(s)$ represents the reference signal, $Y(s)$ represents the feedback from measured system output and $U(s)$ represents the output signal, $K_P$, $K_I$ and $K_D$ are the proportional, integral and derivative gains respectively, $P_W$ and $D_W$ are the proportional and derivative set point weights respectively, and $N$ is the derivative filter coefficient. A block diagram of 2-DOF control system is shown in Fig.2.
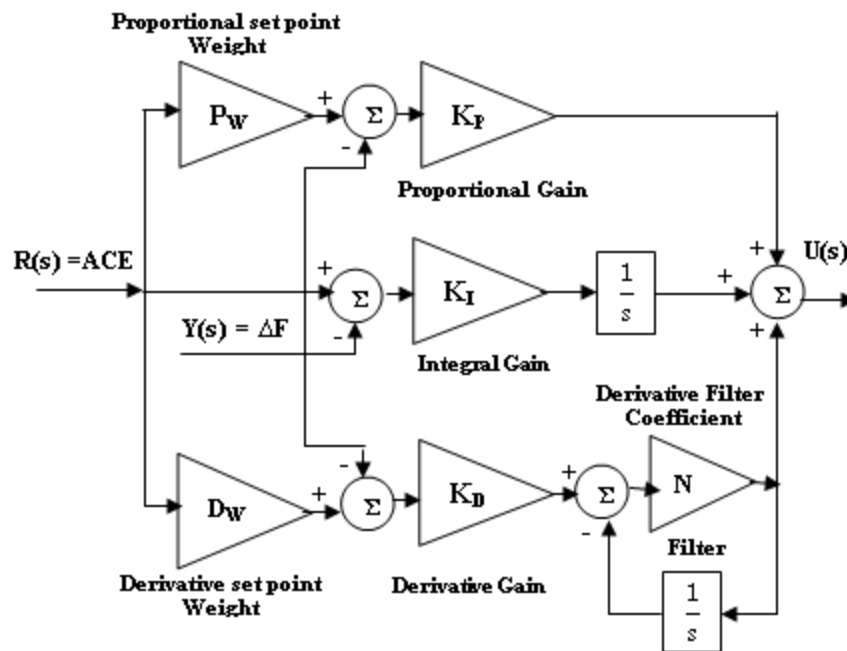


Fig. 1 Block diagram for 2 DOF-PIDN controller
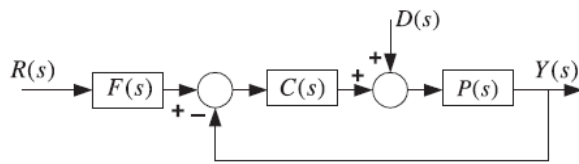
Fig. 2 Block diagram for 2 DOF control system

In this Fig 2, C(s) is a single degree-of-freedom controller, D(s) is the load disturbance and F(s) acts as a pre filter on the reference signal. For a parallel two-degree-of-freedom PIDN controller, C(s) and F(s) are given by:

$$F(s) = \frac{(P_W K_P + D_W K_D)s^2 + (P_W K_P N + K_I)s + K_I N}{(K_P + K_D N)s^2 + (K_P N + K_I)s + K_I N} \quad (1)$$

$$C(s) = \frac{(K_P + K_D N)s^2 + (K_P N + K_I)s + K_I N}{s(s+N)} \quad (2)$$

The main function of the AGC system is to control the load-frequency and tie-line power during load disturbance. So the error signal of frequency and tie-line power are utilized as design criteria to tune the 2DOF-PIDN controller. This error signal is used to produce the individual ACE signal as in the regular circumstance.

$$ACE_1 = \beta_1 \Delta F_1 + \Delta P_{Tie12}^{Error} \quad (3)$$

$$ACE_2 = \beta_2 \Delta F_2 + a_{12} \Delta P_{Tie12}^{Error} \quad (4)$$

The error inputs to the controllers are the individual ACE signals is given by Eqn. (3) and (4). The BUZOA technique is used to decide the optimal parameters of 2DOF-PIDN controllers with the goal to limit integral square of ACE signal, which can be detailed in an accompanying way: The performance of these responses is measured using performance functions such as Integral of Squared Error (ISE) given by

$$J_i = \int_0^{t_{sim}} [(ACE_i)^2] \, dt \quad (5)$$

The problem constraints are the proposed controller parameter bounds. Therefore, the design problem can be formulated as,

$$Minimize J_i \quad (6)$$

Subject to

$$K_P^{min} \le K_P \le K_P^{max}, K_I^{min} \le K_I \le K_I^{max}, K_D^{min} \le K_D \le K_D^{max}, N^{min} \le N \le N^{min}, P_W^{min} \le P_W \le P_W^{max}, D_W^{min} \le D_W \le D_W^{max} \quad (7)$$

## 2.2 Buzzard Optimization Algorithm based design of 2DOF-PIDN controller

Buzzard Optimization Algorithm (BUZOA) is one of the modern heuristic algorithms and has a great potential to solve complex optimization problems. This algorithm is modeled by paraphrasing and simulated with the behavior of collective flight (group) buzzards (vultures). A piece member in same group is presented by the ability vector and the position vector in all the search space. The time iteration has presented the new position of a particle by the position vectors and the ability vectors in the search space. The new and next position of a particle, regarding the current ability vector, and the best position founded by that particle and the best particle in the same group in the turkey buzzards position is updated in the each iteration. Let us assume $d$ -dimensional buzzard search space. $i$ -th particle is described by the vector of position $L_i$ as follows in this $d$ -dimensional space:

$$L_i = (l_{i1}, l_{i2}, l_{i3}, \ldots \ldots l_{id}) \quad (8)$$

$C$ -vector is the ability of smell, and the ability of taste for the $i$ -th particle is defined by the vector $C_i$ as follows:

$$C_i = (c_{i1}, c_{i2}, c_{i3}, \ldots \ldots c_{id}) \quad (9)$$

The best position which $i$ -th particle is found is thevector $C_{i,best}^*$ and are shown as follows:

$$C_{i,best}^* = (c_{i1}^*, c_{i2}^*, c_{i3}^*, \ldots \ldots c_{id}^*) \quad (10)$$

The best position that has found the best particle inthe whole particle is $C_{g,best}^*$ and defines as follows:

$$C_{g,best}^* = (c_{g1}^*, c_{g2}^*, c_{g3}^*, \ldots \ldots c_{gd}^*) \quad (11)$$

The best position in the whole particle is $C_{g,best}^*$, achieve the best position of each particle $C_{i,best}^*$ and best position among all particles $C_{g,best}^*$, we select the position of each particle as the best location achieved for that particle in the first iteration ($t=1$).

$$C_{i,best}^* = L_i(t), \qquad i = 1, 2, 3, \ldots d \quad (12)$$

$$cost (C_{i,best}^*) = cost (L_j(t)) \quad (13)$$

The changing location and cost of each particle in the process iteration algorithm as follows.

$$\begin{cases} \quad if cost\left(\left(L_i(t)\right) < cost\left(C_{i,best}^*\right)\right) \Rightarrow \\ \qquad else\ Not\ change \\ cost\left(C_{i,best}^*\right) = cost\left(L_j(t)\right)\ i = 1,2,3\dots d \\ \qquad\qquad C_{i,best}^* = L_i(t) \end{cases}$$

(14)

To update the location of each particle, the followingequations are used:

$L_1(t) = \alpha_1 L(t-1) + \alpha_2 * rand * (C_{g,best}^* - C_i(t-1))$   (15)

$L_2(t) = L_1(t) + \beta * rand_1 * (C_s(t) - Cit-1+1-\beta*rand2*Cvt-Cit-1+\gamma*rand1*\left(C_{g,best}^* - C_i(t-1)\right) + (1-\gamma) * rand_2 * \left(C_{g,best}^* - C_i(t-1)\right)$   (16)

$L_i(t) = L_i(t-1) + C_i(t)$   (17)

$\alpha_1$: the inertia weighting factor, used in the insider path and $\alpha_2$, $\beta$ and $\gamma$ are define the training constant coefficient. $rand_1, rand_2$ are two random numbers with uniform distribution in interval 0 to 1. Updating the ability vector each particle is defined in term of bellow equation.

$C_1(t) = \alpha_1 C(t-1) + \alpha_2 * rand * (C_{i,best}^* - l_i(t-1))$   (18)

$C_2(t) = C_1(t) + \beta * rand * (C_s(t) - Cit-1+1-\beta*rand*Cvt-Cit-1+\gamma*rand*Cg,best*-lit-1$   (19)

$C_i(t) = C_i(t-1) + L_i(t)$   (20)

$C_i(t-1)$, is the ability vectors in repetition $(t-1)^{th}$ and $L_i(t-1)$ is the Position vector in repetition$(t-1)^{th}$. To prevent the excessive increase in the ability and speed of a particle, in the movement from one location to another

location, we limit the variation of the ability to the range $C_{min} \leq C \leq C_{max}$. $C_s$ is smell capability,$C_v$ is the vision capability and smell = 1-taste. The flowchart of Buzzard Optimization Algorithm is depicted in Fig.3.6. The ACE minimization for optimal estimations of controller's coefficients has been tackled utilizing the BUZOA technique. The general straight forwardness of this controller is a fruitful methodology towards the optimal transient response of the system under different sorts of possible exchanges in the restructured condition.

## 3. Modeling of a 2DOF-PIDN Controller Based Agc Loop of a Two-Area Multisource Interconnected Thermal-Hydro-Wind Restructured Power System

The power systems are integrating increasing levels of variable renewable energy resources in the electric power mix. Currently, many winds systems exist throughout the world and supply a significant portion of energy to the networks. Because variable renewable energy generation is variable and uncertain power systems with increasing shares of variable renewable energy require more flexibility to balance electricity supply and demand at all timescales. One measure of power grid reliability is the stability of a system's frequency at a desired level. This study addresses the impact of hydro and wind power generation on the AGC system of a two-area multi-source restructured power system. Each area has two Gencos and Discos. The Gencos in area-1 is a thermal reheat power plant unit and hydro power plant unit and area-2 is a thermal reheat power plant unit and wind power plant unit. Transfer function block diagram model of 2DOF-PIDN controller based AGC system for a two-area multi-source thermal-hydro-wind interconnected restructured power system is shown in Fig.3.
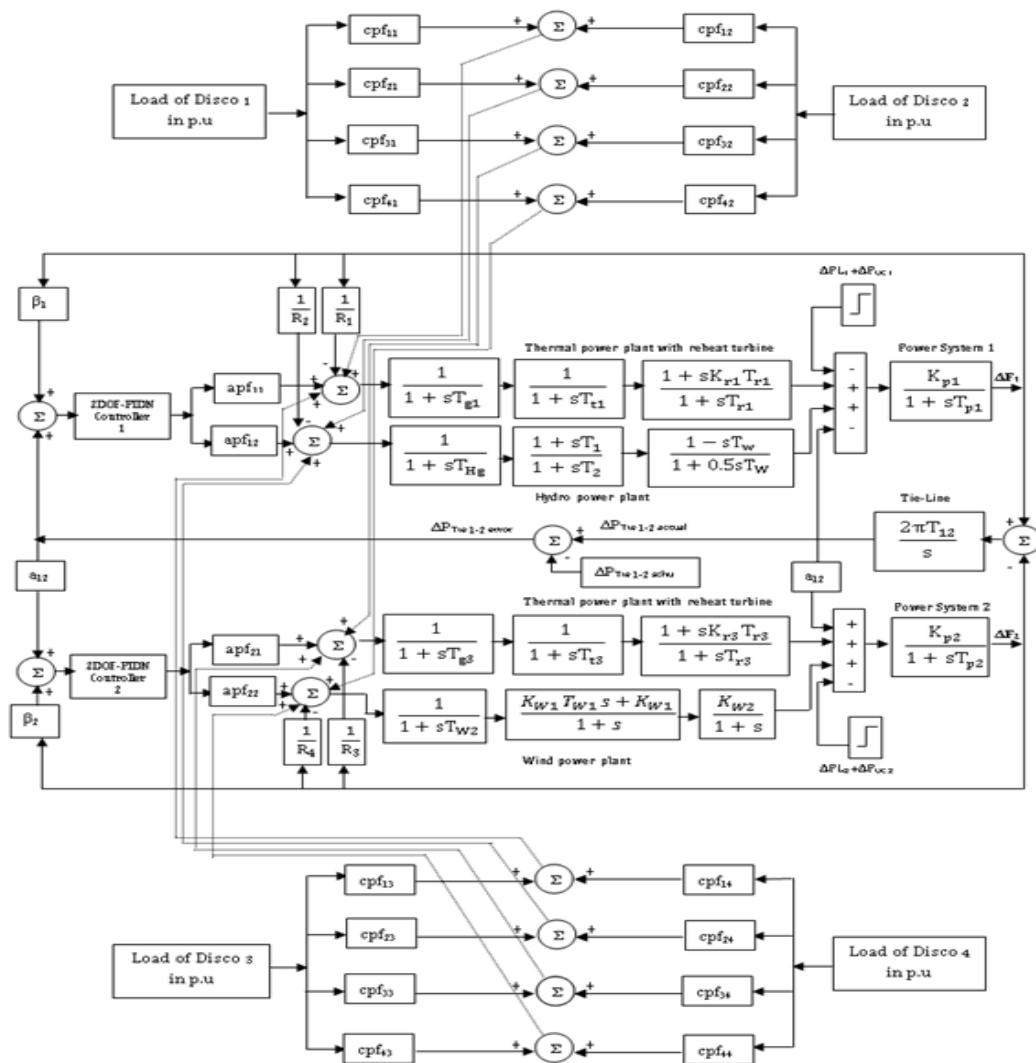
Fig. 3 Transfer function block diagram model of 2DOF-PIDN controller based AGC system for a two-area multi-source thermal-hydro-wind interconnected restructured power system

## 4. Evaluation of Power System Ancillary Service Requirements (ASR) Indices

Power system restoration is all around perceived as a significant undertaking to diminish the effect of a disturbance that happens in power systems. The significant level methodology of the systems restoration plan is to reestablish the respectability of the interconnection as fast as could be expected under the circumstances. The system restoration procedures are found firmly identified with the system characteristics. In the wake of investigating the conditions and characteristics of blackouts, system restoration organizers or dispatchers will choose the appropriate remedial measures using the power system ASR indices which were obtained with the dynamic response of the control input deviations and change in power generation of

Gencos of each area for different sorts of possible exchanges. The different power system Ancillary System Restoration indices ($ASR_1$, $ASR_2$, $ASR_3$, $ASR_4$, $ASR_5$ and $ASR_6$) are determined as pursues

Stage 1: The $ASR_1$ is obtained from the deviation of dynamic response with the change in control input of area-1 at peak time from the final value of the response

$$ASR_1 = \Delta P_{c1}(\tau_p) - \Delta P_{c1}(\infty) \quad 21)$$

Stage 2: The $ASR_2$ is obtained from the deviation of dynamic response with the change in control input of area-2 at peak time from the final value of the response

$$ASR_2 = \Delta P_{c2}(\tau_p) - \Delta P_{c2}(\infty) \quad (22)$$

Stage 3: The $ASR_3$ is acquired from the deviation of dynamic response with the change in power generation of $Genco_1$ to reach

the peak value for the first time from the final value of the response

$$ASR_3 = \Delta P_{G1}(\tau_p) - \Delta P_{G1}(\infty) \quad (23)$$

Stage 4: The $ASR_4$ is acquired from the deviation of dynamic response with the change in power generation of Genco$_2$ to reach the peak value for the first time from the final value of the response

$$ASR_4 = \Delta P_{G2}(\tau_p) - \Delta P_{G2}(\infty) \quad (24)$$

Stage 5: The $ASR_5$ is acquired from the deviation of dynamic response with the change in power generation of Genco$_3$ to reach the peak value for the first time from the final value of the response

$$ASR_5 = \Delta P_{G3}(\tau_p) - \Delta P_{G3}(\infty) \quad (25)$$

Stage 6: The $ASR_6$ is acquired from the deviation of dynamic response with the change in power generation of Genco$_4$ to reach the peak value for the first time from the final value of the response

$$ASR_6 = \Delta P_{G4}(\tau_p) - \Delta P_{G4}(\infty) \quad (26)$$

## 5. Simulation Results and Observations

In this examination AGC performance of a two-area multi-source thermal-hydro-wind power generating units of restructured power system using PI/PIDN/ 2DOF-PIDN controllers is considered. The model of the power system under investigation has been developed in the matlab / simulink environment. The parameters values of the two-area multi-source AGC system are given in the appendix. The proposed secondary controllers like PI, PIDN and 2DOF-PIDN are considered one at a time. The control parameters and gain values of the proposed PI/ PIDN/ 2DOF-PIDN controllers are optimized through BUZOA technique with the goal to limit the ACE signal for the two-area multi-source thermal-hydro-wind restructured power. The optimal solution of control inputs is taken an enhancement issue and the target work in Eqn (5) is inferred utilizing the frequency deviations of control areas and tie-line power changes. In the bilateral exchanges every one of the Discos has an agreement with the Gencos and the accompanying Disco

Participation Matrix (DPM) alluding is considered as

$$DPM = \begin{bmatrix} 0.4 & 0.5 & 0.2 & 0.2 \\ 0.3 & 0.3 & 0.1 & 0.1 \\ 0.2 & 0.1 & 0.5 & 0.4 \\ 0.1 & 0.1 & 0.2 & 0.3 \end{bmatrix} \quad (27)$$

For this situation, each Disco demands 0.25 pu.MW for each from Gencos as characterized by *cpf* in the DPM matrix and each Gencos takes part in AGC as characterized by the accompanying area participation factor apf$_{11}$ = apf$_{12}$ = 0.5 and apf$_{21}$ = apf$_{22}$ = 0.5. The BUZOA technique is used to optimize PI, PIDN and 2DOF-PIDN controller gain estimations of the test system is shown in Table 1. These controllers are executed in a proposed test system and compared with that of the PI and PIDN controllers. The comparative dynamic output responses of the area frequencies and tie-line power deviations of the test systems with various sorts of controllers have shown up in Fig.4. The setting time and peak over/under shoot of the area frequencies and tie-line power deviations of the test systems using PI, PIDN and 2DOF-PIDN controllers have appeared in Table 2. From the Fig 4 and Tables 2, it very well may be seen that the proposed 2DOF-PIDN controller have better dynamic responses of frequency deviations of each area and tie-line power deviations as far as settling time and peak over/under shoot are concerned when compared with that of PI/ PIDN controllers. The above analysis revealed that 2DOF-PIDN controller has less peak deviation, magnitude of oscillations, and faster settling time than PI/ PIDN controllers and shows superior performance for controlling of system oscillations.

The Comparison of dynamic responses of the change in control input deviations and change in power generation of each Genco for the test system using PI, PIDN and 2DOF-PIDN controller is shown in Figs 5 and 6. From the Figs 5 and 6, the different power system Ancillary System Restoration indices (ASR$_1$, ASR$_2$, ASR$_3$, ASR$_4$, ASR$_5$ and ASR$_6$) are determined using Eqn (21-26) of the test system with different PI / PIDN / 2DOF-PIDN controllers. The ASR indices of PI/ PIDN/

2DOF-PIDN controller based AGC system for the test system are recorded in the Table 3. From the Table 3, ASR indices the restorative measures like the change in control input deviations and change in power generation of Genco in each area can be adjudged. Likewise, the dynamic execution and ASR indices reflect that the 2DOF-PIDN controller based AGC loop of the test system had improved the dynamic responses of control input deviations and change in power generation of Genco in each area of the test system under various uncontract step load demand change conditions. Furthermore, the proposed 2DOF-PIDN controller-based two-area thermal-hydro-wind ensures improved ASR indices to provide reduce the restoration time, thereby improving the system reliability.

**Table 1 Optimal control parameters of the for the test system**

| Controllers | Gain and control parameters | Area-1 | Area-2 |
|---|---|---|---|
| PI | $K_{Pi}$ | 0.439 | 0.277 |
| | $K_{Ii}$ | 0.243 | 0.251 |
| PIDN | $K_{Pi}$ | 0.311 | 0.194 |
| | $K_{Ii}$ | 0.403 | 0.342 |
| | $K_{Di}$ | 0.589 | 0.401 |
| | N | 8.341 | 6.031 |
| 2DOF-PIDN | $K_{Pi}$ | 0.532 | 0.423 |
| | $K_{Ii}$ | 0.457 | 0.371 |
| | $K_{Di}$ | 0.643 | 0.617 |
| | N | 16.77 | 14.79 |
| | $P_{Wi}$ | 0.525 | 0.733 |
| | $D_{Wi}$ | 0.745 | 0.953 |
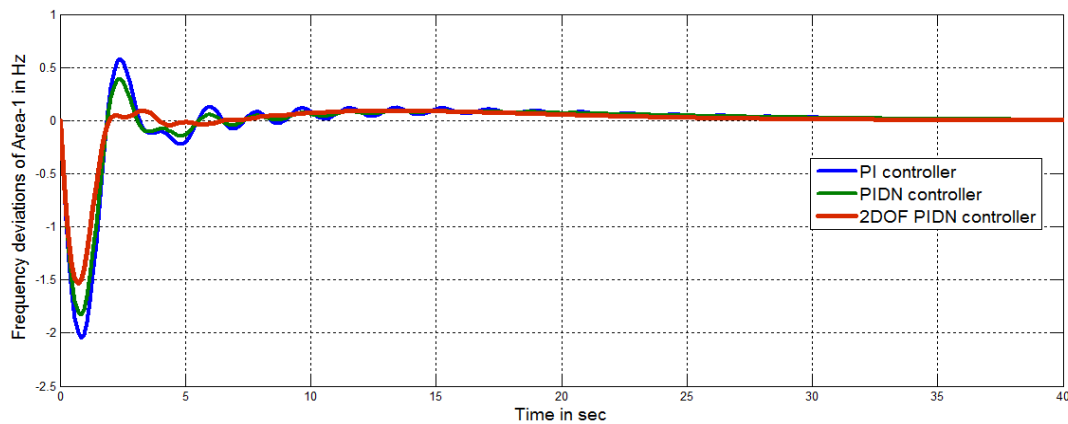


Fig. 4 (a) Dynamic responses of the frequency deviations of Area-1
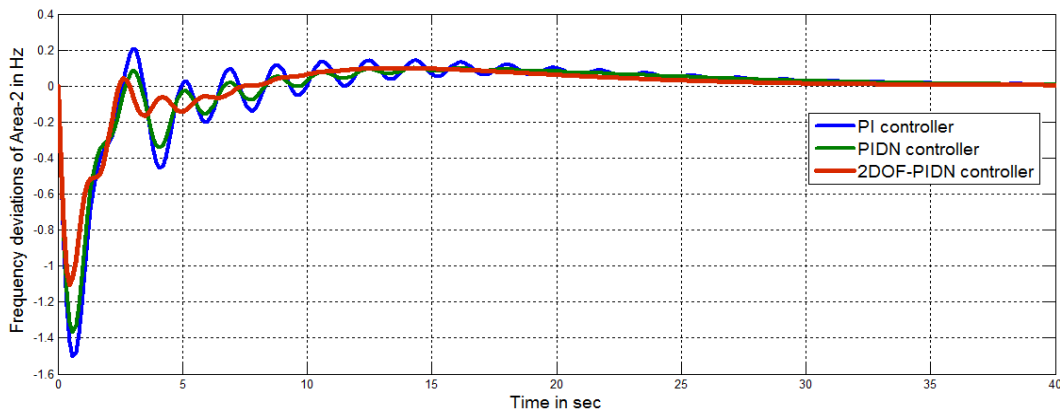


Fig. 4 (b) Dynamic responses of the frequency deviations of Area-2
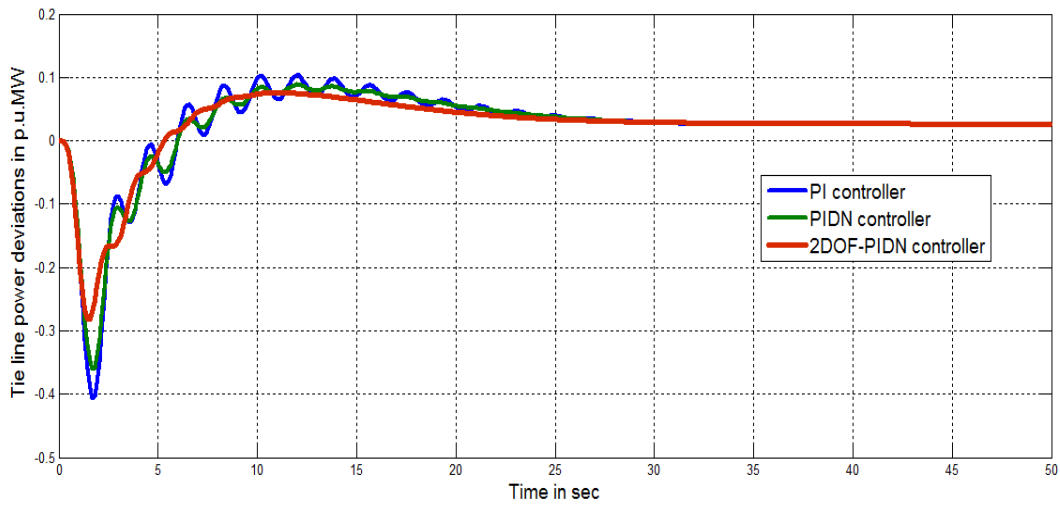
Fig. 4 (c) Dynamic responses of the Tie-line power deviations (actual)
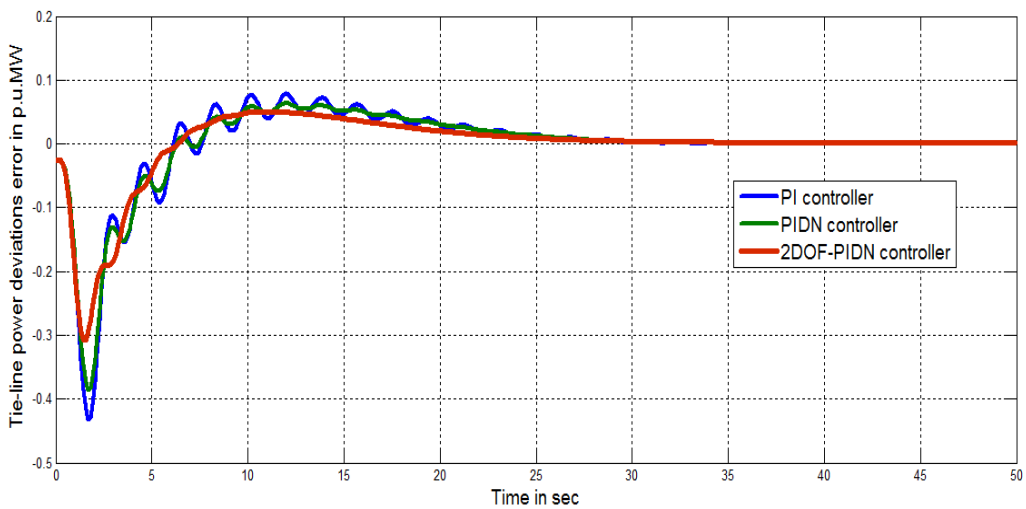


Fig. 4 (d) Dynamic responses of the Tie-line power deviations (error)

Fig. 4 Comparison of dynamic responses of the change in frequency deviations and tie-line power deviations for the test system using PI, PIDN and 2DOF-PIDN controller
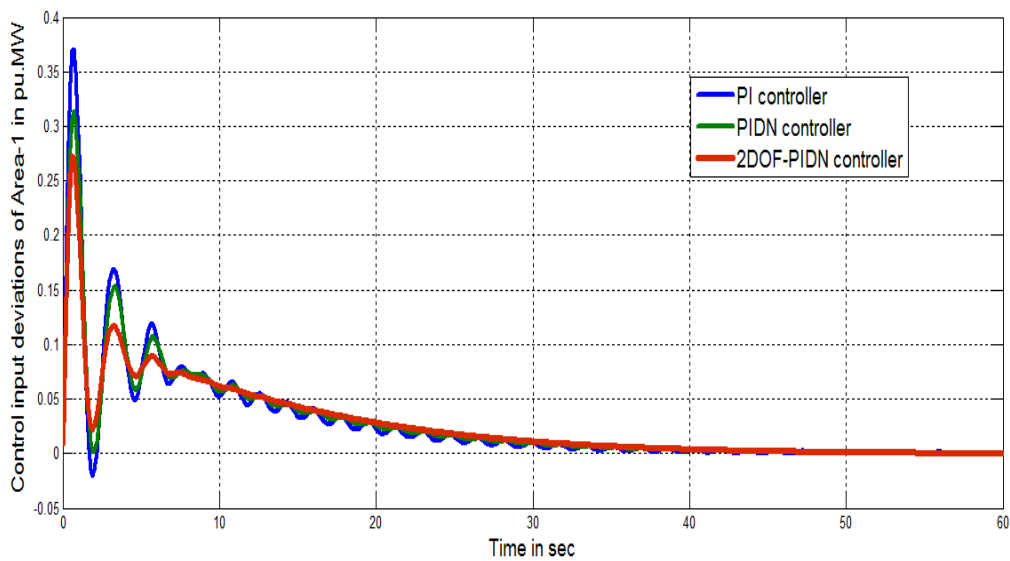


Fig. 5 (a) Dynamic responses of the control input deviations of Area-1
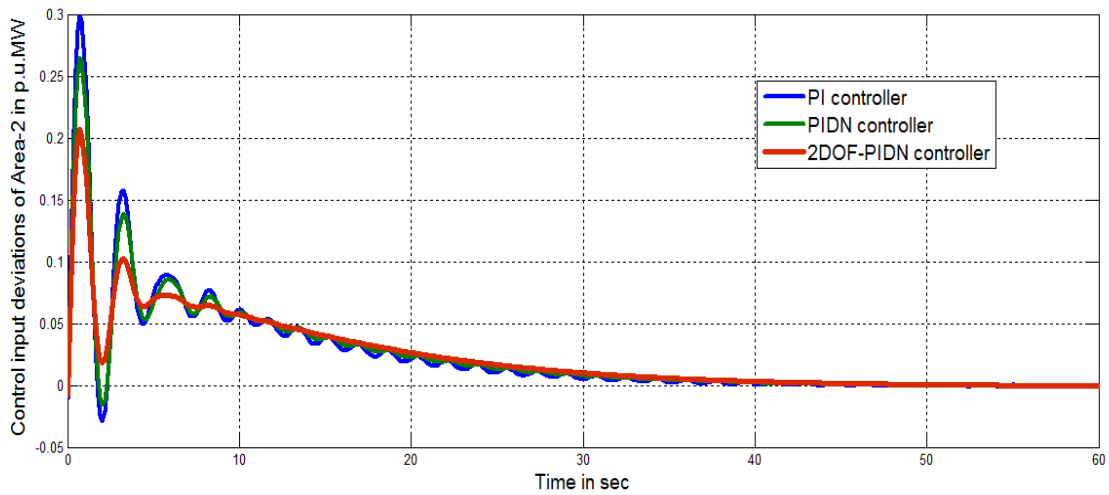
Fig. 5 (b) Dynamic responses of the control input deviations of Area-2

Fig. 5 Comparison of dynamic responses of the change in control input deviations for the test system using PI, PIDN and 2DOF-PIDN controller
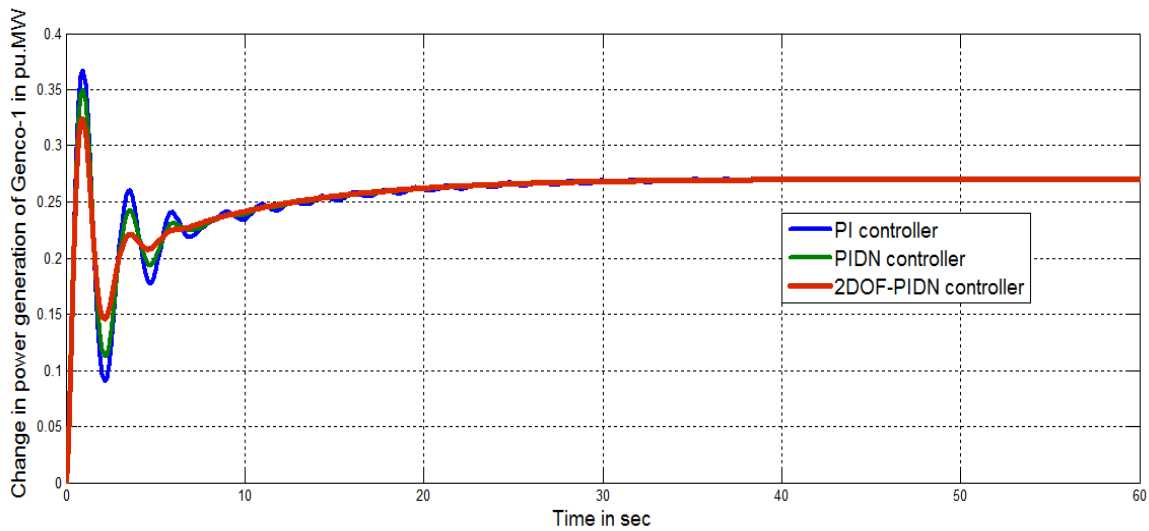


Fig. 6 (a) Dynamic responses of change in power generation of Genco-1
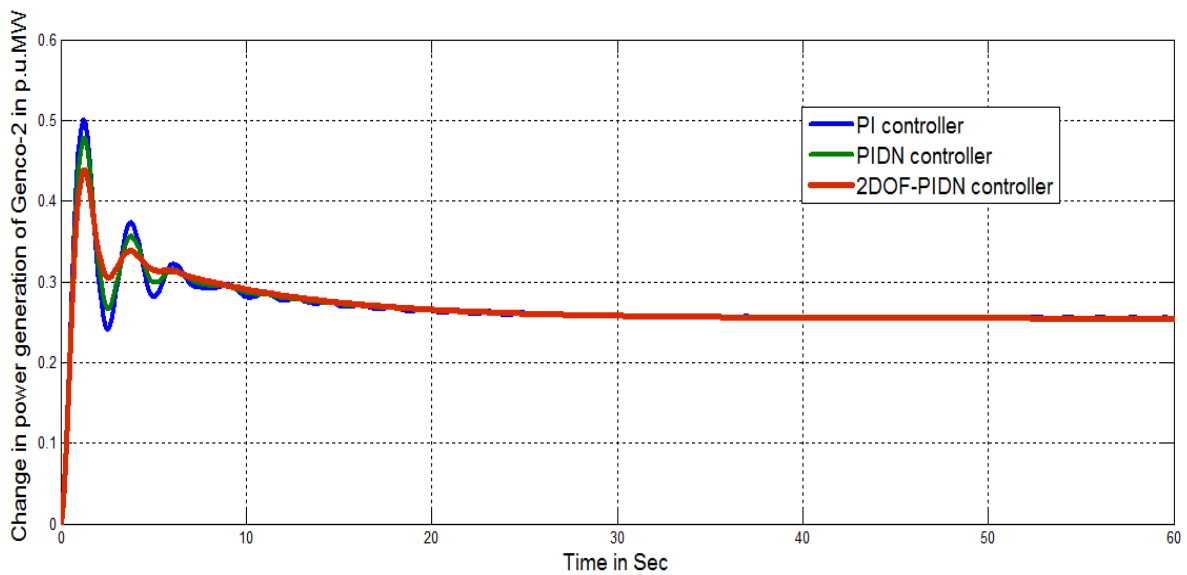


Fig. 6 (b) Dynamic responses of change in power generation of Genco-2
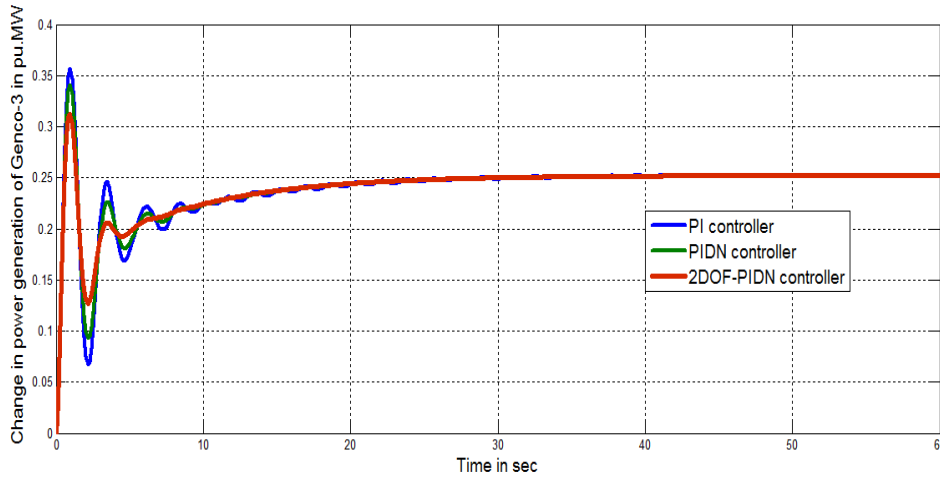
Fig. 6 (c) Dynamic responses of change in power generation of Genco-3
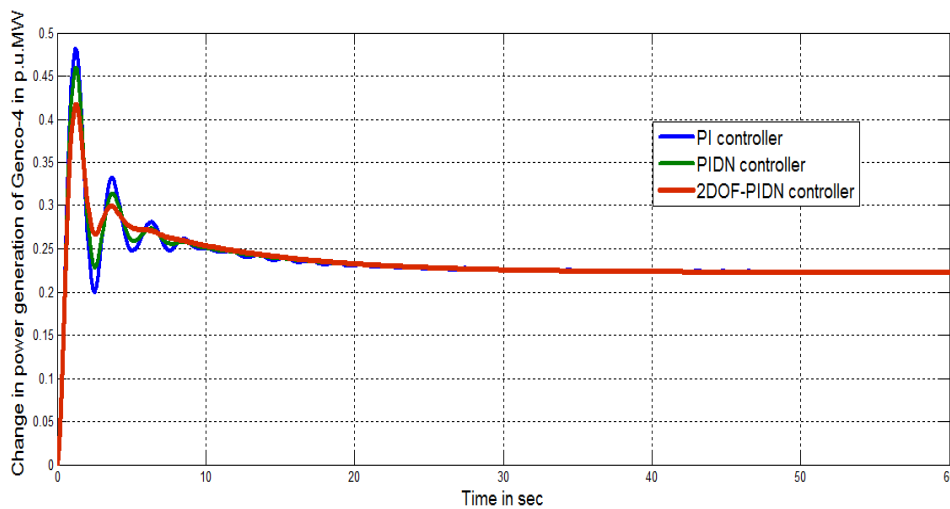


Fig. 6 (d) Dynamic responses of change in power generation of Genco-4

Fig. 6 Comparison of dynamic responses of the change in power generation of Genco for the test system using PI, PIDN and 2DOF-PIDN controller

**Table 2 Dynamic performances of area frequencies and tie-line power deviations of test system using PI/ PIDN/2DOF-PIDN controllers**

| Controllers | Settling time of test system | | | Peak over/under shoot of test system | | |
|---|---|---|---|---|---|---|
| | $\Delta F_1$ in sec | $\Delta F_2$ in sec | $\Delta P_{tie}$ in sec | $\Delta F_1$ in Hz | $\Delta F_2$ in Hz | $\Delta P_{tie}$ in p.u.MW |
| PI | 36.371 | 34.523 | 35.084 | 2.052 | 1.503 | 0.403 |
| PIDN | 29.743 | 30.301 | 26.804 | 1.806 | 1.368 | 0.361 |
| 2DOF-PIDN | 26.804 | 24.957 | 25.518 | 1.497 | 1.105 | 0.282 |

**Table 3 ASR indices of AGC loop for the test system using PI/ PIDN/2DOF-PIDN controllers**

| Controllers | ASR indices of AGC loop for the test system | | | | | |
|---|---|---|---|---|---|---|
| | $ASR_1$ | $ASR_2$ | $ASR_3$ | $ASR_4$ | $ASR_5$ | $ASR_6$ |
| PI | 0.371 | 0.299 | 0.367 | 0.501 | 0.356 | 0.479 |
| PIDN | 0.307 | 0.265 | 0.351 | 0.477 | 0.341 | 0.458 |
| 2DOF-PIDN | 0.271 | 0.206 | 0.303 | 0.438 | 0.312 | 0.416 |

## 6. Conclusion

The proposed 2DOF-PIDN controllers are designed utilizing BUZOA and implemented in a two-area multi-source thermal-hydro-wind restructured power system. Investigation reveals that the comparison of dynamic responses the proposed BUZOA tuned 2DOF-PIDN controllers exhibit quick, progressively precise and superior dynamic characteristics than that of the responses obtained using PI/PIDN controllers. It is also observed that the frequency deviations of every area and tie-line power deviations have been diminished regarding fewer peaks over / under shoot and decreased settling time as compared with PI / PIDN controllers. Furthermore, the restoration procedure for the 2DOF-PIDN controller's

based test system ensures improved ASR indices which give an extraordinary edge of robustness. These ASR indices indicate that the ancillary help necessary to improve the effectiveness of the physical activity of the power system with the expanded transmission limit in the network. The proposed 2DOF-PIDN controller's based AGC system for two-area thermal-hydro-wind interconnected restructured power system shows better execution to guarantee improved ASR indices so as to upgrade the system stability.

## 7. Acknowledgement

## References

1. Arshaghi, A., Ashourian, M. and Ghabeli, L., (2019), Buzzard optimization algorithm: a nature-inspired metaheuristic algorithm, Majlesi Journal of Electrical Engineering, Vol.13 (3), pp.83-98.

2. Baskar, B., Paramasivam, B., and Chidambaram, I. A., (2018), Ancillary Service Requirement based Automatic Generation Control Assessment in a deregulated power system with HES and IPFC units, Journal of Engineering Science and Technology, Vol.13(10), pp.3092-3115

3. Chidambaram, I.A. and Paramasivam, B., (2012), Control performance standards based load-frequency controller considering redox flow batteries coordinate with interline power flow controller, Journal of power sources, Vol.219, pp.292-304.

4. Donde, V., Pai, M.A. and Hiskens, I.A., (2001), Simulation and optimization in an AGC system after deregulation, IEEE transactions on power systems, Vol.16 (3), pp.481-489.

5. Fosha, C.E. and Elgerd, O.I., (1970), The Megawatt Frequency Control problem: A New Approach via Optimal Control Theory, IEEE Transactions on Power Apparatus and Systems, Vol. PAS-89 (4), pp. 563-574.

6. Pappachen, A. and Fathima, A.P., (2017), Critical research areas on load frequency control issues in a deregulated power system: A state-of-the-art-of-review, Renewable and Sustainable Energy Reviews, Vol.72, pp.163-177.

7. Pardeep Nain, Singh Parmar, K.P. and Singh, A.K., (2013) "Automatic Generation Control of an Interconnected Power System Before and After Deregulation", International Journal of Computer Applications, Vol. 61 (15), pp.11-16.

8. Ravi Shankar, Pradhan, S.R., Kalyan Chatterjee and Rajasi Mandal,, "A comprehensive state of the art literature survey on LFC mechanism for power system", Renewable and Sustainable Energy Reviews, Vol. 76, pp.1185–1207, 2017.

9. Sadia Firdous, Mohammed Abdul Rahman Uzair, (2015), Load Frequency Control Techniques, International Journal of Science, Engineering and Technology Research, Vol. 4(8), pp.2887-2893.

10. Sahu, R. K., Panda, S., and Padhan, S., "Optimal gravitational search algorithm for automatic generation control of interconnected power systems", Ain Shams Engineering Journal, Vol.5 (3), 721-733, 2014.

11. Sahu, R. K., Panda, S., Biswal, A., and Sekhar, G. C., "Design and analysis of tilt integral derivative controller with filter for load frequency control of multi-area interconnected power systems", ISA transactions, Vol.61, pp.251-264, 2016.

12. Saikia, L.C., Nanda, J. and Mishra, S., "Performance comparison of several classical controllers in AGC for multi-area interconnected thermal system", International Journal of Electrical Power & Energy Systems, Vol.33 (3), pp.394-401, 2011.

13. Sánchez, J., Visioli, A. and Dormido, S., (2011), A two-degree-of-freedom PI controller based on events, Journal of Process Control, Vol.21 (4), pp.639-651.

## 9. Appendix

### Table.1: Control area, Gencos parameters [3, 10]

| Parameters | Area1 | Area 2 |
|---|---|---|
| Area capacities | 1000 MW | 1000 MW |
| Rating of single generating machine | 500 MW | 500 MW |
| $K_p$ (Hz/p.u.MW) | 120 | 120 |
| $T_p$ (sec) | 20 | 20 |
| $\beta$ (p.u.MW / Hz) | 0.425 | 0.425 |
| R (Hz / p.u.MW) | $R_1=R_2=2.4$ | $R_3=R_4=2.4$ |
| $T_g$ (sec) | $T_{g1}= 0.08$ | $T_{g3} = 0.08$ |
| $T_t$ (sec) | $T_{t1}= 0.36$ | $T_{t3} = 0.36$ |
| $T_r$(sec) | $T_{r1}= = 10$ | $T_{r3}= 10$ |
| $K_r$ | $K_{r1}= 0.5$ | $K_{r3}= 0.5$ |
| Synchronising coefficient (p.u.MW / Hz) | $2\pi T_{12}=0.545$ | |
| System frequency (F) in Hz | 60 Hz | |
| Area participation factor (apf) | $apf_{11}=apf_{12}=apf_{21}=apf_{22}= 0.5$ | |
| Area capacity ratios | $a_{12} = -1$ | |
| Hydro power generating unit | $T_{Hg} =0.2$ sec, $T_1=0.513$ sec, $T_2=10$ sec, $T_w=1$ sec, | |
| Wind power generating unit | $T_{w1}=6.0$ sec, $T_{w2}=0.041$ sec $K_{w1}= 1.25$, $K_{w2}=1.4$ | |

# OPTIMIZED FREQUENCY AND POWER CONTROL STRATEGY FOR HYBRID ENERGY SYSTEM

## K. Kalpana and M.M.T. Ansari
Department of Electrical Engineering, Annamalai University, Annamalainagar, India

_____

## ABSTRACT

*Power and frequency stabilization arethe major factorsthat should be considered in hybrid energy systems to improve system efficiency. Due to economic reasons, wind-diesel hybrid energy systemsare widely adopted. The voltage and frequency of the system depend on the wind condition are deliberated while extracting the maximum power.Wind supply and its high penetration provide the required power to the load, but at low penetration of wind, the diesel generator is used to meet the required load. Moreover, a storage unit is connected to the system to store the energy and to meetout the power demand. However, wind turbine generator has fluctuations in its energy production and this leads to frequency deviation and power imbalance in the system. Suitable control strategies are essential to maintain the power balance and frequency changes. This research work proposed an optimization approach to manage the frequency and power control issues in the hybrid wind-diesel energy system using Grey Wolf Optimization. The optimization approach is used in the research work optimizes the fuzzy P-I-D (proportional–integral–derivative) controller parameters. The proposed optimization approach is experimentally verified and compared with the conventional PI controller, fuzzy controller, and fractional-order P-I-D Controller. Simulation outcomes demonstrate that the proposed control strategy is efficient for the hybrid system with better frequency control, power balance, and avoids system instability.*

_____

## 1. Introduction

Distributed generation system plays a vital role in energy management and provides a clean environment. To reduce the energy requirements from a single source, alternative technologies such as fuel cells, photovoltaic systems, wind turbines, diesel engines are introduced. In these, wind energy gets more attention in recent times and the technological advancement in the present era helps to achieve better power quality by integrating wind energy systems with existing systems. However, power quality and reliability are the major factors that should be considered while introducing new technologies. Since a single power source cannot meet the necessary demands, and the possibility of continuous supply is less. This leads to the invention of hybrid energy systems such as wind-diesel, wind –PV,etc., along with the battery to make sure the availability of energy sources. With the fast controllability and quick response time, diesel engines are mostly preferred for the integration of energy systems.

Diesel generators are widely used in remote locations to provide power where the grid is not available. But, due to environmental pollution and cost, it is essential to integrate a cost-effective system with diesel generators for an economic environmentally friendly energy system. Among all the renewable energy sources wind energy systems are widely integrated with diesel generators as it is suitable for remote locations. Integrating wind and diesel energy systems will be a better choice for isolated location energy requirements.Voltage and frequency controllers along with electronic converters are used to manage the load requirements. Under low wind conditions, load requirements are solved by using diesel generators.Since the wind speed is not linear and the speed mismatch introduces fluctuations in the output and it can be eliminated using diesel generators. An illustration of a wind-diesel hybrid energy system is depicted in figure 1.
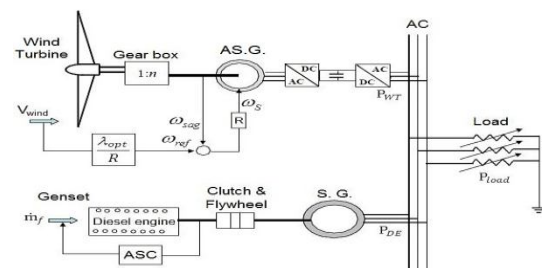


Figure1 Wind-Diesel Hybrid Energy system [3]

Integrated wind turbine generators (WTG) and diesel generators are widely used as hybrid approaches. However, the dynamics of both systems are different from each other. Hybrid systems are often designed with energy storage systems to store and distribute the generated power. This energy storage system is utilized to supply during the transients for a short duration. Frequency stability should be maintained to balance the demand and supply in an energy system and it is applicable for wind-diesel energy systems also. So it is essential to introduce an efficient control strategy while implementing the hybrid system. Various control schemes are followed in conventional hybrid energy systems such as PI, PID, fractional PID Fuzzy based models. Proportional Integral (PI) Controller is widely used in industrial applications.

The design and structure of the PI controller are simple and cost-effective. PI controllers eliminate the steady-state error and forced oscillations. However, for nonlinear and uncertain system conditions, the PI controller lags in performance. The integral model introduced in the controller has controlover the system speed and stability. Proportional Integral Derivative (PID) Controllers are employed as an industrial controller that has integral and differential regulator arrangements to optimize the system. PID controllers are also termed as incremental algorithm which has fast response compared to PI controller. It has different dynamic concepts such as D mode for a quick change of controller input, I mode for zero error by increasing the control signal, P mode to eliminate oscillations by applying actions inside the control system. The derivative mode of the PID controller increase system stability and gain.

The integral time constant increase the controller response and due to this reasons PID controller are widely adopted in hybrid energy systems. Low overshoot range and minimum settling time are the major advantages of PID controllers. Later fractional order PID (FOPID) controllers are introduced which is an extension of conventional PID controller which are less sensitive to parameter changes of a control system. The fractional-order helps the system to attain ISO damping easily. All the operations are usually represented in fractional order, so that other than proportional, integral, and derivative constants, the order of fractional integration and fractional derivative need to be considered in FPID controllers.

Other than PI, PID, and FOPID, fuzzy controllers are introduced which control the system based on fuzzy sets. A fuzzy controller doesn't require an accurate mathematical model and provides better results even for imprecise inputs. Compared to other controllers, fuzzy controllers perform better for complex, nonlinear systems. Based on the fuzzy sets, for the class of objects,the fuzzy controller provides a smooth transition between membership to non-membership functions. Considering this advantage of fuzzy controller, the proposed system is developed to optimize the fuzzy PID controllerto minimize the power and frequency deviations in the hybrid energy system.

The Research work is structured in the following manner: In section 2, detailed analysis of existing literaturein hybrid energy systems are presented, the proposed optimization approach using fuzzy PID controller is presented in section 3, and its experimental results, observations are presented in section 4 followed by conclusion in the last section.

## 2. Related Works

Recently, researchers pay more attention to increase the hybrid energy system performance by introducing innovative technologies. This section presents a literature analysis of existing systems to frame the motivation of the proposed work. The merits and demerits of existing models are analyzed systematically by discussing the key technology.

Power imbalance and frequency deviation are the two important factors considered in most of the research work proposed for a wind-diesel hybrid energy system. Suitable frequency control models are essential to obtain better power quality. Similarly, variables in a hybrid energy system such as dc-link capacitance, kinetic energy, operating region, wind penetration, turbine size, number of turbines, power reserve, power curve, and power droop control gain, etc., should be considered in a hybrid energy system design. To improve the load frequency control novel double equivalent

input disturbance controller (EID) is introduced in the literature [11]to fine-tune the WTG results by controlling the pitch angle. Another equivalent input disturbance controller is introduced to obtain balanced power output by adjusting the output power on the diesel generator side. Compared to the conventional PI controller, the EID controller attained better performance in a wind-diesel energy system.

Neural network and sliding mode method based control strategy is reported few research works to reduce the frequency deviation and load variance in a hybrid wind-diesel energy system. It is essential that the output power of diesel generators should be regulated, for that sliding mode control is introduced in literature. Pitch angle control is smoothened using the sliding mode to reduce the power fluctuations. The neural network model is used to observe the load variations. A combined approach attains better accuracy and stability for a hybrid energy system. The power management strategy is reported in the literature utilizes the ANFIS model to achieve power balance in microgrids. Along with the classification approach, Genetic algorithm and particle swarm optimization are incorporated to achieve robust power management and maximum PowerPoint in a hybrid wind-diesel-photovoltaic energy system. The minimized cost function is the major advantage of the optimization approach. The dynamic multi-stage decision model is reported in the literature to reduce the diesel running cost and to maintain the wind-diesel system. For optimized decisions, the path nature and wind power production are considered to reduce the fuel cost and system instability.

Fuel consumption is one of the cost increasing factors in a diesel generator. In order to reduce the consumption, air compression and storage at constant pressure approach is presented in literature. The production cost and pollution are reduced by introducing wind energy with diesel generators. In conventional systems, switch off the diesel generator on lower loads to prevent damage is not possible. Research work overcomes the limitation and provides a reliable power supply to the system. Similar air compression approach based energy

regenerative air storage is reported in literature which reduces the limitation of wind turbine systems in a hybrid wind-diesel energy model. Fuel consumption minimization and environmental benefits are the major advantages of the regenerative storage model. Maximum power point tracking without speed sensors is achieved in research work using perturb and observe method for fixed speed diesel generator and variable speed wind turbine. For three phase voltage source inverter, two control levels are introduced at a common coupling point for standalone system power requirements.

Optimization is widely adopted to increase the existing system performance. The controller parameters in hybrid energy systems are optimized using optimization algorithms. Various optimization algorithms such as particle swarm optimization (PSO), whale optimization genetic algorithm (GA), differential evaluation, other evolutionary algorithms are introduced to improve the controller performance . The performance of the proportional integral derivative (PID) controller is improved in literature utilized epsilon multi-objective genetic algorithm. WTGpitch angle is optimized to minimize mechanical stress and to reduce the power deviations. Moreover, the optimization approach regulates the charging level of the energy storage systems by decreasing the size and controls the overall system frequency.

Nomadic people optimizer is introduced in literature for a hybrid energy system as a tri-objective approach by considering the operators such as initial meeting, tent distribution, family search, leadership transition, and normal leaders periodic meeting. Life cycle cost minimization and $CO_2$ emission reduction are the major objectives of the Nomadic people optimizer. Operational and financial optimization of a renewable energy system is reported in the literature reduces the system electricity cost using mixer integer linear programming model. By sizing and scheduling the components, the power supply loss and maximum load capacity can be obtained using the approach. Accuracy and

efficiency are the major advantages of the optimization approach.

## 2.1 Research Motivation

Based on the above analysis the following observations are presented as the motivation behind the research work.

- Power imbalance and frequency deviation are mainly considered by the researchers.
- Traditional models are introduced to improve the performance,however; the performances are not satisfactory for large systems.
- Few research work utilized machine learning models such as ANN and ANFIS to classify the optimal parameters. though the performance is better, it could be further increased in optimization approaches.
- Further, to increase the hybrid system performance various meta-heuristic and nature-inspired algorithms are introduced.

## 2.2 Research Objective

Based on the above research findings, the objective of this research work is framed to improve the power and frequency factors of an isolated hybrid wind-diesel energy system using a Nature-inspired optimization model. for this the research work contributes the following

- Grey wolf optimization (GWO) is proposed to improve the power and frequency factors of an isolated hybrid energy system.
- The optimization approach is used to obtain optimal parameters of Fuzzy PID controllers for better performance.

## 3. Proposed Optimization Model

The proposed optimization model is aimed to optimize the fuzzy PID controller parameters. Before that, a hybrid wind-diesel energy system is formulated using first-order block diagram representation. the nature of wind power prediction is quite difficult so the diesel generator system is integrated with a wind turbine generator for clean energy generation and catering to the load demand. The power deviation is mathematically formulated as

$$\Delta P_{tot} = \Delta P_{Dg} + \Delta P_{wtg} - \Delta P_{Es} - \Delta P_{Load} \quad (1)$$

where$\Delta P_{Dg}$ is the output power deviation in diesel generator, $\Delta P_{wtg}$ is the output power deviation in wind turbine generator, $\Delta P_{Es}$ is the deviated power in the energy storage unit and $\Delta P_{Load}$ represents the power deviation in load. Figure 2 depicts the block diagram of the hybrid wind-diesel energy model. The generator systemon the diesel side is modeled based on figure 1 in the frequency domain as follows

$$\Delta P_g = \left(\Delta P_{c1} - \frac{1}{R_D}\right)\Delta F \quad (2)$$

$$\Delta P_{DgT} = \left(\frac{K_D(1+sT_{D1})}{(1+sT_{D2})(1+sT_{D3})}\right)\Delta P_g \quad (3)$$

$$\Delta P_{Dg} = \left(\frac{1}{1+sT_{D4}}\right)\Delta P_{DgT} \quad (4)$$

where the time constants are represented as $T_D$ and speed governor gain is represented as $K_D$, the frequency deviation is represented as $\Delta F$. Equation 4 represents the power deviation of the diesel generator. Similarly, for wind turbine generator, the power deviation is expressed as

$$\Delta P_{wtg} = K_g(\Delta F_T - \Delta F) \quad (5)$$

$$\Delta F_T = \left(\frac{1}{1+sT_{wg}}\right)\left(K_{tp}\Delta F_T - \Delta P_{wtg} + KPC\Delta x3 + \Delta Pw \quad (6)\right.$$

$$\Delta x_1 = \Delta P_{c2}\left[\frac{K_{P1}(1+sT_{p1})}{1+s}\right] \quad (7)$$

$$\Delta x_2 = \Delta x_1\left[\frac{K_{P2}}{1+sT_{p3}}\right] \quad (8)$$

$$\Delta x_3 = \Delta x_2\left[\frac{K_{P3}}{1+sT_{p3}}\right] \quad (9)$$

where the fluid coupling gain in a wind turbine is represented as $K_g$, pitch control is represented as $K_{PC}$, $K_{P1}$, $K_{P2}$ and $K_{P3}$ are the pitch responses, $\Delta F_T$ represents the frequency deviation over pitch response and frequency deviation is represented as $\Delta F$. Equation 5 represents the WTG power deviation. The power system is mathematically formulated as a complete system and it is expressed as

$$\Delta F = \left[\frac{K_p}{1+sT_p}\right]\Delta P_{tot} \quad (10)$$

where the gain of the power system is represented as $K_p$ and $T_p$ represents the time constant.
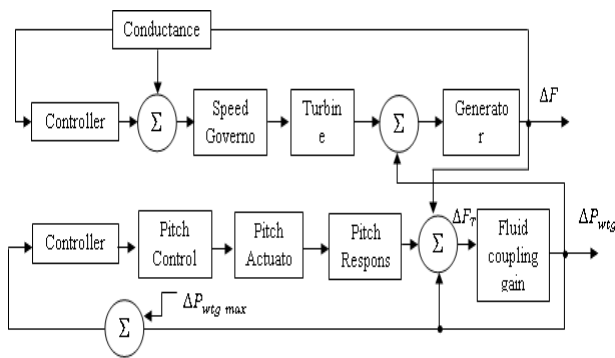
Figure 2 Block diagram of Hybrid Wind Diesel Energy Model

In order to optimize the controller parameters, grey wolf optimization is introduced to the hybrid energy system. Grey wolf optimization (GWO) is a metaheuristic optimization algorithm formulated based on grey wolf hunting strategies. Generally, wolves live as a group and a male will be a leader which is termed as alpha, and female wolves take the responsibilities such as place search, hunting, and alert other wolves, etc., Alpha decision will be final and all the members should obey the alpha decision. The hunting nature of wolves has three portions such as tracking the prey, encircling the prey, and attacking the prey.

Finding the best solution is the main objective of the wolf optimization model and the decision is provided by alpha which is considered as α, the next best solutions are obtained by females and other members in the group which is represented as β (beta) and δ (delta). All the other solutions are represented as ω(omega.) The hunting procedure will be formulated by α,β, and δ, the other wolves ω will follow the superior decision. wolves identify the prey and create a circle to observe the prey behavior and it is expressed as a vector function as

$$\vec{I} = \left| \vec{L}.\vec{P}_v(t) - \vec{P}(t) \right|$$
(11)

$$\vec{P}(t + 1) = \vec{P}_v(t) - \vec{I}\vec{L}$$
(12)

wherethe number of iteration is represented as $t$ and vector coefficients are represented as $\vec{I}$ and $\vec{L}$.. The vector position of the prey is represented as $\vec{P}_v(t)$ and $\vec{I}$ is the grey wolf present position and the new position is

obtained as $\vec{L}$. The new vector positions for the values of $\vec{I}$ $and$ $\vec{L}$ is given as

$$\vec{I} = 2\vec{x}.\vec{r_1} - \vec{x}$$
(13)

$$\vec{L} = 2.\vec{r_2}$$
(14)

where the vector values decrease from 2 to 0 for every iteration and position of random vector changes into [0,1] for $\vec{r_1}$ and $\vec{r_2}$. The position of wolves are considered as $(x, y)$ and the position of prey is considered as $(x',y')$. By regulating the vector positions $\vec{I}$ and $\vec{L}$ the best positions are obtained. The random values are obtained using grey wolves as nodes placed in a random position. α and β along with δ route the hunting operations.The hunting behavior is expressed as the best solution and its mathematically formulated as

$$\vec{I_\propto} = \left| \vec{L}.\vec{X}_\alpha - \vec{X} \right|$$

$$\vec{I_\beta} = \left| \vec{L}.\vec{X}_\beta - \vec{X} \right|$$
(15)

$$\vec{I_\delta} = \left| \vec{L}.\vec{X}_\delta - \vec{X} \right|$$

$$\vec{X_\propto} = \left| \vec{X} - I_1.(\vec{I_\propto}) \right|$$

$$\vec{X_\beta} = \left| \vec{X} - I_1.(\vec{I_\beta}) \right|$$
(16)

$$\vec{X_\delta} = \left| \vec{X} - I_1.(\vec{I_\delta}) \right|$$
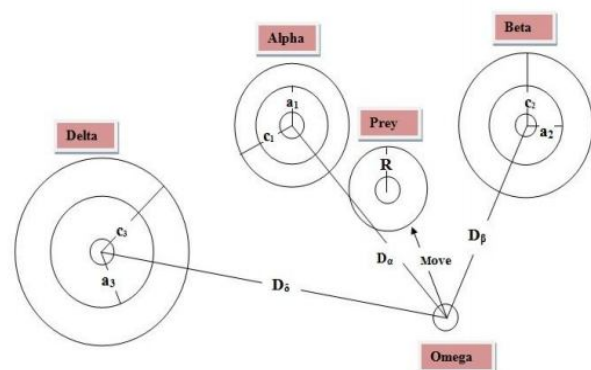


Figure 3GWO algorithm-position update process

The vector values of $x$are expressed in equation (16). Figure 3 depicts the attacking mechanism of grey wolves over the prey. the estimated position of the prey is updated immediately and the position of wolves is also changed based on the prey movement. The optimization process limits its local optima

based on the new solution. If the values of $|\vec{I}|>1$ then the process will be terminated and all the wolves will move away from the prey and start to search other decision spaces. The pseudocode of the grey wolf optimization process is summarized as follows.

| Pseudocode of the grey wolf optimization |
|---|
| Begin |
| Initialize the wolves population, α, β, and δ |
| Obtain the best solution for the search agent Xα |
| Obtain the second-best solution for the search agent Xβ |
| Obtain the third-best solution for the search agent Xδ |
| For t=0 |
| While (t < Max Iteration) |
| For each search |
| Update the position of search agent |
| End for |
| Update the position |
| Calculate the fitness function for search agents |
| Update Xα, Xβ, Xδ |
| End while |
| End |

The above optimization approach is incorporated to optimize the parameters of the fuzzy PID controller in a hybrid energy system. Based on fuzzy set theory, the logical conditions of fuzzy are derived. Using fuzzy logic, the parameters of the P-I-D controller are improved to regulate the frequency and power of the wind-diesel hybrid system as the Fuzzy PID model. The controller has three processesthat include a fuzzificationprocess, rule base and interface engine, defuzzificationprocess. Figure 4 depicts the fuzzy PID controller used in the proposed approach.Variable errors $E$ and change in error is represented as $\Delta E$ are considered as controller inputs in the proposed approach. PID parameters such as $K_p$, $K_I$ and $K_D$ are the outputs calculated based on the fuzzy controller.
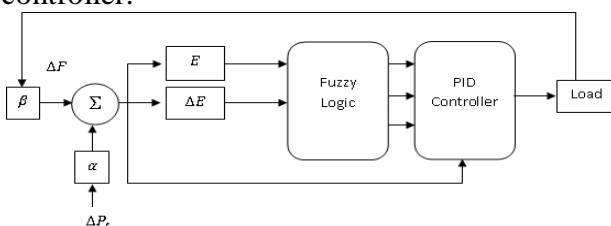


Figure 4 Fuzzy PID controller

The input signals for $E$ and $\Delta E$ with sampling time 0.01s are applied to the variables such as negative big (NB), negative small (NS), zero (ZE), positive small (PS), positive big (PB). The output variables for the control signals are expressed in terms of zero (ZE), positive small (PS), positive medium (PM), positive big (PB).

**Table 1. Fuzzy control Rules**
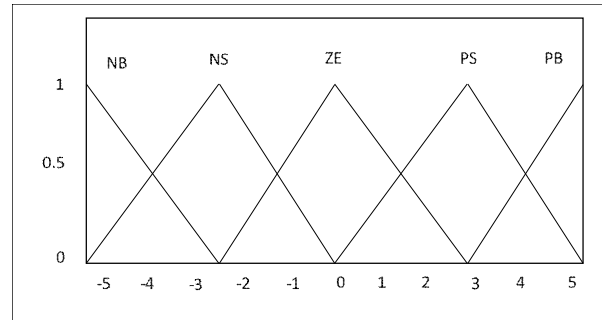


|  |  | E | | | | |
|---|---|---|---|---|---|---|
|  |  | NB | NS | ZE | PS | PB |
| ΔE | NB | PB | PB | PB | PB | PS |
|  | NS | PB | PM | PM | PB | PB |
|  | ZE | PB | PM | ZE | PB | PB |
|  | PS | PB | PM | PM | PM | PB |
|  | PB | PS | PB | PM | PM | PB |

Figure 5 Control input variables membership function

Figure 5 depicts the membership function input variables which are obtained based on the IF-THEN rule. In table 1 the relationship between error function and error deviationsare listed for the proposed approach.The Grey wolf optimization approach is used in the proposed model to obtain the Fuzzy PID controller optimal parameters. From the analysis, the frequency variation obtained as an error function should be minimized and it is obtained using PID control parameters $K_p$, $K_I$ and $K_D$.

## 4. Result and Discussion

The simulation model of the proposed hybrid energy system for power and frequency control is conducted to validate the efficiency of the optimization method. A 350kW diesel generator, 750kW wind turbine, are combined to design the hybrid wind-diesel energy

system, and the simulation is performed in MATLAB 14.1. Figure 6 depicts the simulation model of the wind turbine generator used in the proposed model. similarly, figure 7 depicts the simulation design of the controller

model. Proposed model performance is validated in two categories such as with optimization model and without optimization model to highlight the superior performance of the proposed approach.
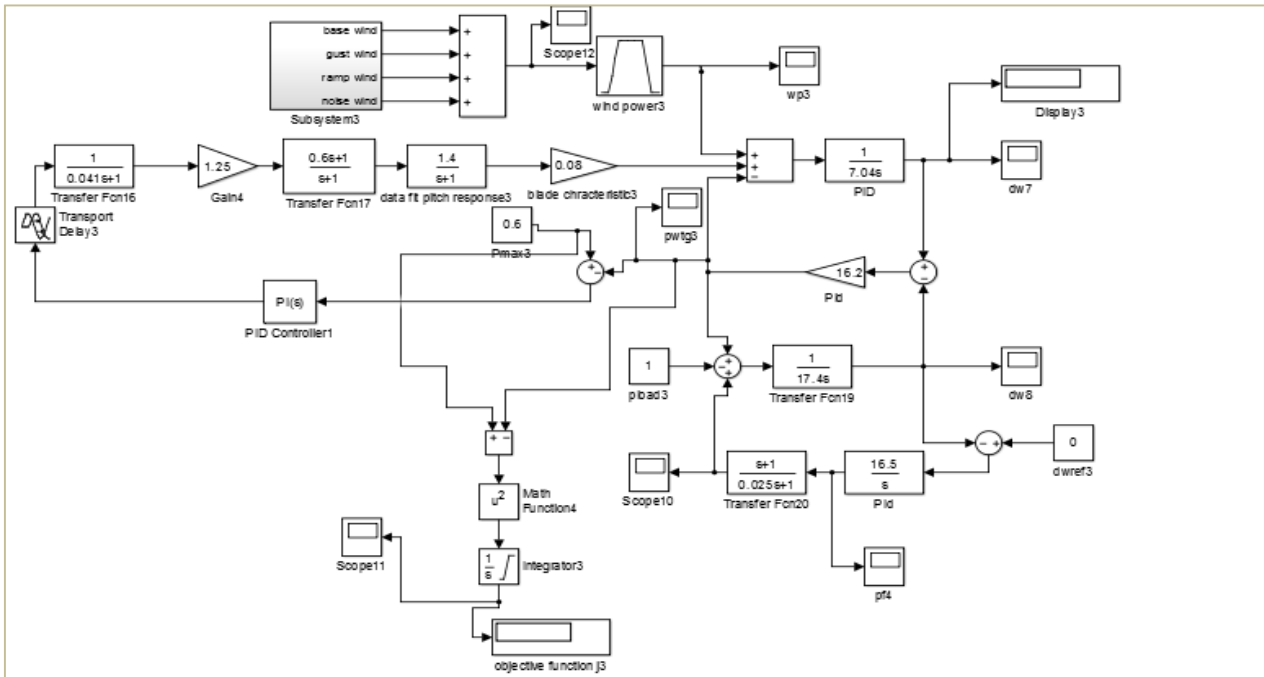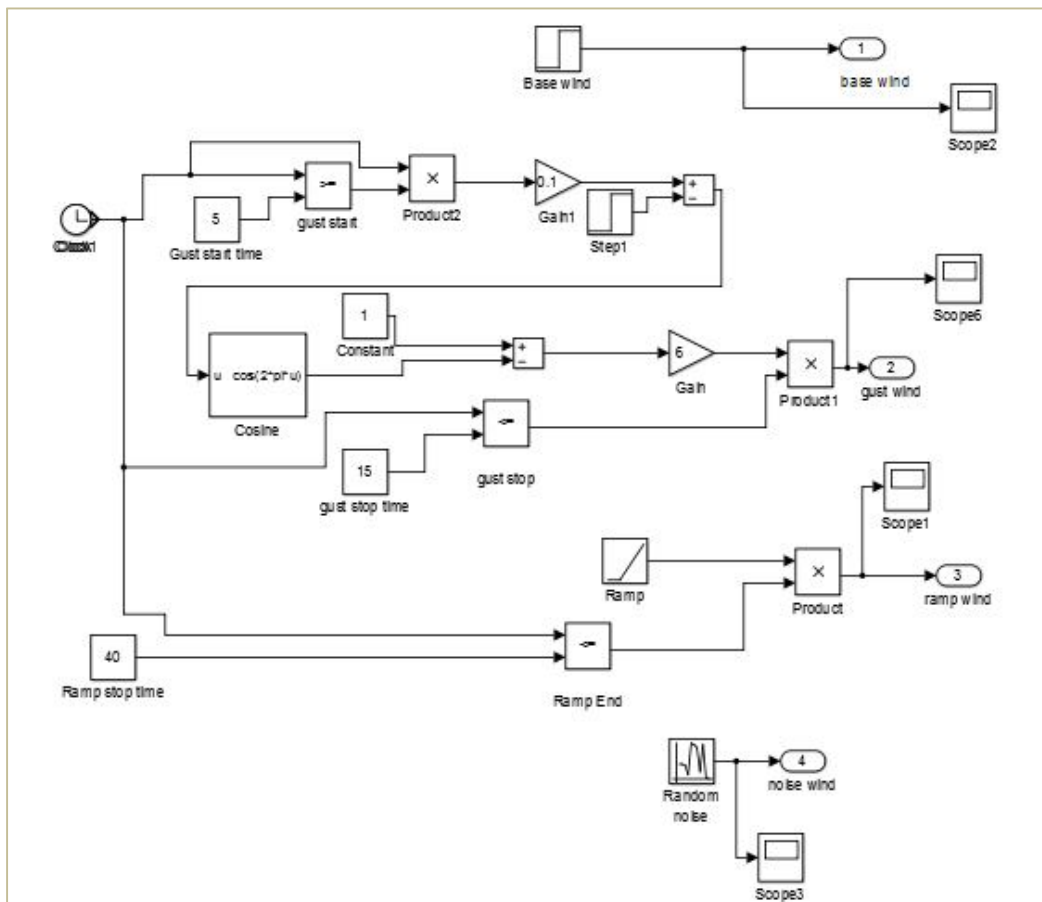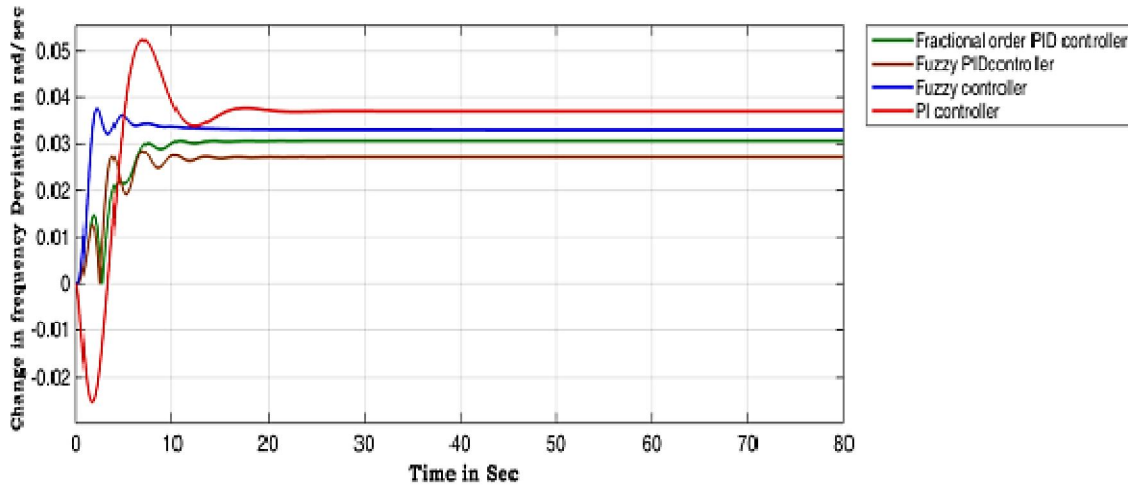


Figure 6 Simulation Model of Wind Turbine Generator



Figure 7 SIMULINK model of wind speed

Figure 8Frequency deviation response without optimization approach
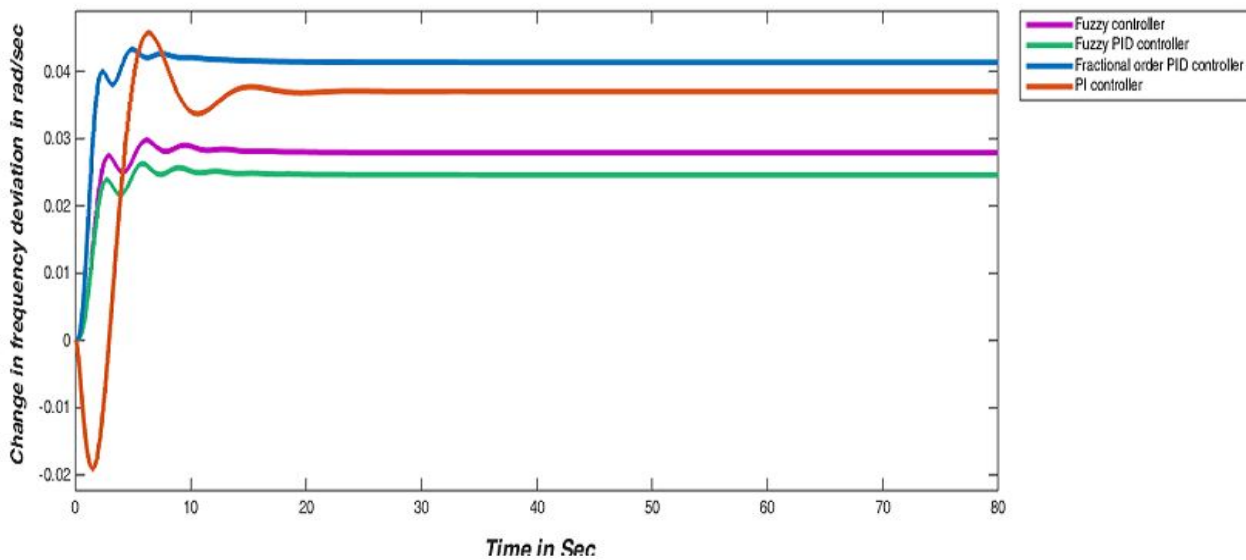


Figure 9 Frequency deviation response with optimization approach

The frequency deviation obtained in the conventional wind-diesel hybrid energy system without an optimization approach is depicted in figure 8. To validate the superior performance of the controller, conventional PI controller, Fuzzy Controller, fractional order PID controller is used to compare with the proposed model fuzzy PID controller. It could be observed the proposed controller provides minimum frequency deviation compared to other controller approaches. Moreover, the performance of the PI controller is poor compared to other models as it exhibits a maximum change in frequency within a short time. Fractional order PID controller performance is near to the proposed Fuzzy PID controller, however, its steady-state value is quite high compared to the proposed approach.

The performance in frequency deviation is further improved using the optimization approach and it is depicted in figure 9. It could be observed that due to the optimization approach the range of frequency deviation is reduced compared to figure 8.

The parameters such as peak overshoot and settling time observed from the frequency deviation curve are detailed in table 2. It is observed that the proposed controller model provides minimum overshoot and settling time. The system stable condition is defined in terms of rise time and If the rise time is low, the system is stable so that peak overshoot must also have obtained as stable. From the table, it is clear that the fuzzy-PID controller exhibits minimum settling and overshoot time for both conditions compared to other controllers.

**Table 2 Frequency deviation analysis**

| S.NO | CONTROLLER | Without Optimization | | With Optimization | |
|---|---|---|---|---|---|
| | | Peak Overshoot | Settling Time(sec) | Peak Overshoot | Settling Time(sec) |
| 1 | PI controller | 0.052 | 26 | 0.048 | 20 |
| 2 | FOPID Controller | 0.0375 | 21.6 | 0.042 | 15 |
| 3 | FUZZY controller | 0.0306 | 20 | 0.029 | 13 |
| 4 | FUZZY PID Controller | 0.0283 | 19.5 | 0.026 | 12.8 |

The power generated by the wind turbine generators without optimization modelis measured and depicted in figure 10. It could be observed that due to the efficient control mechanism the power generated by the wind turbine generator is steady for Fuzzy PID controller. In the case of PI controller, the overshoot varies twice than Fuzzy PID controller that leads into system instability. In case of fractional PID controller and conventional fuzzy controller the response is similar and the difference is minimum. In that fractional PID provides better performance compared to conventional fuzzy controller. However, the Proposed Fuzzy PID controller exhibits better steady performance compared to other controllers.
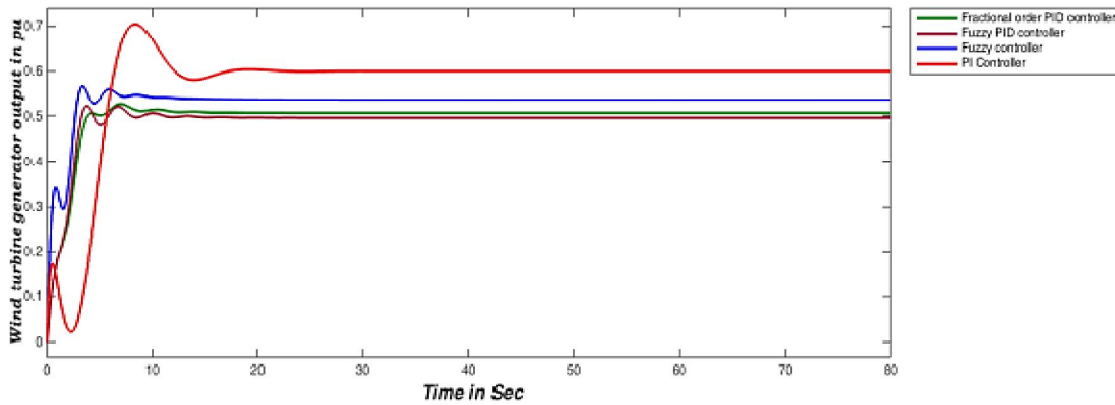


Figure 10 Wind turbine generator without optimization approach

The wind turbine generated power output for controller models with optimization approach is depicted in figure 11. It could be observed that proposed fuzzy PID controller exhibits stable performance than other controllers. When the generated power is compared with the controller without optimization results the performance of optimization model based results are better. The stability of the controller increases due to the optimization process.
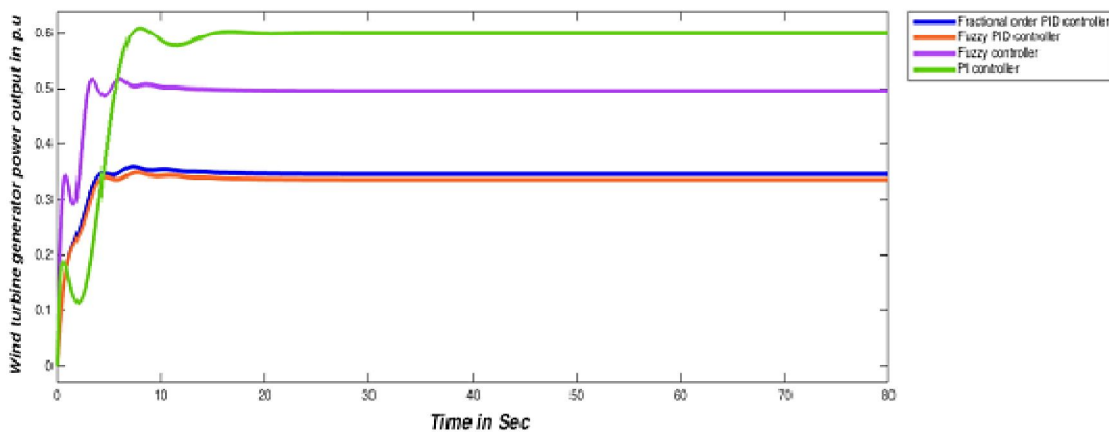


Figure 11 wind turbine generator with optimization approach

The power output analysis performance of the wind turbine generator is listed in table 3 in terms of settling time and peak overshoot time. It is observed that proposed fuzzy PID controller exhibits minimum settling and overshoot time for both conditions compared to other controllers.

**Table 3 Wind turbine generator power output analysis**

| S.NO | CONTROLLER | Without Optimization | | With Optimization | |
|---|---|---|---|---|---|
| | | Peak Overshoot | Settling Time(sec) | Peak Overshoot | Settling Time(sec) |
| 1 | PI controller | 0.705 | 27.5 | 0.6 | 19 |
| 2 | FOPID Controller | 0.5673 | 20.4 | 0.51 | 14.2 |
| 3 | FUZZY controller | 0.5261 | 19.5 | 0.36 | 13.8 |
| 4 | FUZZY PID Controller | 0.5215 | 19.2 | 0.34 | 11 |

The power generated in the hybrid energy system using wind-diesel generator is depicted in figure 12 without optimization and figure 13 depicts the performance analysis of generated power with optimization approach. compared to other controllers the proposed Fuzzy PID controller exhibits stable and better performance. In the case of the PI controller, the sudden increase in the output may damage the system. In case of fuzzy controller and Fractional PID controller the performance is better compared to PI controller however, it is less than the proposed Fuzzy PID controller.
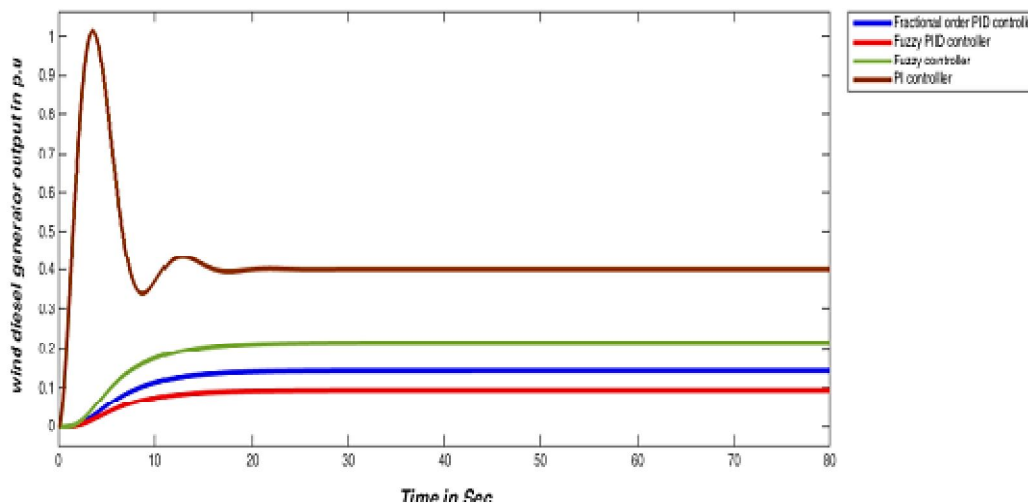


Figure 12 Wind-diesel generator without optimization approach - Generated power analysis
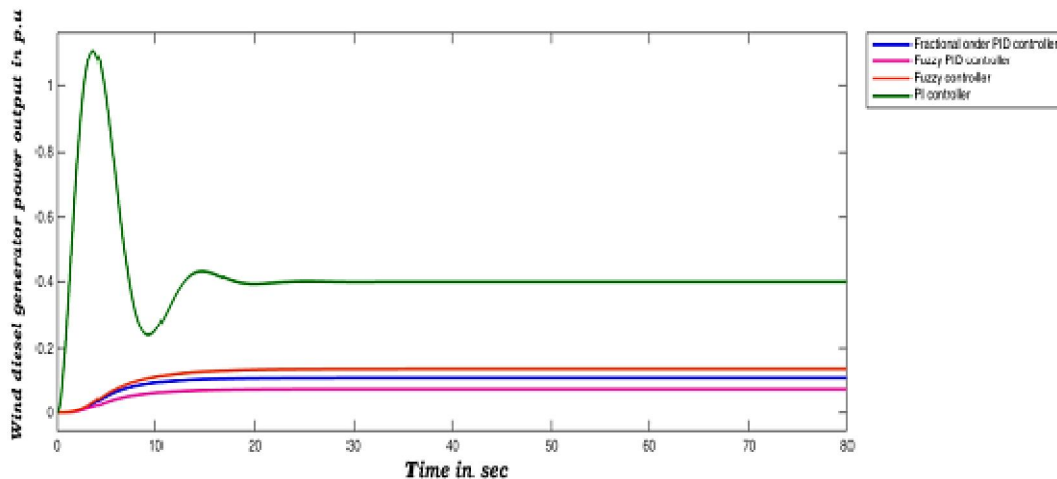


Figure 12 Wind-diesel generator with optimization approach- Generated power analysis

Table 4 depicts the details of power generated by hybrid wind-diesel energy system in terms of settling time and peak overshoot time. The performance of proposed controller and other controllers are observed with optimization and without optimization model and it is visible that the proposed fuzzy PID model exhibits superior performance in all aspects.

**Table 4 Power output analysis for wind-diesel generator**

| S.NO | CONTROLLER | Without Optimization | | With Optimization | |
|---|---|---|---|---|---|
| | | Peak Overshoot | Settling Time(sec) | Peak Overshoot | Settling Time(sec) |
| 1 | PI controller | 1.11 | 25 | 1.11 | 18 |
| 2 | FOPID Controller | 0.1315 | 20.25 | 0.12 | 12 |
| 3 | FUZZY controller | 0.1011 | 19.95 | 0.1011 | 11.6 |
| 4 | FUZZY PID Controller | 0.0701 | 17.45 | 0.06 | 10.2 |

The optimizer plot for the grey wolf optimization module is depicted in figure 13. The functions are presented on both sides and the optimal solution is obtained for the given functions. In the proposed approach, PID controller parameters are considered as objective functions and the optimal solution is obtained to improve the parameters.
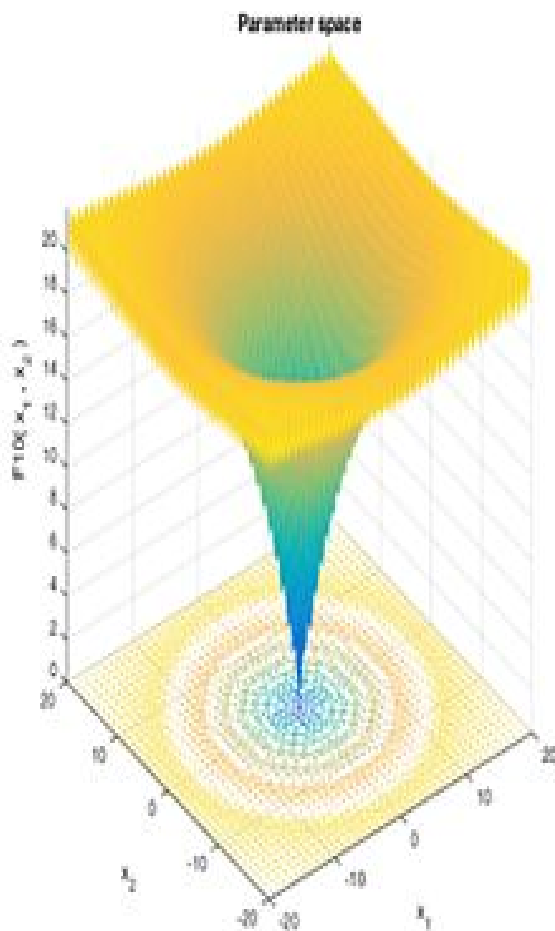


Figure 13 Grey wolf optimization module
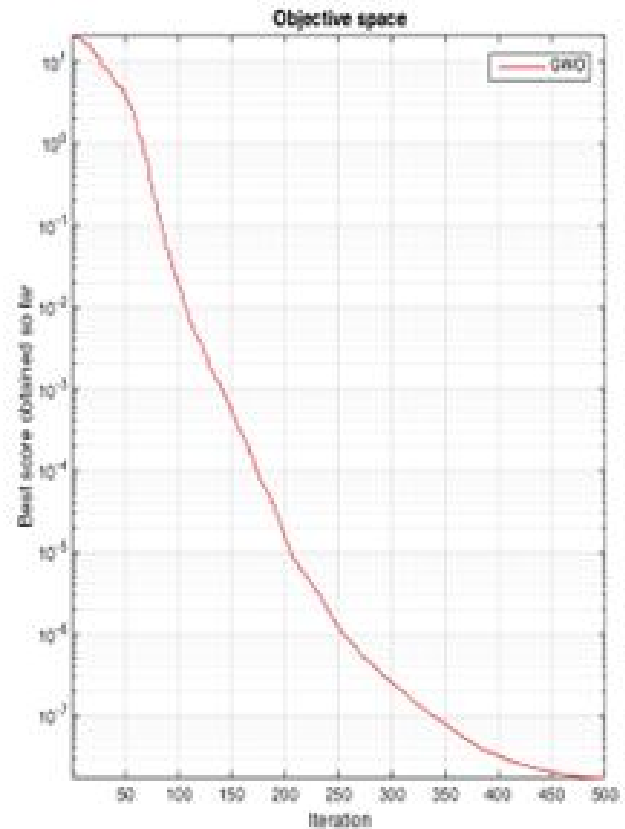


Figure 14 Obtained best score

**Table 5 Objective function**

| Control schemes | Objective function |
|---|---|
| PI controller | 0.8571 |
| Fractional order PID controller | 1.061 |
| Fuzzy controller | 5.887 |
| Fuzzy PID controller | 5.489 |

The best score obtained for the given objective is depicted in figure 14. It is observed that the proposed fuzzy PID controller attains better

score than other models due to the optimal parameters. though the score between fuzzy and fuzzy PID are close there is a huge variation in other performance analyses. Table 5 depicts the objective function values for the different controller approaches. It is observed from the table the objective function of the proposed Fuzzy PID controller and the fuzzy controller havea maximum objective function value that indicates the proposed approach covers the maximum extent to obtain better performance. From that, it is concluded that the fuzzy PID controller attains better performance than the conventional fuzzy controller.

## 5. Conclusion

An optimized power and frequency control for a hybrid wind-diesel energy system is presented in this research work. The necessity of frequency control and power balance strategies in isolated systems are identified and framed in the research model. to improve the performance of controllers, optimal parameters are identified in the proposed approach using grey wolf optimization. To validate the proposed approach performances, simulation design is obtained and analyzed for the frequency deviation, the power generated in wind turbines, and power generated in the wind-diesel energy system in terms of settling time and peak overshoot time. Conventional controller models such as PI controller, fuzzy controller, and fractional order PID controller are used to compare with the proposed fuzzy PID controller. Proposed approach simulation results are obtained for two categories as with optimization and without optimization model and it is observed that for both cases fuzzy PID controller performs better. This research could be further developed by introducing a hybrid optimization approach to increasesystem accuracy and efficiency.

## References

1. Abbas Q. Mohammed; Kassim A. Al-Anbarri; Rafid M. Hannun (2020), "Optimal Combination and Sizing of a Stand–Alone Hybrid Energy System Using a Nomadic People Optimizer", IEEE Access, vol. 8, pp. 200518-200540.
2. AsitMohanty, MeeraViswavandya, PragyanParamita (2015), "Optimisation and Improvement of Voltage stability in a Standalone Wind-diesel-micro Hydro Hybrid System" Procedia Technology, vol.21, pp.332-337.
3. Baseem Khan; Pawan Singh (2017), "Selecting a Meta-Heuristic Technique for Smart Micro-Grid Optimization Problem: A Comprehensive Analysis", IEEE Access, vol. 5, pp. 13951-13977.
4. ChunSheng Wang; Jiamin Li; Yukun Hu (2019), "Frequency Control of Isolated Wind-Diesel Microgrid Power System by Double Equivalent-Input-Disturbance Controllers", IEEE Access, vol. 7, pp. 105617-105626.
5. DjohraSahebKoussa, M. Koussa, S. Bellarbi (2017), "Hybrid diesel-wind system with battery storage operating in standalone mode: Control and energy management – Experimental investigation" Energy, vol. 130, pp. 38-47.
6. Félix Dubuisson; MiloudRezkallah; Ambrish Chandra; MaaroufSaad; Marco Tremblay; Hussein Ibrahim (2019), "Control of Hybrid Wind–Diesel Standalone Microgrid for Water Treatment System Application" IEEE Transactions on Industry Applications, vol. 55, no. 6, pp. 6499-6507.
7. GrzegorzIwanski, ŁukaszBigorajski, WlodzimierzKoczara (2018), "Speed control with incremental algorithm of minimum fuel consumption tracking for variable speed diesel generator", Energy Conversion and Management, vol. 161, pp. 182-192.
8. Haixin Wang; Junyou Yang; Zhe Chen; Weichun Ge; Yunlu Li; Yiming Ma; Jian Dong; Martin OnyekaOkoye; Lijian Yang (2019), "Analysis and Suppression for Frequency Oscillation in a Wind-Diesel System", IEEE Access, vol. 7, pp. 22818-22828.
9. Hesham M. Fekry; Azza Ahmed Eldesouky; Ahmed M. Kassem; Almoataz Y. Abdelaziz (2020), "Power Management Strategy Based on Adaptive Neuro Fuzzy

Inference System for AC Microgrid", IEEE Access, vol. 8, pp. 192087-192100.

10. Ibrahim.H., Lefebvre.J, Methot. J.F, Deschênes, Jean-Sébastien (2011) "No-storage wind-diesel system: Mechanical modeling based on power flow models" 2011 IEEE Electrical Power and Energy Conference, EPEC 2011. pp. 17-22.

11. Inés Tejado, Blas M. Vinagre, José Emilio Traver, Javier Prieto-Arranz, Cristina Nuevo-Gallardo (2019), "Back to Basics: Meaning of the Parameters of Fractional Order PID Controllers" Mathematics, vol. 7, no. 530, pp. 1-16.

12. Leong Kit Gan, Jonathan K. H. Shek, Markus A. Mueller (2016), "Optimised operation of an off-grid hybrid wind-diesel-battery system using genetic algorithm", Energy Conversion and Management, vol. 126, pp.446-462.

13. Mahmood Ul Hassan, Muhammad Humayun, RizwanUllah, Baoquan Liu, Zhuo Fang (2018), "Control strategy of hybrid energy storage system in diesel generator based isolated AC micro-grids", Journal of Electrical Systems and Technology, vol. 5, no. 3, pp. 964-976.

14. MiloudRezkallah; Sanjeev Singh; Ambrish Chandra; Bhim Singh; Marco Tremblay; MaaroufSaad; Hua Geng (2019), "Comprehensive Controller Implementation for Wind-PV-Diesel Based Standalone Microgrid", IEEE Transactions on Industry Applications, vol. 55, no. 5, pp. 5416-5428.

15. Minghan Yuan; Yang Fu; Yang Mi; Zhenkun Li; Chengshan Wang (2018), "The Coordinated Control of Wind-Diesel Hybrid Micro-Grid Based on Sliding Mode Method and Load Estimation", IEEE Access, vol. 6, pp. 76867-76875.

16. Mohammed E. Lotfy; TomonobuSenjyu; Mohamed A. Farahat; Amal F. Abdel-Gawad; Atsushi Yona (2017), "Enhancement of a Small Power System Performance Using Multi-Objective Optimization" IEEE Access, vol. 5, pp. 6212-6224, 2017.

17. Neerparaj Rai, Bijay Rai (2018), "Control of fuzzy logic based PV-battery hybrid system for stand-alone DC applications" Journal of Electrical Systems and Information Technology, vol. 5, no. 2, pp. 135-143.

18. RaffaelEngleitner; AdemirNied; Mariana Santos Matos Cavalca; Jean Patric da Costa (2018), "Dynamic Analysis of Small Wind Turbines Frequency Support Capability in a Low-Power Wind-Diesel Microgrid", IEEE Transactions on Industry Applications, vol. 54, no. 1, pp. 102-111.

19. Saad.Y, Younes.R, Abboudi.S, Ilinca.A (2018), "Hydro-pneumatic storage for wind-diesel electricity generation in remote sites" Applied Energy, vol. 231, pp. 1159-1178.

20. Sebastian C. Manchester, Lukas G. Swan, Dominic Groulx (2015), "Regenerative air energy storage for remote wind–diesel micro-grid communities" Applied Energy, vol.137, pp.490-500.

21. Shailendra Kumar Tiwari; Bhim Singh; Puneet Kumar Goel (2019), "Control of Wind–Diesel Hybrid System with BESS for Optimal Operation", IEEE Transactions on Industry Applications, vol. 55, no. 2, pp. 1863-1872.

22. TuTu, Gobinath P. Rajarathnam, Anthony M. Vassallo (2019), "Optimization of a stand-alone photovoltaic–wind–diesel–battery system with multi-layered demand scheduling" Renewable Energy, vol. 131, pp. 333-347.

23. Yu Hu, Juan M. Morales, Pablo Solana (2015), "Dynamic multi-stage dispatch of isolated wind–diesel power systems" Energy Conversion and Management, vol.103, pp. 605-615.

# ROLE OF INFORMATION TECHNOLOGY IN ENERGY HEALING TECHNIQUES - A META ANALYSIS

## Jeo J.A[1,2*], Molly J.[1] and Krishna P.K[2]

[1]Kristu Jayanti College (Autonomous) Bengaluru
[2]Srinivas University, Mangaluru
*jeojoy@kristujayanti.com

_____

## ABSTRACT

*Human body behaves like a rechargeable battery which utilizes the energy on the earth and the entire universe for recharging itself. The mother earth and the entire universe help and provide us everything needed for the spiritual, mental and bodily healing. Besides human beings have a constant flow of energy from the feet to the minds. The Energy Healing Techniques believe that this flow of energy can heal the body by itself in a natural way. The paradigm shift from the traditional medicine system which reveals us about the meridian system and the energy chakra vortexes to the modern science all tell us about energy system and be indebted to the basic principle that every substance is produced of energy. Modern era medical practitioners have recognized the benefits of energy healing and have started implementing it as one of the supplements to the modern medical treatment. This review provides light into the classification of energy healing techniques, global and national impact of Energy Healing Techniques, the various conventional and modern approaches for the measurement of biofield energy and how Information Technology is involved in the various techniques. Energy healing techniques and the use of computers and other information technology in the therapeutic modalities were identified and analyzed using databases from different sources. Information was extracted from the topic related books and journals in addition to the relevant websites. This review summarizes various conventional and modern approaches for measurement of biofield energy and the use of computers and information technology for the same. The structural analysis infers that extended usage of computerized imaging and software analysis is the need of the hour for scientific evidences of the effectiveness of these therapies.*

_____

*Keywords:  Energy Healing, Biofield Energy, Role of Information Technology.*

## Introduction

Human beings do not consist of only physical matter. The human body can be considered as an embodiment of wider spectrum of energy fields which vibrates at different levels of refinement. It can be manifested that our energy fields encompass whatever that has occurred in our life time. If this energy field is not in a balanced state then it may lead to diseases.

Human nervous system has specialized subsystem called autonomic nervous system which controls activity like breathing, sweating, digestion, and even the beating of our heart and no need for us to give these functions a basic thought. Our memory, mobility and senses can function normally from the brain energy. Psychological and emotional energies are transmitted in the form of electrical impulses along the neural and meridian pathways of the human body. These energy transmissions in association with the vibrations of atoms and molecules produce electromagnetic fields in the form of Human Bio Field.

The human brain sends signals which ranges in the frequencies between 20 and 100 Hz to the muscles, and energy patterns can be observed in the concurrent diagnosis of the brain and muscles. Ganglions along the spine is observed to emit electromagnetic energy frequencies. The root cause of electromagnetic energy in the nerve centers is basically due to the electromagnetic nerve impulses and biochemical processes through hormones like oxytocin. The centers of energy in the human beings are of considerable size spanning across several centimeters . Another matter of importance is that the electromagnetic energy radiated by the tissues cannot be local. The energy field radiated from the human heart can be measured several feet away from the body. Frequencies below 100 Hertz are used in brain research studies using electroencephalogram (EEG) and those below 200 Hertz are used in electromyography (EMG). Human beings are considered as bodies that are constantly vibrating in unique electromagnetic waves (healthy human Bio field is of frequency 62-68 MHz) .

The term energy was first depicted in ancient Indian texts like Upanishads and in Traditional Chinese Medicine almost five thousand years earlier. Energy healing is the healing methodology which existed in the past which focuses on the restoration of human energy body as well as maintains the right balance of the energy flow in the different planes such as human body, mind and the soul.

The physical illness, mental illness and even financial issues to an extent are considered as issues related to the energy blockages under the Energy Healing paradigm. According to this it identifies the basic cause of any illness as the blockage or imbalance of the energy flow in the human body. When this blockage or imbalance in the energy flow is fixed, curing takes place inherently. This is the basic principle of working of these techniques. The efficiency of these techniques depends on Healer-Client relationship which involves attributes such as collaboration, trust, compatibility, communication and trust.

## Energy Healing Techniques

The techniques which are considered as a subset of complementary and alternative medicine rooted on the belief that a vital energy flows through the human body whose goal is to balance the energy flow in the human body.

HER (Healing Energy Research) is widely used to define areas which describes intentional influence of living beings on one another without the usage of physical medium. We can categorize the Energy Healing techniques as follows:

- Traditional Eastern Asian Techniques such as Reiki and qigong
- Professional Traditions practiced in the West which is often practiced by nurses like Therapeutic Touch and Healing Touch.
- Eastern European bioenergy traditions.
- Contemporary Metaphysical Traditions which have eclectic backgrounds.

## Generally Practiced Energy Healing Techniques

**Techniques based on meridian system:** Acupuncture/Acupressure are ancient Chinese therapies and they work for the balancing of chi/ki/qi energy flow in the meridian system of the body. Emotional Freedom Technique (EFT) which uses mind-body medicine in combination with needle-free acupuncture. The two skills used in EFT are tapping locations and the framing of reminder phrases regarding the problem which is addressed. Donna Eden's Healing Technique is associated with meridians, chakras, aura and the other five energy systems namely the basic grid, the celtic weave, the five rhythms, triple warmer, and the radiant circuits. In this technique the body energies weave themselves into celtic weave which are present at the cellular as well as beyond the aura level and this celtic weave is worked upon for the restoration of health.

**Energy-Focused Bodywork Techniques:** Therapies like Lomi, Shiatsu, Trager and Craniosacral Therapy (a light-touch manual therapy that works at the blockages in the craniosacral system) are examples of these which work intentionally on this subtle energy.

**Distance Healing Intention Therapies:** Distance Healing Intention (DHI) which is defined as an act directed towards the improvement of health of a person at a far off distance from the healer; Johrei a Japanese healing technique which comprises of energy channeling and light massage; Reconnective Healing which is a spectrum healing technique involving energy, light and information.

**Other Therapies:** Healing Touch (HT) which works with various energy fields of the body and chakras; Intuitive Healing which uses intuition for the healing process; Polarity Therapy (PT) which uses principles of attraction, repulsion and neutrality; Pranic Healing which works on the basic principle of cleansing or eradicating dirty energy from the body and substituting it with prana; Quantum Touch which focuses on practitioner's breathwork, intentions, energy sensations and touch; Reiki where practitioner's channel

universal energy through their hands into the patient's body; Qigong which focuses on regaining the balance of the body through movements of the body in coordination with breathing along with meditation; Reflexology, a Chinese based intense massage therapy which improves overall improvement of the lymph flow; Chakra Healing which works on proper alignment and synchronous working of the chakras which will allow a steady flow of energy throughout the body ; Shamanic Healing where Shaman is the one who makes in roads to unordinary reality in a changed state of consciousness.

### Traditional and Complementary Medicine(T&CM) – An Indian Perspective

AYUSH which monitors the departments of Ayurveda, Yoga, Unani, Siddha and Homeopathy was formed in 2014 under the Ministry of Health, India, include various expert committees and councils for monitoring the respective disciplines including the T&CM.

The regulations to be followed by homeopathy practitioners were updated in 2014 and the updated list of registered Traditional Medicine ™ practitioners was made in 2016.
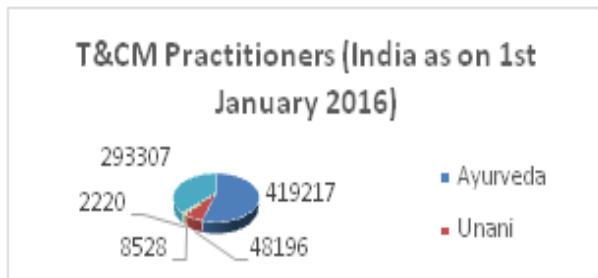


Global Analysis Report of Energy Healing Techniques

Out of 179 WHO member countries 98 of them have framed policies at the national level on Traditional and Complementary/Alternative Medicine (T&CM)[3]. Eighty-eight percentages of countries among 170 countries that have membership in WHO have acknowledged the usage of T&CM .
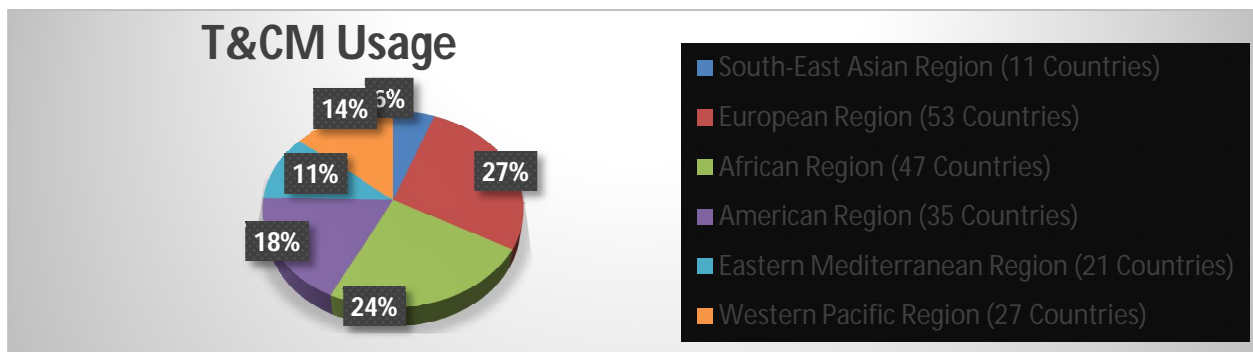


The usage of different types of T&CM for 133 countries is as given below:
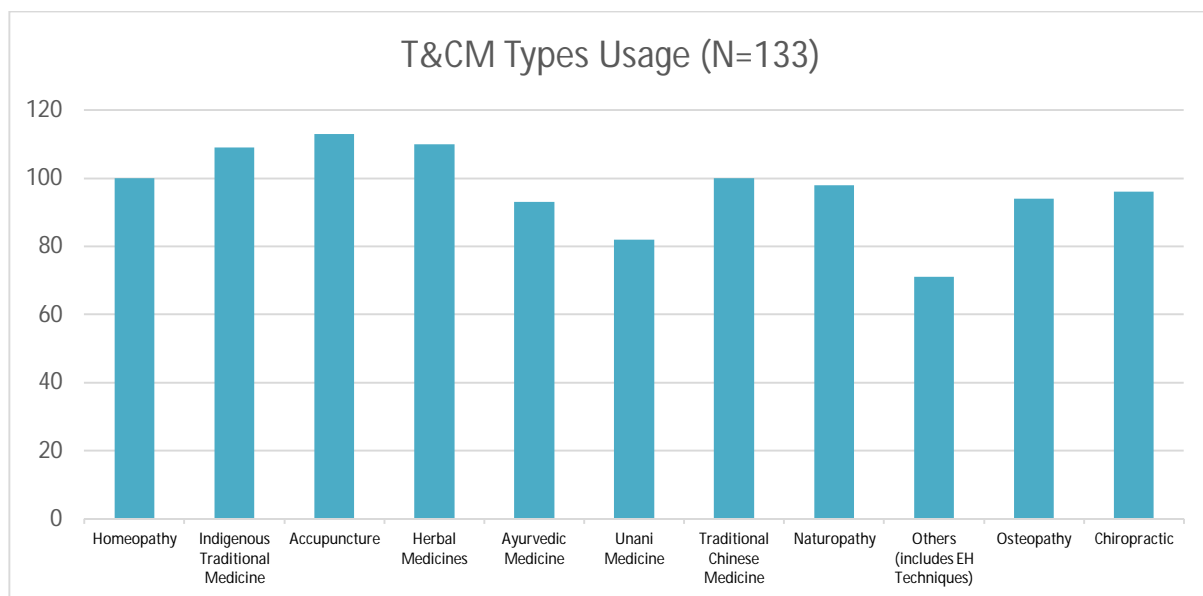
From the graph given above it is evident that among the various types of T&CM techniques the Energy Healing Techniques are least used. Forty percentages (Seventy-Five countries) have reported to have National Research Institute for T&CM.

## Bio Field Measurement Devices in Energy Healing

These are physical instruments used for measuring bio field interactions. They fall under two broad categories: Diagnostic Devices which measure bio field properties and Therapeutic Devices in order to manipulate biofield interactions. These devices work under different modalities such as Electromagnetic Field (EMF)-light, heat, non-thermal; electrical current, vibration and sound; physical and mechanical; intentionality and no locality; gas and plasma.

## Conventional Measurement of Human Bio Field

Conventional medical science used Electrocardiogram (ECG) developed in 1887 for tracking the electrical signals of heart and Electroencephalogram (EEG) developed in 1875 for recording the electrical signals of the brain. For tracing the magnetic field measurements of the heart and brain magneto cardiogram (MCG) and magneto encephalogram (MEG) are used respectively. In order to capture the very low human magnetic fields specialized equipment's like Super-conducting Quantum Interference Device (SQUID) were used. Medical scans, such as Functional Magnetic Resonance Imaging (FMRI) and Positron Emission Tomography (PET) were also used for tracking the electromagnetic activity. Galvanic Skin Response (GSR) was used as a major technology for lie detection. Medical imaging systems such as thermography uses the infrared camera for capturing the emissions (which were infrared in nature) from the human body on the order of 100 watts.

## Modern Approaches for the Measurement of Bio Field

The modern approaches for the measurement of bio field falls under three categories: (1) high-voltage electrophotography, (2) acupuncture point conductivity measurements, and (3) bio photon measurements.

### (1) High-Voltage Electrophotography

The gas discharge visualization (GDV) camera, developed by the Dr. Korotkov in 1948 is the best among the contemporary high-voltage electrophotography technique which is based on the Kirlian effect and uses pulses (10-microsecond) of high-frequency (1024 Hz) and high voltage electricity (10-15 kV). A charge-coupled detector (CCD) is used here in order to detect the pattern of photons emitted from each fingertip. This information is then analyzed in the computer using GDV software for various parameters of the emission patterns including area, intensity, density, and factuality, as well as details of various sectors of the fingertip patterns that purportedly relate to the bioenergetics of specific organs and organ systems.

### (2) Acupuncture Point Conductivity Measurements

Here assessment of electrical conductivity of the skin is done through the acupuncture meridian system for the purpose of providing information about the energy flow related to the health of the body. This technique is otherwise known as electro dermal screening (EDS), electro dermal testing (EDT), and electro acupuncture (EAV). The primary usage of these devices is in allergy testing.

### (3) Bio Photon Measurements

Measurements of extremely weak light emission from the body which is in the visible range from 400 to 720 nm in wavelength, is one of the techniques used for checking the radiant non-thermal human bio field. For the measurement of bio photons the various methodologies used include: (1) photomultiplier tubes, which is used for registering the photon count over time; (2) a spectral analysis system, which uses a set of cut-off optical filters to determine the wavelength characteristics of the emitted light; (3) and a two-dimensional system of sensitive photon-counting devices, including arrays of cooled photomultipliers and CCDs that produce bio photon images.

## Information Technology in Energy Healing

Poly contrast Interference Photography (PIP) developed in 1980's by Harry Oldfield is another imaging system which does the analysis of the light reflected from the object being scanned with the help of a computer program. The light would be interfered by the energy field both when the incident ray travelled towards the object and when the reflected ray bounced off the object. Computer program is used for the analysis of different light intensities being reflected from the person or object being scanned. The software associated with this technique can identify distinctly the various patterns of light as they are already calibrated in the machine before in hand. The different pattern of colours signifies a distinct inference and is used to portray the positive vibrations and imbalances in the bio-field.

Digital Aura Scanner (DAS) is an imaging system based on the thermal energy was developed in 2007. This imaging system uses an ordinary digital camera and a computer. Software which is customised to take the scanning. This software uses photon interference to scan in and around the body. This is a computer programming innovation which allots a number to each specific frequency of photons and re-codes each number into the visible light range. After processing, the image is displayed on the computer screen and energy intensity variances can be noted. We don't see the difference in energy absorption with our own eyes because we use heuristics that generalize colours, patterns and shapes so that we can better distinguish borders and objects. Every colour has a diverse frequency and, in this system, they represent a different stage and condition. Here pictures are taken for the subject using full-spectrum lighting against a white background. These pictures are then processed by the computer so that we are able to see the energy field as a series of patterns and symmetry showing the infected areas as distorted and darker and help us to understand true root cause of the disease and enable us to visualise all seven chakras or glands.

Resonant Field Imaging (RFI) is an electromagnetic measurement and imaging process which can create full colour bioenergy charts of objects, animals, plants and even ambient energy fields. In this technique the practitioner holds the **RFI™** Digital Frequency Counter with a specially tuned antenna in his hand, and place the antenna in each part of the bioenergy field where you want to detect the colour. As the sensor tells you the objective frequency in standard scientific units, you simply enter that number into the RFI™ software program. Once the measurement of all the regions of the Aura is done the software can automatically generate full colour images of the Aura, the Brain, or both. Distance Healing can be made possible through various modes starting from the simplest of all, that is, by email. Webinars and Internet Conferences shall also facilitate Distance Healing Practices. Another pivotal example for the role of Information Systems is in the Energy Healing is the aura scanning reports generated by GDV camera while scanning fingers of both left and right hand of the person. The report generated gives us an idea about the energy flow in the body, chakra alignment and predicts the malfunctioning of various organs within the body. These reports help the healer to take a look at the chakra analysis before and after the healing process. The GDV camera can be associated with the GDV Sputnik, which uses sensors to evaluate the energy field of the environment around. The auxiliary device Biocor can be used for correcting the energy state with the help of very high frequencies.

## Conclusion

The Energy Healing Techniques owes its existence way back in the past and is still continued to exist as one of the Alternative Medical practices all over the world. Even though we have different practices globally, most of these practices are focused on the basic phenomenon of energy accumulation and flow. As the WHO report states the usage of these techniques have not encompassed the whole world as on date. The lack of scientific devices for quantifying the bio-field is another drawback in the research advancement in this area. The impact of these therapies on the healer and the person who is healed can be scientifically explored in a wider horizon.

Even though we have enormous advancements in Information Technology less is known about the usage of these technologies in the Energy Healing practices. Wider scientific research can be carried out on the usage of information technology in all the areas of Energy Healing practices and more tools should come into existence which will prosper the usage of these techniques all over the world. Taking Photos or Scanning the clients facilitate the specialist to assess the field of energy for better analyses of their health-related problems. When used, the operator and client can uncover the root disharmonies of their disease and DAS therefore enables effective monitoring of a client's ongoing condition. Analyzing at the DAS image, we can assess the energy field of a person and perceive energy blocks, leakages, and ranges of inflammation and weakening in the body parts. This study is meant to serve as a pilot for future research. Though difficult, it is imperative from a public health standpoint to shift through the concepts of Complementary and Alternative Medicine (CAM) and learn how alone or in combination they can improve upon our current standard of health care. Software development related to the domain of Energy Healing engages a lot of researchers for the development of software system. More and more National Research Institutes focusing on this area should come up all over the world. Assumptions that most of these therapies do not have any side effects are to be proven scientifically.

## References

1. Ann L. Baldwin and Natalie L. Trent, "An Integrative Review of Scientific Evidence for Reconnective Healing", The Journal of Alternative and Complementary Medicine", Volume 23, Number 8, 2017, pp. 590–598

2. Ann Marie Chiasson, "Energy Healing: The Essentials of Self-Care", United States of America, 2013

3. Aoyagi Y, Stein RB, Branner A, et al. Capabilities of a penetrating microelectrode array for recording single units in dorsal root ganglia of the cat. J Neuroscience Methods. 2003; 128: 9–20.

4. B. Shanmuga Priya, R. Rajesh, "Understanding Abnormal Energy Levels in Aura Images", ICGST AIML-11 Conference, April 2011

5. David Muehsam, Gaétan Chevalier, Tiffany Barsotti, Blake T. Gurfein, "An overview of biofield devices", Biofield Science and Healing: Toward a Transdisciplinary Approach, 2015, pp. 42-51

6. Dean Radin, Marilyn Schlitz, Christopher Baur, "Distant Healing Intention therapies: An overview of the scientific evidence", Biofield Science and Healing: Toward a Transdisciplinary Approach, Research Gate, November 2015

7. Fridlund AJ, Cacioppo JT. Guidelines for human electromyographic research. Psychophysiology. 1986; 23:567–589.

8. Hammerschlag R, Jain S, Baldwin AL, et al. Biofield research: a roundtable discussion of scientific and methodological issues. J Alternat Complement Med. 2012; 18: 1081–1086.

9. https://www.who.int/traditional-complementary-integrative-medicine/WhoGlobalReportOnTraditionalAndComplementaryMedicine2019.pdf?ua=1

10. Jens Rowold, PhD, Diploma and Paul D Hewson, Biofield Frequency Bands—Definitions and Group Differences, Global Advances in Health and Medicine 2020, Volume 9: 1–10

11. John Upledger, Tad Wanveer "Helping the Brain Drain: How Craniosacral Therapy Aids ADD/ADHD", 2009

12. Kuman M, J Altern, "Measuring Reiki Healing - Mystery, Placebo or Real Energy Healing", HSOA Journal of Alternative, Complementary & Integrative Medicine, Volume 3, Issue 1, 2017

13. McCraty R, Atkinson M, Tomasino D, Bradley RT. The coherent heart. Heart-brain interactions, psychophysiological coherence, and the emergence of system-wide order. Integr Rev. 2009; 5: 10–115.

14. Mima T, Hallett M. Corticomuscular coherence: a review. J Clin Neurophysiology. 1999; 16: 501.

15. Moreno-L_opez Y, Mart_ınez-Lorenzana G, Cond_es-Lara M, Rojas-Piloni G. Identification of oxytocin receptor in the dorsal horn and nociceptive dorsal root ganglion neurons. Neuropeptides. 2013; 47: 117–123.

16. Motoyama H. Theories of the Chakras: Bridge to Higher Consciousness. Wheaton, IL: Theosophical Publishing House; 1988.

17. P. H. Canter, L. B. Brown, C. Greaves and E. Ernst, "Johrei Family Healing: A Pilot Study", Access Publication, July 2006

18. Rubik B(2016), Measurement of the Human Biofield and Other Energetic Instruments

19. Rubik B. The biofield hypothesis: its biophysical basis and role in medicine. J Alternat Complement Med. 2002; 8:703–717.

20. Sara L. Warber, Deogracia Cornelio, Jeremy Straughn, and Gaia Kile, "Biofield Energy Healing from the Inside", The Journal of Alternative and Complementary Medicine, Volume 10, Number 6, 2004, pp. 1107–1113

21. Sara L. Warber, Rosalyn L. Bruyere, Ken Weintrub, Paul Dieppe, "A consideration of the Perspectives of Healing Practitioners on Research Into Energy Healing", Global Adv Health Med. 2015, pp. 72-78.

22. Shreya Prakash, Anindita Roy Chowdhury, Anshu Gupta, "Monitoring the Human Health by Measuring the Biofield Aura: An Overview", International Journal of Applied Engineering Research, ISSN 0973-4562 Vol. 10 No.35 (2015)

23. Wayne B. Jonas and Cindy C. Crawford, "Science and Spiritual Healing: A Critical Review of Spiritual Healing, Energy Medicine, and Intentionality", Alternative Therapies in Health and Medicine, 2003, pg. 56

24. https://timesofindia.indiatimes.com/life-style/health-fitness/home-remedies/5-most-effective-energy-healing-techniques-and-how-they-work/articleshow/70698807.cms

25. https://www.the-energy-healing-site.com/types-of-energy-healing.html

26. https://www.spiritualresearchfoundation.org/about-us/methodology-of-research/polycontrast-interference-photography-pip

27. https://www.barbarabeckerhealing.com/long-distance-healing-part-iii-by-computer-technology/

28. http://jmshah.com/aura-report-biowell-gdv.html

29. http://gdvsoftware.com/gdv-software-history

# STRATEGIZING THE HIGHER EDUCATION IN INDIA FOR FUTURE –A TECHNOLOGY-DRIVEN APPROACH IN EDUCATION

## K. Anusha[1], D. Praveenadevi[2] and S. Poojitha[1]
[1]KL Business School, Koneru Lakshmai Education Foundation, Vaddeswaram, Guntur, AP, India
[2]K..S. Rangaswamy College of Arts and Science, Namakkal District, Tamilnadu
kanagalanusha@gmail.com

---

## ABSTRACT

*Background/ Objectives: To understand the role of Indian higher education in promotion of social cohesion, civic behavior and nation building and; to design for a transforming model in strengthening the higher education with formulation of world class generic strategies. Methods: A model is constructed to assess the role of higher educational institutions in pandemic. The Institutions are categorized into four categories: mass customization, Innovation, mass production and continuous improvement considering the parameters the product change and process change.*
*Discussion: The higher educational institutions help in strengthening of social capital. The emergence of quality and innovation in their approach is a need for higher educational institutions to formulate world class generic strategies and evaluate their competiveness and readiness.*

---

*Keywords: Higher Education, Information Technology, Quality, Pandemic, Strategy*

## Introduction

The Indian higher education system is the third-largest in the world. India is the second-largest in the e-learning market after the United States. The UGC (University grant commission) in India is the main governing body to enforce the standards. The Indian higher education system is adding millions of students every year. India has a total of 967 universities in the country as of 2020, among 967 universities: 54 are central universities, 418 state universities, 125 deemed to be universities, and 70 private universities. In India, the universities are monitored by an apex body. The universities are indirectly controlled by the ministry of education and funded jointly by the state government apart from state universities. They are premium research institutes like the National Institute of Technology (NIT) Indian Institute of Technology (IIT) Indian Institute of Information technology (IIIT) Indian Institute of Science (IISc) across the country in science and technical education. The enrollment is increasing correspondingly and the quality dimension is being mandated for institutions across the country. The private sector is strong in Indian higher education. Institutes are sourcing international students around the world to enroll in master's programs. The universities to function have to be accreditation

under the act of parliament without accreditation the government notes the institution to be fake. Accreditation is overseen by an autonomous institution like All India Council for Technical Education (AICTE), Indian Council of Agricultural Research (ICAR), National Assessment and Accreditation Council (NAAC), Pharmacy Council of India(PCI), Bar Council of India (BCI), etc. established by UGC. Universities are ranked to measure Quality on the range of parameters related to research, reputations, and teaching. The National Institutional Ranking Framework is a mechanism to administrate the quality for universities and institutions.

## Review of Literature

Indian Education Institutions rank second in student enrollment to higher education and are competitively advantageous as the country has a large English-speaking population. India ranks 28 out of 88 countries in the English proficiency Index**.** In India, UGC granted the NAAC A+ Universities to offer Online Learning. Most Millennial (aged 22-35) are into online certification and in re-skilling for career advancement. Digital Landscape in India, internet usage and penetration is rapidly increasing to reach 550 million population Content is important in the education industry. The content through e-learning is through self-paced, live e-learning. Since the lockdown in

---

India, about 300 million students are dependent on education online. The major segments accelerated at a fast pace online in each segment: Primary and Secondary -60%, Test Preparation -64%, Up skilling and Online Certification- 38%, Higher Education -41%, and Language and Casual Leaning -42% CAGR (KPMG,2019). The Indian Education system needs to be educated to use information technology; otherwise, purchase and transfer of technology. The pros of traditional classroom teaching and ICT tools should be integrated into a single system. The drivers for online education in India include internet penetration, government initiatives, and affordability. Massive Open Online Courses (MOOCs) offer the flexibility to take select courses online via the web. They are interactive, provide community interactions among students and professors also provide with the assignments, quizzes and emerged to be a popular mode of learning.

**The Need for IT Integration to Higher Education Institutions**

Information Technology assesses how Information Technology has facilitated the growth in interactive learning and what has been its impact in the higher education scenario in the country. The Outbreak of COVID-19 caused a sudden closure of campuses to prevent transmission and ensure social distancing. The economic impact is highly visible. The educators had to focus on online learning systems. The need for technology integration was important for the institutions by overcoming the limitations as accessibility and affordability for many students. The education climate changed rapidly with the use of e-learning and virtual learning. The Pandemic turned out to be ideal to experiment and deploy new technology to make education delivery possible and meaningful.
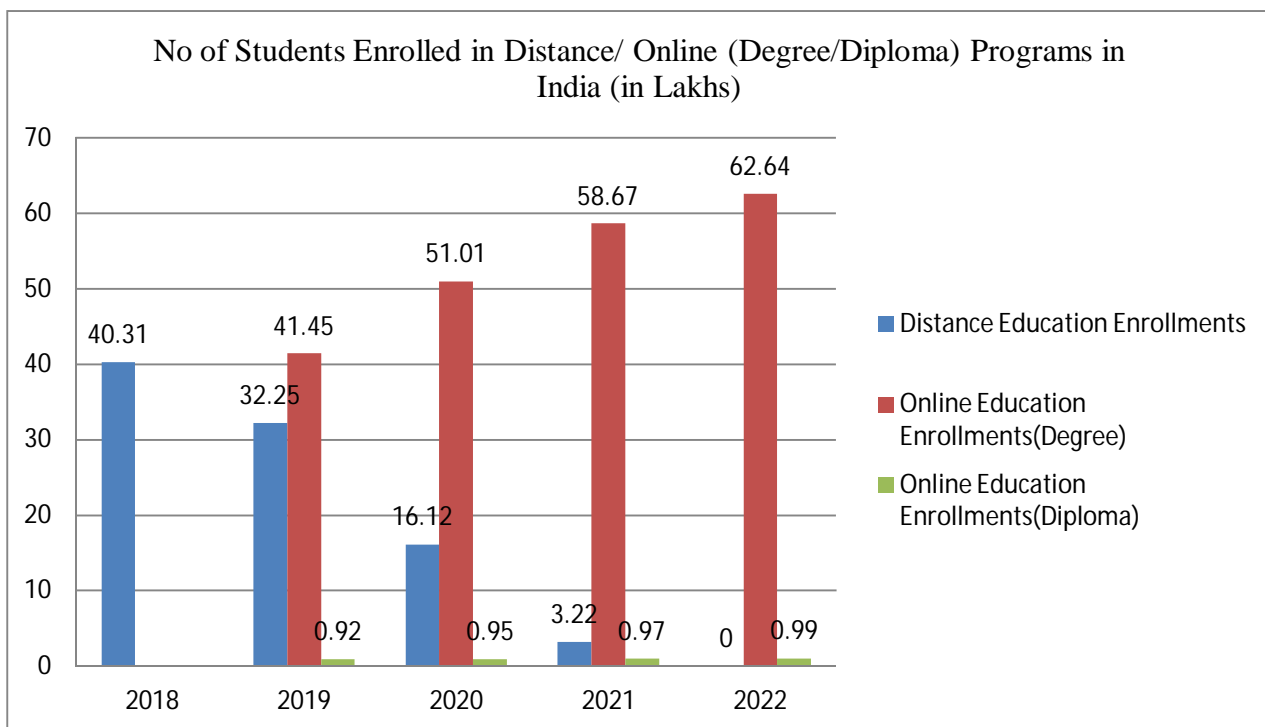


Source: Schoolguru-valuvox analysis, January 2019

**Higher Education Institutions Strategies for Information Age**

The future development of educational institutions is wholly dependent on strategic thinking i.e. 'Predicting the future. Strategic thinking answers the questions like are the institutions familiar with SWOT analysis to assess where are we now? Also where we want to be (Vision)
How will we get there? (Strategy)
In a business environment, Institutions are now experiencing rapid and continuous change, which can be identified in terms of product change and terms of process change. Product change characterizes the demand for new

courses or new services. Institutions change their courses because of competitive moves; customers' preferences are the emergence in the nation. Process change refers to altering the procedures like the methodologies used in teaching and the integration of technologies to deliver the outcome or services. Process broadly refers to faculty, accreditation systems technologies, and procedures used to develop the institution.
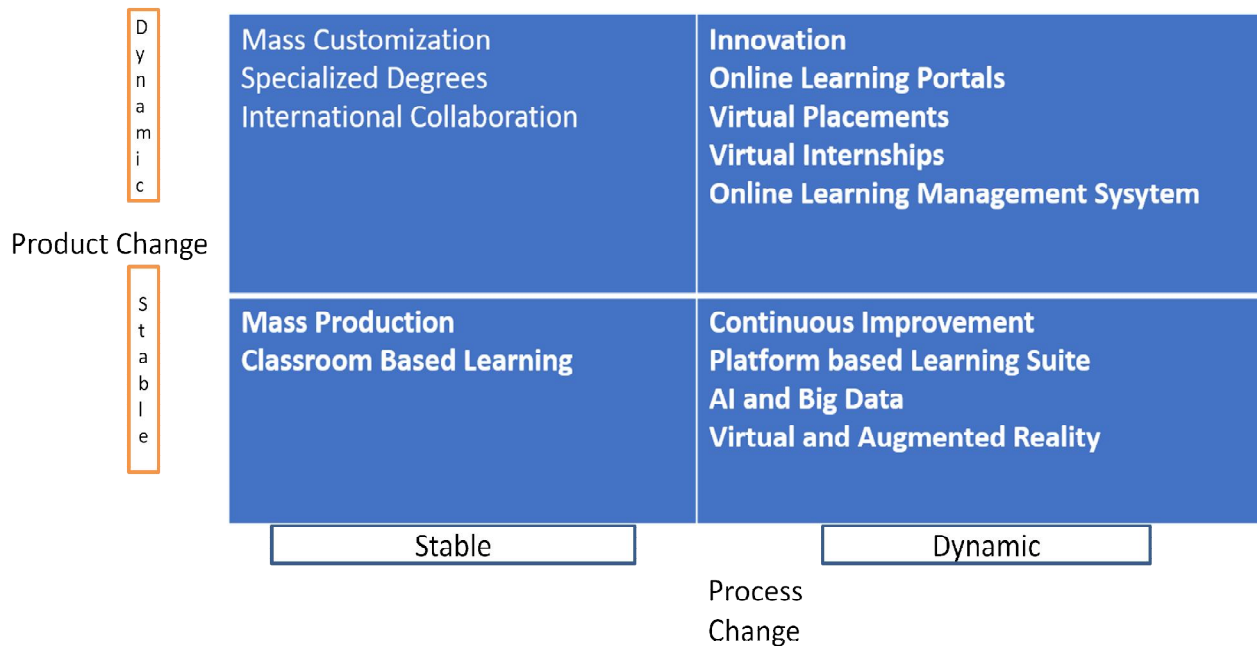


The matrix is a classified change to be either stable or dynamic. Stable change is slow and generally predictable. Dynamic change is revolutionary, rapid, and generally unpredictable. The two types of changes provide four possible combinations of change conditions that can assess an organization to understand its competitive position, infrastructure, and IT strategies and processes appropriately.

## Dynamic Product and Process Change: Innovation Strategy

The Institution focusing on Innovation strategy frequently create a new course, constantly innovates the process required to develop and produce the new methodologies into the new system these institutions excel in research and development e.g. IIMs, NITs, IIITs. The Institutions inherently design for change in constantly shifting their processes to compete under innovation conditions.

The educational institution decentralizes decision making, develop procedure, broadly define jobs and evaluate performance subjectively.

Online learning portals are online knowledge-sharing tools. A learning tool helps to trace the information needed quickly. Below are mentioned with the top learning portals.

Bharat Skills is a repository for skill-based courses. Have e-learning videos available for trades like electricians, carpenters, plumbers, etc.

Skill India is a multilingual portal for about 400 courses in 10 different regional languages.

NAASCOM-Future Skills is an industry-driven learning ecosystem for the students and professionals to re-skill.

Skills build provides courses in the latest technology like cyber security, Artificial Intelligence along with soft skills.

TCS ion Digital Learning Hub is a digital portal that collaborates with organizations to offer courses across various fields. **All the portals provide higher education courses like graduate, post-graduate, and research courses.**

Swayam a portal available free of cost online education portal runs on the principle of access, equity, and quality.

NPTEL portal is coordinated majorly by IIT Madras along with other IITs has web and video courses across 23 disciplines. The portal has recorded lectures from IITs, which are then uploaded online for others to access.

Swayam Prabha is a group of 32 DTH channels, which run high-quality educational programs. The contents are provided by NPTEL, IITs, UGC, CEC, IGNOU, and NCERT. The courses are available for students from class 9 to post-graduation level in the subjects of arts, science, commerce, performing arts, social sciences, agriculture among others.

### Virtual Placements

Virtual placements use virtual campus recruiting tools to leverage the process, the best way to start with is either live interviews, placement talks, offer technical assessments, ensure that each stage of the process is managed virtually with real-time updates, and to accurate the digital hiring process.

### Virtual Internships

The Virtual internship programs allow participants, to gain work experience in a remote setting. The virtual internships allow the intern to get first-hand experience with companies on a global scale while working from the comfort of their chosen location. The student virtual but still part of a team, in constant communication with the team, and can manage/supervise the project.

### Online Learning Management System

Many universities in India are integrating the online Learning Management System (LMS) platform and Enterprise Resource Planning (ERP) into their web portal. Students can remotely log in to access course material and also attend live classes with teachers. Pre-recorded lectures, videos can be uploaded on the LMS & ERP platforms making it easy for students to go through them multiple times. LMS & ERP adoption is still poor in many parts of India where students do not have the access to computers or broadband internet.

### Stable Product and Process Change: Mass Production Strategy

Most of the education institutions permit them to standardize courses, routines work, and standard rules and procedure and centralize decision making. The focus of these educational institutions is to strive for the largest size and lowest cost structure in the education sector. These institutions often are hierarchical and bureaucratic.

Classroom-based learning: Technology is an integral part of these institutions. The institutions made minor changes in student experience like animated content, usage of PowerPoint instead of blackboard, and usage of gadgets like laptops, tablets to take down notes [12].

### Dynamic Product Change and Stable Process Change: Mass Customization

Institutions are facing customers making unique and unpredictable demands. The basic approach of these institutions is to meet the demands through flexible platforms; the focus is on individual customer satisfaction through flexibility and responsiveness. The institution's strategy is to produce course variety rapidly and inexpensively. The decision-making of these institutes is through centralized coordination.

**Specialized degrees**: The students are interested in opting for industry-focused programs. So there is a demand to offer specialized programs is picking up.

**International Collaborations:** Indian Institutions and Students are looking for collaboration with world institutes to excel in collaborative research, and to showcase their work and innovations.

### Stable Product Change and Dynamic Process Change: Continuous Improvement

The focus of the Institution is customer satisfaction through process improvement. These institutes manage rapid innovation and use of the new process, systems, and structures to facilitate long-term organization learning about products to make continuous improvement efficient these institutions employ cross-functional teams to improve the process. The members of these teams turn to

that function-specific work and execute the rules they develop.

## Invest in Online Learning

Universities and colleges have started to invest heavily in online teaching. Students want to grab the opportunity to work collaboratively and closely with teachers and colleagues from across the world. Online learning is cost-effective and even profit-making. However, technical support for faculty, financial management, professionalism, and a team approach to course development and delivery are the factors for success.

| video-conferencing apps | Free version available | Meeting participants (default) | Screen-sharing | Whiteboard | Meeting recording | E2E encryption | Plans from (p/m) |
|---|---|---|---|---|---|---|---|
| Zoom | Yes | 100 | Yes | Yes | Yes | No | $14.99 |
| Microsoft Teams | Yes | 250 | Yes | Yes | Yes | No | $5.00 |
| Google Meet | Yes | 100 | Yes | No | Yes | No | $6.00 |
| Cisco Webex | Yes | 200 | Yes | Yes | Yes | Yes | $13.50 |

## Platform-Based Learning Suite

A learning platform from a students' perspective, is a **place to find educational content, search and buy courses** or whole educational programs. And, from an educator's view, it is **the place to deliver knowledge**.

**Online learning platform** takes off a lot of the hard work of building an audience, marketing, and sales, on the control over pricing, user data, and branding. Online learning platforms are often used to identify marketplaces for courses or education like Coursera, Udemy, and Lynda, while course platforms usually refer to the software used to create a learning environment.

**AI and Big Data** Universities be wise to embrace and lead AI in deep learning, which applies machine learning tools and techniques to solve any problem that requires "thought" – human or artificial. Harnessing machine learning technology, much like the AI tools in educational applications span from giving computers "vision," to speech recognition, machine translation, medical diagnosis, etc. The institutions need to believe that deep learning is the new scientific infrastructure for research and learning.

## Virtual Reality and Augmented Reality

Virtual Reality is a new reality tech that stimulates immersive experiences for colleges and universities. Virtual Reality can bridge the gap between learners and educators. The future of classroom experience will be hyper-immersive blended with augmented reality, artificial intelligence, and new technologies in transformative teaching. Most of the universities and colleges are into offering virtual reality campus tours.

**Augmented reality (AR)** drives students in enhancing their perception of real engagement by simulating superimposed, artificial objects in real-world environments and. Students can explore, the experience they are present in that environment, or be involved in virtual objects. Today's students are accustomed to the oscillation between an online and in-person experience. In the future, to improve student engagement and success rates teaching strategies of choosing the right technologies is going to matter.

**Re-skilling /Up skilling through certification** Technology changes and globalization are the two possible reactions for individuals to re-skill or up-skill. India is home to over 4,450 Edtech startups. The likes of Toppr BYJU'S, Vedantu, and Unacademy are quite popular in India. Global brands like Coursera, Udemy, and LinkedIn Learning are also popular in the Indian market.

**Quality Circle:** Education is about quality. The quality concept is applied to service improvements. The quality circle recommends solutions. The curriculum is an important aspect of quality education. Extension activities, Skilling, Placement, and Learning in a broader context are of interest in forming quality circles in universities and institutions.

## Discussions

The recommendations for higher education institutions during the pandemic

It is important for institutions to find out solutions with the use of technology and through integrated digital learning platforms, digital skills for teachers and students.

Ensure data privacy and security when sharing that the platforms shall not violate the student data privacy.

A blended approach to address psychological challenges before teaching is necessary. Creating online communities to ensure and examine the communication is happening among the stakeholders.

Provide orientation in Training Teachers and Students towards streaming of lectures.

Plan and Map the Curriculum with the distance learning programs to meet the needs of students. Formative tests, exercises in the course can be used to assess the student.

## Conclusion

A tech-embedded education system is a pandemic-proof solution that can also be something that can continue after the pandemic. It'll allow the higher education institutions and students to widen their outreach, by s adapting to a digital curriculum and digital learning. The mode of education is allowing the big corporate to conduct virtual placements and virtual internships minimizing the impact of the pandemic on career advancement. Education needs to be technology-driven in rural parts of India through a policy with a proactive approach in enabling the digital landscape. The learning tools, quality IT infrastructure, faculty and student familiarization to teaching technologies strengthen the countries digital learning. The institution and a student in the interior part of the country with the conduction of strategic analysis can grow considerably well in the market.

## Limitations and Future Scope of Study

The Study is a theoretical study can be validated and tested further using analytical tools. The technology enabled education has to be assessed as the concept is new in India the studies can be carried in assessing the level of student participation and his understanding while the higher educational instructions are aiming for transforming their approach from traditional to technology driven.

## References

1. Dharmendra Nagda, and Dharmesh Motwani. Role Of Ict In Quality Enhancement In Higher Educational Institutions- Opportunities & Challenges,Vol 4, No 12 (2018) International Education and Research Journal. http://ierj.in/journal/index.php/ierj/article/view/1797

2. Du C, Zan MC, Cho MJ, Fenton JI, Hsiao PY, Hsiao R, Keaver L, Lai CC, Lee H, Ludy MJ, Shen W. The Effects of Sleep Quality and Resilience on Perceived Stress, Dietary Behaviors, and Alcohol Misuse: A Mediation-Moderation Analysis of Higher Education Students from Asia, Europe and North America during the COVID-19 Pandemic. Nutrients. 2021 Feb;13(2):442. DOI:10.37074/jalt.2021.4.1.10

3. Gonzalez T, de la Rubia MA, Hincz KP, Comas-Lopez M, Subirats L, Fort S, et al. (2020) Influence of COVID-19 confinement on students' performance in higher education. PLoS ONE 15(10):e0239490. doi:10.1371/journal.pone.0239490https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239490

4. Hadiya Habib "Role of ICT in Higher Education" International Journal of Creative Research Thoughts (IJCRT) 2017 IJCRT | Volume 5, Issue 4pp 2810-2813 2017 | ISSN: 2320-2882 https://ijcrt.org/papers/IJCRT1704371.pdf

5. R. Krishnaveni and J.Meenakumari ."Usage of ICT for Information Administration in Higher education Institutions – A study" International Journal of Environmental Science and Development, Vol. 1, No. 3, Pg 282-286, August (2010), ISSN: 2010-0264. https://www.semanticscholar.org/paper/Usage-of-ICT-for-Information-

Administration-in-A-Krishnaveni-Meenakumari/c1a7381954044c0372a350453e350f3f850628b9?p2df

6. Rupal S. Patel, Renewing Use of ICT in Indian Higher Education. GAP BODHI TARU14 An International Peer-Reviewed Open Access Journal of Humanities, Volume: I, Issue: 1 ISSN: 2581-5857. https://www.gapbodhitaru.org/res/articles/Paper%20%203%20-%20Copy.pdf

7. Richard J. Schonberger. World Class Manufacturing: The next decade: Building Power, Strength and Value, Free Press,2013, ISBN: 978-1476747347 https://books.google.co.in/books?id=ojJNJoZ4_L0C&printsec=copyright&source=gbs_pub_info_r#v=onepage&q&f=false

8. Tahir Hussain Bhat, Andleeb Nazir , and Afaq Alam Khan "Impact of ICT in Higher Education: Opportunities and Challenges" International Journal of Advance Research in science and engineering" Vol.7, No.4,2008, Pg 1503-1509.
http://www.ijarse.com/images/fullpdf/1524847045_
JK1491IJARSE.p

9. Maatuk AM, Elberkawi EK, Aljawarneh S, Rashaideh H, Alharbi H. The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors. Journal of Computing in Higher Education. 2021 May 3:1-8.

10. Uttam Kr Pegu , Information and Communication Technology in Higher Education in India: Challenges and Opportunities,. International Journal of Information and Computation Technology, ISSN 0974-2239 Volume 4, Number 5 (2014), pp. 513-518. https://d1wqtxts1xzle7.cloudfront.net/51162454/ijictv4n5spl_11.pdf?1483444494=&response-content-disposition=inline%3B+filename%3DInformation_and_Communication_Technology.pdf&Expires=1620998481&Signature=BXcCnHyYTRGA2DZimUSa3xs2B7bG603OGYZ3cvl7T42RcNUulPzzLp~Mx-pMTUSKqPrzl7at7EqHLg8R~eKI~jJSTFCfNwb36UuS8o2zkfnl24Ad~2BvVG7yOubEIlP20SVBYDKWpTu8985yLbhv-jQEjtC9ZEYwTJW71e8Y~5vuzZD07icrWexpRTa1Ozds5ysYbfQjOazQUAt~1xM8iMZWninoxbbcFveSmDfi86rS2-I21QNvDGH8BZM8-9M521aOiUn~x~oP4uHUrTeOCSW2RAj3uLRtuJ7-bo9wy3Ghr4ID8V5pCg9YLzmuJw8FcH0vi-Y8GgU9q56N9zjtg__&Key-Pair-Id=APKAJLOHF5GGSLRBV4ZA

## Websites

1. https://www.orfonline.org/expert-speak/challenges-quality-education-times-pandemic/

2. https://www.expresscomputer.in/guest-blogs/how-important-is-technology-for-education-in-india-during-the-pandemic/61285/

3. https://www.financialexpress.com/education-2/coronavirus-impact-temporary-school-closure-may-cost-india-over-400-billion-says-world-bank/2104537/

4. https://timesofindia.indiatimes.com/home/education/news/10-online-learning-platforms-by-hrd-ugc/articleshow/74964325.cms

5. https://www.businesswire.com/news/home/20200710005233/en/Online-Education-Market-In-India-2020-2024-Increased-Penetration-of-Internet-and-Smartphones-to-Boost-Market-Growth-Technavio

6. https://sannams4.com/overview-of-online-education-in-india/

7. https://www.indiaeducationforum.org/research-report/Trends_and_Opportunities_in_the_Online_Learning_Market.pd

8. https://www.techrepublic.com/article/zoom-vs-microsoft-teams-google-meet-cisco-webex-and-skype-choosing-the-right-video-conferencing-apps-for-you/

9. https://www.ibef.org/download/education-and-training-apr-2019.pdf

10. https://www.researchgate.net/publication/350849186_Concerns_of_College_Students_during_the_COVID-19_Pandemic_Thematic_Perspectives_from_the_United_States_Asia_and_Europe

# THE PUBLIC DISTRIBUTION SYSTEM (PDS) AND FOOD SECURITY IN INDIA: SPECIAL REFERENCE TO COVID 19

## A. Shamshad

Department of Political Science, AKI'S Poona College of Arts, Science and Commerce, Camp, Pune
ashamshad2002@gmail.com

_____

## ABSTRACT

*India's Public Distribution System (PDS) is considered as one of the colossal distribution networks in the world. It came into prominence as a rationing measure during World War II. Import of food grains was the important factor of distribution through PDS before 1960s. Due to the scarcity of food, it accelerated its activities in the 1960s;Later, the Food Corporation of India and Agriculture Prices Commission was instituted to better local accumulation and dearth of food grains for Public Distribution System. PDS had bloomed into a more advanced global scheme for the disposal of government funded food by the end of 1970s.This scheme was improved upon for the better access to the common masses hailing from mountainous and remote regions particularly targeting less privileged section in the society. Keeping this in account, government initiated the Targeted Public Distribution System i.e., TPDS in1997, with a focus on needy people. The work of TPDS is centred on supplying the subsidised food grains such as wheat and rice via far-reaching network of ration shops. Such procured food grains from farmers are delivered to the ration shops under TPDS for the proper distribution of this entitlement to the beneficiaries. It's the duty of centre and state to identify the poor, procure grains and get it delivered to the beneficiaries. The National Food Safety Act (2013) was passed in the parliament in September 2013.This act functions on the existing TPDS to deliver the food to the needy households making it their justifiable and legal right. Food Security and Public Distribution System (PDS) work independently. Food Security stands for affordability, accessibility and availability of uninterrupted food supply to all the people. The problem of production and distribution of food is detrimental to the poor households that are affected with food insecurity. In these types of cases, the responsibility of food security is dependent on the proper scrutiny surveillance of government and the Public Distribution System (PDS). As per the Rome Declaration on World Food Security at the World Food Summit which was held in 1996, "Food security exists when all people have legal access to sufficient and nourishing food to fulfil their dietary requirements and food preferences for healthy life".*

_____

*Keywords: Public Distribution System, National Food Safety Act, Rationing, Food Security*

## Introduction

British introduced Public Distribution of grains through "rationing" system in India during the Second World War. Rationing system and Public Distribution System (PDS) have played a very pivotal role in eliminating the threats of famines and provided massive food security to the needy people. This system was initiated in Bombay in 1939, afterwards reached to other parts in India. One of the aims of government in India was to provide the food security to all the citizens of their country since post independence. Ministry of Consumer Affairs & Food and Civil supplies started Public Distribution System to fulfil the objectives laid down in this regard. Whereas, the Targeted Public Distribution System was instituted in 1997.

Public Distribution System is a government sponsored body with far-reaching chain of rationing shops which works towards the distribution of food and non food commodities to the economically backward classes of society at affordable rates. It is binding on the Centre and State Government to inspect and regulate the Public Distribution System. Activities like procurements, transportations, storage and large-scale allocation of food grains fall under the domain of Centre Government whereas, State Government is responsible for distributing these items to the disadvantaged section of society through Fair Price Shops. Other activities like identifying the families below poverty line (BPL), allocation of food supply, issue of ration cards and monitoring of Indian food security system i.e., FPSs are taken care by the State Government. These are established by the government of India under Ministry of Consumer Affairs, Food and Public Distribution in cooperation with State Governments. They distribute subsidized foods and non food commodities to the disadvantaged people in the society in India. These commodities are comprised of rice, wheat, sugar etc by food departments are distributed through certified

ration shops in several States across India. The Public Distribution System is acquired and maintained by a Government - owned corporation i.e., Food Corporation of India. Followings are the objectives and features of the Public Distribution System;

1. To safeguard the low-paid workers by ensuring the supply of certain minimum quantities of food grains at low price or availing the welfare facilities (food at affordable prices) for the poverty-stricken people.
2. Ensuring equitable distribution.
3. Controlling the inflation on essential commodities in the open market for price stability.
4. Availability of rations during the dearth of food grains, and
5. Eagle-eyed observation on private trade.

With a view to relieve famine and draught victims Public Distribution System started its work of supplying the food to them in 1939, it has also accelerated its activities in larger areas for the procurement, distribution, civic supplies and pricing policies of food grains. Followings are some of the important features of Public Distribution System:

1. The work of Public distribution System is to distribute the selected essential commodities via fair shops such as cooperative owned by Government and rationing shops. These fair shops are controlled and directed under the Government's inspection.
2. Wheat, sugar and rice are distributed as major food grains. Other items like edible oil and kerosene are also distributed to the low-income group in the society.
3. The functioning of free market mechanism is never hampered by the working of the Public Distribution System except in some statutory rationing areas. Consequently, it becomes a dual economy. Customers had two options to purchase the food grains either from the open market or Fair Price Shops.
4. Through the internal procurement system or imports and buffer stock, the government acquires the required amounts of food grains and other items by these two systems which are maintained with the demand of shortage

period. Government helps the Public Distribution System with the timely supplies, incurs the cost of subsidy and determines the quantity goods and rates to be distributed per family.
5. The primary objective of Public Distribution System is to provide basic minimum share of essential commodities at economical rates to the most disadvantaged sections in the society and accounts for the stabilization of their open market price to keep a tab on sudden rise in the prices during crisis. The government charges low rates as compared to open market prices and lessens the procurement and other costs borne by the government.
6. Basically, it covers sensitive urban areas where scarcity of food grains and essential commodities become huge political obligations of Government.

Public Distribution System is considered as a significant food security network in exposure and public expenditure. Rations shops cannot control the herculean task of food grain supplies and meet the requirements of disadvantaged sections of society. The PDS has been criticised for its unfairness in the equal distribution of commodities and is believed to be fiasco in serving the poorer strata of population.

## Phases & Reforms in the Public Distribution System in India

Amid 1960s, management of scarce supplies were emphasized in critical situation. As per the funding avenue Stoppage of PL 480 (Public Law 480 also known as Food for Peace (and commonly abbreviated PL 480) can be utilized for foreign aid. The imports compelled the Government to procure the grains internally. For the availing of food security, Indian took significant initiative with regard to provide a more sustainable institutional framework. In this regard, establishment of FC and Agricultural Prices Commission are termed as Agricultural Costs and Prices (BACP) Commission which heralded the inception of this phase. As per the BACP's recommended prices, the FCI gains the food commodities to dispatch through PDS and a share of the procured quantity is kept as 'buffer stock' to meet any unprecedented situation. If farmers are benefited with

affordable prices, this will surely open up employment opportunities for poor farmers and allied workers, consequently, it will turn into a huge source of happiness for them.

Major segments of this system were inclusive of unconventional set ups and methods of procurement, storing and distributing of food grains. There was a terrific progress in the food security system as a pivotal part of developmental strategies to incorporate changes in the selected food crops, specifically wheat and rice.

There was a surge in the food grains production during 70s & 80s in the country. There was also a drastic increase in the accumulation of buffer stock. With this, the main emphasis on buffer stock maintenance and price control shifted to hike in Public Distribution System supplies. In the 4th plan, (1969-1974, Planning Commission) it states that "in so far as food grains are concerned the basic objective is to provide an effective Public Distribution System. The procured quantities were in excess as compared to the requirement of Public Distribution System needs and minimum reserve was maintained".

As compared to the requirement of PDS, the procured quantities of food grains were abundant and minimum reserve was maintained a programme named Antyodaya were started to lessen the poverty and reduce the overstocking of FCI godowns in fifth year- plan.

The imports gradually slowed down during this period in the year 1975, though small in quantity, there was a net exports of food commodities during this time. To maintain the level of buffer stock, the imports were consistent relatively with less quantity. Government reinforced the PDS in this period for a stable and enduring feature of strategy to regulate the prices, lessen the fluctuations in them and obtain an equal distribution of consumer goods. By the end of 1970s, the PDS was mainly restrictive to city population and did not avail adequate food to the rural population in need. Some state governments extended the scope of Public Distribution System to rural areas and demarcated the target group during the late 1970s and beginning of 1980s. These states are Gujarat, Andhra Pradesh, Tamil Nadu and Kerala. During the later years in 80s and 90s, it was also as there was well marked change in the

food situation. Therefore, there was a sharp increase in the net availability of food grains from 75 million tons in 1968 to 99 million tons in 1977 and again it witnesses a sharp rise in later years reaching million tonnes in 1991.

## Reforms in the PDS

It has been noted that the Government has brought several programmes to modernise the Public Distribution System. The government made use of advanced technology such as digitalisation and computerisation of Public Distribution System to expedite the project. Government wants to automate all the ration shops across the country. This initiative has already been started in the state of Gujarat and Odisha by their respective governments. Some states are making use of innovative technologies to ensure the distribution of food grains in transparent manner with the active involvement of panchayat and village leaders with proper monitoring from Gram Sabha.

The Department of Food and Public Distribution in collaboration with the Indian government have sorted out critical facets of PDS that need urgent improvement to perform its work successfully. Followings are some of the measures;

1. Beneficiary identification, and addressing inclusion/exclusion errors
2. Addressing diversions and leakages
3. Managing food grain storage and ensuring timely distribution
4. Effective accountability and monitoring, and enabling community monitoring
5. Mechanisms for grievance redressal
6. Ensuring food security

## Leveraging Aadhar

One of the recent discoveries in our country is Aadhar card which modernizes the Public Distribution System. Indian Government considers the Unique Identification number i.e., Aadhar a mandatory document for the exclusive verification of the records of its citizens across the country. The official order for the UIDAI (Unique Identification Authority of India) entails the definition of the usages of this unique number for critical applications and services.

UIDAI can play a vital role in the Public distribution System application. The

beneficiaries of PDS can be documented into the Aadhar system. It is noted that amalgamation of Aadhar system with PDS will reduce duplicity and bogus beneficiaries in Public Distribution System database which will facilitate in reducing wastage and distractions in the system. Reinforcement of PDS not only needs digitalization of operations but also coordination with Panchayat Raj Institutions and local community through transparent system. In this system, a mechanized system will keep track the flow of food grains and guarantee that there is no human intervention in the handling of records.

The principal goal of Government of India is to modernize the Targeted Public Distribution System (TPDS). TPDS plans to avail subsidized food through the large network of ration shops. Food grains such as wheat and rice that are availed under TPDS are obtained from farmers, apportioned to the states and delivered to the ration shops to be taken by the appropriate beneficiaries. It is an assiduous task as Public Distribution System functions in all the States and UTs than 5 lacks Fair Price Shops across varied operational environments. Antyodaya Anna Yojana (AAY) was started in December, 2000 for ten million poor families. It anticipates providing food commodities at a subsidized rate of Rs.2/ kg for wheat and Rs. 3/ kg for rice. The States/UTs are required to incur the distribution cost, inclusive the margins to dealers and retailers as well as the transportation cost. Thus, the whole benefit of subsidy is being passed on to the legal beneficiaries under the Antyodaya Anna Yojana (AAY).

**Challenges before Public Distribution System**

Despite the obsolete system of Public Distribution and tremendous stock of food grains, starvation and malnutrition still engulf various parts of India. These disparities across states have deteriorated the matters further to the sufferings of poor. At this very inception, India is confronting the problems of food insecurity for quite a long period of time. Food security is one of the fundamental criteria for the improvement and formation of human capital and the productiveness of human being. Precisely speaking, food security exists when all people have physical and economic access, nutritious food to fulfil the dietary requirements

and food preferences for vital and healthy life. Public Distribution System is the most important medium through which the government ensures food security to the people at the micro level. But, the working of PDS and the other government policies have not been successful in achieving food security at the desired level in India. Presently, huge modernization drive is needed to reach supply of food grains to the actual receipt without the leakages and diversion of the route to the grass level. There is also urgency for the digitalization and computerization of data with regard to beneficiaries and entire food chain supply to ensure the PDS works successfully. These attempts would make the schemes crystal clear; assist uproot fraudulent practices, leakages and allows the beneficiaries to get the products as per their legal rights. It can be supped up after the assessment of the Public distribution system, this process is subject to the numerous challenges like diversion of food grains and leakages, bogus ration cards, inclusion /exclusion errors, , lack of transparency and practicality of Fair Price Shops.

The PDS speeds up the supply of food grains and the dispatch of essential merchandises to disadvantaged population through the large network of Fair Shops regularly at the subsidized rates throughout the nation. It is an integral part of the Government's policy to manage the food economy in the country. This scheme was started with an intention to regulate the rising subsidized food bill incurred by the government as well as to ensure a clearer targeting of poor and the disadvantaged group. Under the join responsibility of Central and State government, the Public Distribution System works. Through the Food Cooperation of India (FCI), Central Government has presumed its duty for storage, procurement, transportation and bulk allocation of food commodities to the State Government. These responsibilities are comprised of allocation within the State, issues of Ration cards, identification of suitable families and the supervision and functioning of Fair Price Shops (FPSs). Under the Public Distribution System rice, wheat and kerosene are being apportioned to the States /UTs for distribution.

The major beneficiaries of PDS goods are rural families of six crore whom about 72 lakh tonnes

of food commodities were sanctioned during 2006. The government introduced Targeted Public Distribution System (TPDS) from June, 1997. As per this scheme, the states are supposed to formulate and implement full-fledged arrangements for the identification of poor. Taking into account the failure of PDS with regard to the service of poor people, the government began issuing unique ration cards to the people living Below Poverty Line.  For ensuring the food security to the poor, PDS has evolved one of the major instruments of the government's financial policy and is considered as the largest network of its kind across the globe with 5 lakh Fair Price Shops.

However, the data points out that around 60% poor households using PDS are unable to get ration supplies. It is also stated that in high poverty-stricken states, 'out of stock' scenarios were as high as 80%. And 34% of those going to PDS offices had to pay four or more visits before any action was taken against their grievances. Moreover, around 50% of them took the help of bribe to get the new ration cards issued. Even though, the owners of fair price shops are to be blamed for the corruption, they also have genuine problems which also need to be addressed. Very meagre margin in business accounts for low profitability, particularly after the launch of Targeted Public Distribution System. They are given very low credit they cannot life up enough food grains from the Government godowns. Sometimes, they have to pay the bribe to the PDS officials to get the sufficient supply of food grains. The government-run Food Corporation of India procures food grains for PDS from farmers. Many times, the support price is very low as a result of that FCI can only bargain for low quality grains and the rest goes to the open market. Corruption is more rampant in UP, Delhi, Bihar and the Northern State's PDS, whereas, Himanchal Pradesh and Kerala are considered as comparatively less corrupt states.

Central Vigilance Committee appointed by the Supreme Court has censured PDS as one of the most corrupt sectors, mentioning political intervention as the root cause of its failure in various states. "Corruption is all pervasive in the entire chain involved in the PDS. It continues to remain a formidable problem. It is true that some officers are doing a good job but then most of the functionaries under them in the Department are typically callous and resort to corrupt practices." This remark has been given by the Central Vigilance Committee headed by Justice D.P. Wadhwa, retired Supreme Court judge, submitted its report to a Bench of Justice Dalveer Bhandari and K.S. Radhakrishnan, hearing a petition on the need for streamlining the PDS. Senior counsel Colin Gonzalves, appearing for the People's Union for Civil Liberties, announced the committee's concerns over the mal functioning of the PDS in various States, and submitted a chart based on hid findings. The Bench recorded the report for further deliberation. The report stated that fraudulent practices in the PDs was a cancerous growth and had to be abolished as the patchwork would be in vain. "The Central government gives a whopping Rs. 28,000 crores annually to the States to subsidise food for the poor but till the recommendations of the committee are put in place, the poor will go on suffering at the hands of corrupt officials, dishonest fair price shop (FPS) owners, treacherous transporters and, possibly to a large extent, unscrupulous millers as well." There was diversion of food grain supplies to the PDS on a massive scale, black marketing by Fair Price System dealers, a strong nexus between the government officials and the dealers, improper records in registers, and most importantly political interventions hamper public distribution. Starting from Delhi, "the PDS is inefficient and corrupt. There is diversion and black marketing of PDS food grains on a large scale. Subsidised food grains do not reach the poor, who desperately need the same. These poor people never get the PDS food grains in proper quantity and quality. There is all-round complicity of FPS, transporters and corrupt officials of the Civil Supplies Department."

The report stated that in Rajasthan, Jharkhand & Bihar the PDS "is unsatisfactory; there are many irregularities, irregular lifting of grain, no lifting and bulk lifting. PDS has collapsed. The committee was informed that political pressure is put on officials and the advisory committee in appointment of FPS dealers." The distribution mechanism of these States has been continued in the hands of the most corrupt and inefficient people. The committee was informed that rotten grain and good grain are lying together in the

godowns." If FPS owners do not pay the godowns manager Rs. 10-20 a bag, he supplies rotten grain, says the report. The report also says that in Bihar, "the most disappointing fact is that food grains are not distributed every month. The committee visited many villages and towns and met lots of beneficiaries. It was a general complaint that during the last many years, they got food grains only for 2 to 3 months. The state of affairs in Karnataka, Orissa, Uttarakhand and Gujarat was similar, says the report.

## Global Hunger Index & Food Security

As per the report, our country is ranked 94th among 107 countries in the Global Hunger Index (2020) and falls under serious hunger category with 27.2 score. Last year, it was 102nd out of 117 countries. In the hunger index, India is behind Nepal (73rd), Bangladesh (75th), Pakistan (88th), and Indonesia (70) among other countries. Among 107 countries, merely 13 countries have done worse than India namely Rwanda (97th), Nigeria (98th), Liberia (102nd), Afghanistan (99), Chad (107), and Mozambique (103rd) among others. Other 17 nations including, Turkey, Belarus, China, Ukraine, Kuwait and Cuba shared top spots with GHI scores less than five as per the website of the Global Hunger Index that tracks the same. The mortality rate stood at 3.7 % under five years old population. Report says that 14% of India's population is affected with malnutrition. It also points out that the recorded a child stunning rate of 37.4 %. These children known as stunted children are those who have "low height against their age", signifying severe under-nutrition.

## Working of PDS in the period of Covid Pandemic

There is huge growing concern of food insecurity and economic slowdown due to the Coronavirus pandemic all over the world. Lockdowns, border closing, quarantine requirements, social distancing restrictions have hindered the supply and distribution agencies putting the huge pressure on them to make availability and accessibility of food grains to the masses. Precarious occupations are worst hit pushing the people to the loss of their livelihoods and even risking their basic needs. As per the estimate of World Bank around 71 million people will confront utter poverty

globally due to this pandemic. The UN has pointed out that we are going through one of the worst phases in the history of impeding food emergency. The World Food Programme has estimated that around 130 million people will suffer from food insecurity. This number may rise to 820 million as predicted by the State of Food insecurity in the World report, 2019.The covid-19 pandemic and the Nation-Wise lockdown has caused many people to lose their livelihoods and multiplied the demand depression that the country was already confronting. Due to the growing unemployment rate and stagnant rural wages, the country was already going through the worst phase long before the lockdown. Coronavirus pandemic deteriorated the precocity of many people's lives throughout the country. Consequently, the dual attack of slowdown and rising unemployment has resulted in massive food insecurity in India during this time.

It's a matter of great concern that this might have worst effects on the nutrition status of people. In this situation, PDS plays a vital role in extending support to the affected population under the supervision of government. Even though these are some significant innovations to provide the food and cash to the people, still there are some lacunas which need to be addressed. The availability of abundant food stocks can be utilized as an opportunity to provide universal Public Distribution System which is immensely needed now. Other issues such as inclusion of oils and pulses, universal food support through school meal, decentralized procurement, Integrated Child development Services and enhanced cash transfer through social security schemes must be deal with earnestness. Undoubtedly despite some shortcomings, PDS has contributed a great deal of support to the people after the worst impact of national lockdown. However, the necessity for some support in the form of subsidized or free food commodities to a substantial population than those documented by the national Food Security Act (2013), is crucial in current scenario where there is a huge spike in Corona Virus cases which has devastated the economy.

It evident from the data from last few months that PDS has been proven as one of the effectual platforms which garnered support and access to

the people. Azim Premji University has conducted a Covid-19 survey and have found that about 20% of worst affected households did not receive any rations, while about 50 % of households were not benefited from the cash transfer facility, consequently exhibiting the relative effectiveness of Public Distribution System comparatively other relief measures. It has been traced in the research that in Chhattisgarh that more than 300 families were 95% of them reported having ration cards, on the basis of these findings Public Distribution System must provide rations to the affected families during this pandemic.

## Concluding Observations & Suggestions

It has been found that there are large number of beneficiaries in the single state that is, Kerala that have a durable infrastructure for the PDS. Given the state of Kerala, it has received around 12 percent of food grains through Public Distribution System. This state accounts for around 3 percent of total population of India. In this circumstance, it can be pointed out that Bihar is the less benefited states from the operation of PDS, this state does not get any neither any benefit from food procurement and distribution operations. India cannot afford to rely on more import of food commodities to meet its requirements due to its large continental dimensions. On the other hand, there is an urgent need to produce more food grains and during the times of need, rest of the commodities can be imported for the efficient distribution. The PDS in the country supports the transfer of the food grains grown locally to the benefits of poor and disadvantaged population in several geographical regions. The growing food subsidy and food stocks have come under the suspicion for the cost-ineffectiveness of the PDs. There is a need for the reconstruction of the PDS to abolish hunger and make food commodities available to the poor in a cost-effective manner wherever they may be.

Not only the major food deficit States but also the major surplus States are the major beneficiaries of PDS. Not only the PDS helps in achieving the objectives of food security in food deficit States but also it generates a ready demand for the supplies in surplus producing States.

The following points may be taken into consideration for the effective implementation of TPDS:

1. Commodities other than wheat and rice needed to be kept out from the ambit of TRDS. Its major goal of providing subsidized food to the poor is to be guaranteed food security to them. Wheat and rice are two sought after commodities in India which are considered as the basic necessities. Hence, food subsidy must be provided for these two commodities.

2. Commodities such as sugar should be excluded from the purview of PDS. Sugar should not be tempered with and the system of tax on sugar should be stopped.

3. It is expostulated that if the production of coarse cereals is accelerated in dry land areas, it can check the degradation of soil leading to environmental damage. But there is a difficulty in supplying coarse cereals through PDS on subsidized rate under the cover of food security. Coarse grains cannot be stored for long time that makes it unsuitable for the long-term storage and distribution under PDS. Standard variety of coarse grains is not available; hence, it cannot be included in the national level program. But government can take some concrete steps to supply it as per the needs of the specific regions.

4. One of the commodities is Kerosene oil which is supplied through PDS for the poor. This is one of the essential items in which a large-scale illicit diversion occurs, poor and needy are cornered by fraudulent people and subsidized kerosene is adulterated with diesel to make money. Subsidy on kerosene is meant for the poor but rich corner them and uses the same for commercial purposes.

5. A large number of commodities should be resisted to be included in the coverage of food subsidy.

6. The FPS (Fair Price Shop) should be allowed to sell all the commodities other than wheat and rice at full market prices via PDS outlets so as to ensure their economic feasibility.

7. The beneficiaries from the population below the poverty lines should be taken into account for TDPS and food security. And

the people a who are above the poverty line should be facilitated with the availability of good grains at a stable price in the market. The coverage of food subsidy should not be extended to the people above poverty line ensuring no needy person is left from the benefits. Stability in food grain prices should be ensured through the maintenance of a buffer stock and open market operations of the FCI. Nevertheless, there is huge surplus of food grains with FCI, it's advisable to continue the supply of food grains under PDS to the APL population for the temporary relief.

8. Given the liberalization of external sector, timely exports and imports will supplement the operation of buffer stock leading to the smaller size of required buffer stock.

9. For identification and other purposes rations cards can be used by the administration. For this to work smoothly, multi-purpose identity cards should be issued in future. Many people produce ration cards only to prove their identity before the administration.

10. There are various operational schemes which are in the favour of the welfare or income transfer schemes where distribution of essential commodities is involved. Such schemes with others which are serving the same purpose can be merged and some sort of convergences among them can be strengthened.

11. Some community grain banks can by established in very sensitive areas where from disadvantaged people can take grain when they are in need and pay off the same in the form of grains after their ordeal is over. Government and the administration must work towards safeguarding them from natural disaster like earth quake and flood which spurt starvation.

At last, old, sick and disabled must be provided with a minimal amount of social security as they are not able to give their services even if the employment is available for them. Government must implement some special schemes so that they are not starved.

## Reference

1. Angus Deaton & Jean Dreze,( 2009) Food and nutrition in India: Facts and interpretations, Economic & Political Weekly, 44(7), 42–65.

2. Government of India, Agricultural Statistics at a Glance, Ministry of Agriculture, New Delhi, 2003.

3. Government of India, Annual Report 2002-03, Department of Food and Public Distribution, New Delhi, 2003.

4. Government of India, Report of the Working Group on Public Distribution System and Food Security, Planning Commission, New Delhi,2001.

5. Government of India, Tenth Five Year Plan (2002-07), Planning Commission, New Delhi, 2002.

6. Jean Dreze & Rohan Khera, (2015) Understanding leakages in the public distribution system, Economic & Political Weekly, 50(7), 39–42.

7. Jean Dreze, Rohan Khera,( 2013) Rural poverty and the public distribution system. Economic & Political Weekly, 48(45–46), 55–60.

8. JeanDreze, Excess stocks of the Food Corporation of India must be released to the poor, Indian Express,2020. https://indianexpress.com/article/opinion/col umns/coronavirus-lockdown-food-for-poor-migrants-mass-exodus-jean-dreze-6353790

9. JeanDreze, Rohan Khera, Thought for food. Outlook, 2015. https://www.outlookindia.com/ magazine/story/thought-for-food/295144

10. Kaushik Basu,( 2011) India's foodgrain policy: An economic theory perspective, Economic & Political Weekly, 46(5), 37–45.

11. P.V. Rajeev, (1999) Planning for Social Reforms, Deep and Deep Publications, New Delhi.

12. Reforms in the Public Distribution System and Better Targeting of Food Subsidies, Working Group on Reforms in the Public Distribution System and Better Targeting of Food Subsidies during the 12th Plan Period,

Department of Food and Public Distribution, Planning Commission, July 29, 2011.

13. Tata Economic Consultancy Services, Study to Identify Diversion of PDS Commodities from Fair Price Shops, New Delhi, 1998.

14. World Bank, India's public distribution system: A national and international perspective, World Bank: Poverty and Social Policy Department,1996.

15. http://planningcommission.nic.in/aboutus/committee/wrkgrp12/pp/wg_pds.pdf.

# IMPACT ANALYSIS ON SHRIMP FARMS OF NAVSARI DISTRICT, GUJARAT, INDIA WITH REFERENCE TO COVID 19 PANDEMIC

## R. Bengani, K. Manoj, A. Varsani and J. Chotliya

Department of Aquatic Biology, Veer Narmad South Gujarat University Surat, Gujarat, India
Email: ranjanabengani@vnsgu.ac.in

_____

## ABSTRACT

*Shrimp farming sector has been known as an important area in the economic growth of India. On March 25th, India initiated a strict 21-day lockdown, later extended till May 31st. Still at present India is not fully unlocked and restrictions are present. The whole aquaculture production system was disturbed due to COVID 19 pandemic. Survey was carried out using structured questionnaires through direct interview to collect the relevant information from different shrimp farms of Navsari district. Survey results revealed that COVID-19 pandemic affected different areas of shrimp farming sector. Overall farm production and development was affected including reduction in consumption, cancellation and loss of export order, reduction in selling price as well as demand, delayed in stocking, lack of technical support and skilled manpower. The most affected area was transport sector that hampered seed procurement and selling of harvested crop. Inadequate storage facilities were principal reason for the spoilage of their production. It is recommended to implement government assistance so farmers can sustain post lockdown for managing the farm activities*

_____

*Keywords: COVID-19, aquaculture, analysis, production*

## Introduction

Shrimp farming is an aquaculture entrepreneurial activity that exists in marine, brackish or freshwater environments, culturing shrimp or prawn for human consumption. Shrimp are a highly nutritive valuable commodity among the edible crustaceans (Lemos et al., 2004). Globally, shrimps represent 15% of the world trade of fish and fishery products in terms of value, and are ranked as second highest food commodity after tuna (FAO, 2016).

In recent years, although global farmed shrimp production has increased to 5.7 million tons in 2010 (Brito et al., 2016) and about 25% of shrimp sold on the world market are raised on shrimp farms (Boyd et al., 1998). Shrimp farms operated with good management and business practices can be profitable and benefit the local economy by creating jobs in production, processing, marketing, feed manufacture, transportation and related support services. In India farmed shrimps alone account for 51% of the total earnings and shrimp farming is being practiced in about 1.2 lakh ha with a production of 4.26 lakh ton (MPEDA, 2016). It has been recognized as a part of Blue Revolution for geographic features of southwest. It has created a wage – earning employment opportunities to the poor peasant households of coastal people. They are involved in fry collection, farming, harvesting and processing of shrimp (Barmon, et al., 2006)

India announced, a strict 21-day lockdown on March 25th and the lockdown was later extended until May 31st (https://fish.cgiar.org/news-and-updates,2020) All the fishing activities were halted and there was closure of storage facilities, markets, and processing plants. On April 9th, India's Ministry of Home Affairs allowed fishing and aquaculture businesses to pursue their activities under conditions of following the COVID -19 guidelines (economictimes.indiatimes.com,2020). The was great effect on both International and national fishing sectors. Frozen shrimp which makes up 70% of India's seafood export earnings have been severely affected (https://fish.cgiar.org/news-and-updates,2020). or India's shrimp farmers, the lockdown was announced at the beginning of its summer farming season (between March and July). This period usually yields 60 percent of India's annual shrimp production, with the winter crop (between August and December) making up the remainder(https://thefishsite.com/articles/how-

has-indias-shrimp-sector-weathered-the-covid-19-crisis)

A majority of India's farmers (85%) are small and marginal farmers with less than two hectares of land. More than nine million active fishers directly depend on fisheries for their livelihood, 80% of which are small scale fishers; the sector as a whole employs over 14 million people (https://www.hakaimagazine.com/news/indias-fishers,2020).The pandemic created an unprecedented economic, social and health crisis with impacts on the most vulnerable groups including women (harvesters, processors and vendors), migrant fishers, fish workers, ethnic minorities and crewmembers (https://www.orfonline.org/expert-speak/impact-covid19,2020). The study carried out by Bennett et al., 2020, on assessment on COVID-19 impact indicated that shrimp farming got disrupted as supply chains were broken, labour shortage emerged and market access got affected.

The present study was aimed to identify the constraints affecting aquaculture development and profitability ratio of shrimp farming due to limitations and restrictions because of COVID-19 pandemic. Navsari district of Gujarat state was selected purposively for the study as the district accounts for the largest shrimp farming area (12037.18 ha) in the state. There is total 346 farms present in Navsari region. Farmers of Navsari district mostly prefer to culture *Litopenaeus. Vannamei* specie of shrimp which is of great economic importance.

## Materials and Methods

Basic information of farmers was collected from the Marine Products Exports Development Authority (MPEDA). Two blocks namely Jalalpore and Gandevi having highest shrimp production in the district were selected for the study (Fig.1). From each of the sampled block, two clusters of villages were selected based on area under shrimp culture. Total of fifty selected farms were visited and details about farmers were collected. The farmers belonged to different villages like Machad, Matvad, Karadi, Samapor, Onjal, Mangrol, Bhat, Bhinar, Danti, Mendhar, Vansi and Borsi. Following the method of Kothari and Garg (2014), personal interview of the farmers was taken from the selected sites with pre structured questionnaire.
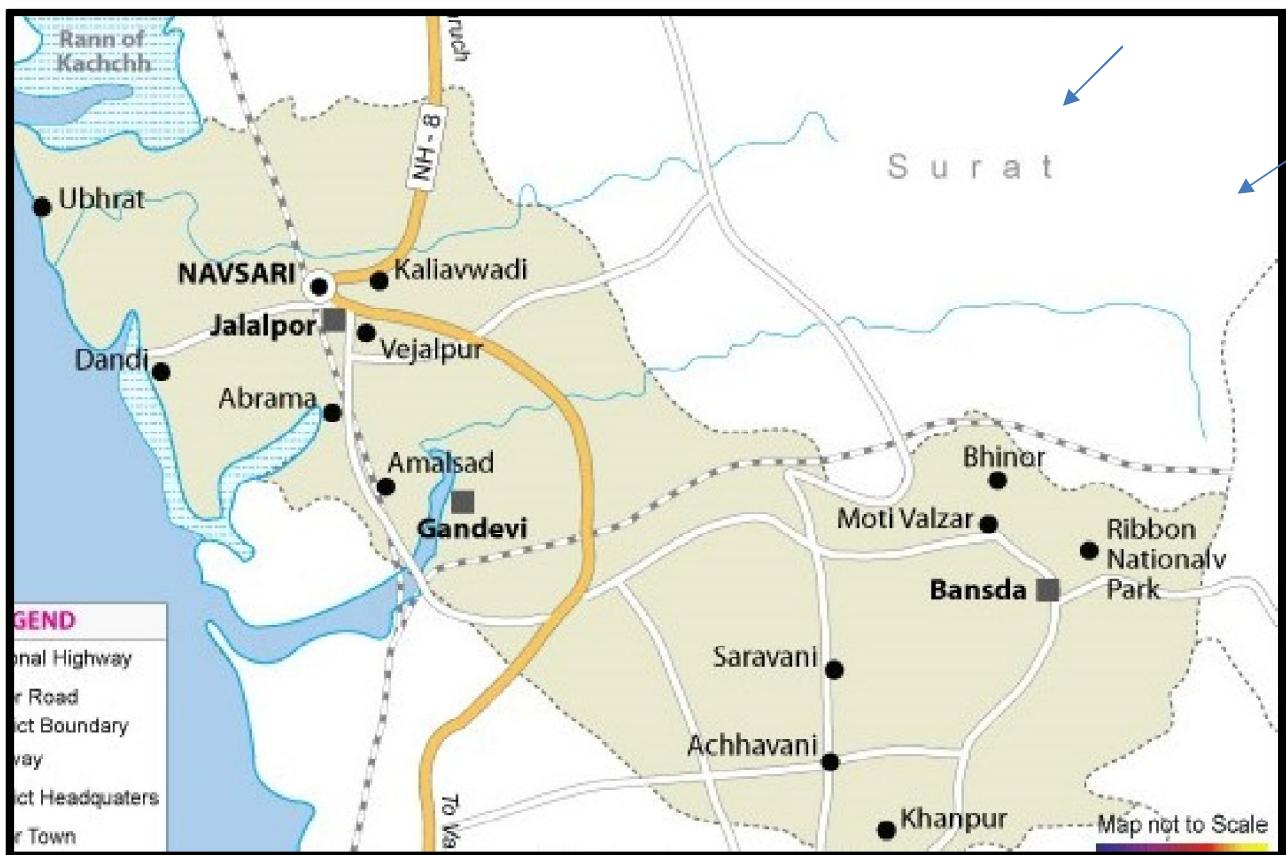


Fig. 1 Map showing selected blocks of Navsari district

Fig 2. Map depicting selected villages

## Result and Discussion

### Basic Details of Farmers

During the survey maximum numbers of farmers were from village Samapor whereas least number were from Machhad village (Fig.1.1). The education level of farmers surveyed is summarized in (Table 1.2). Education level of the respondents were categorized into 3 group: secondary level of education (38%). higher secondary (36%) and

graduation level (26%), Fig. 1.3. According to survey it was observed that shrimp farmers owned shrimp farming training to operate and setup farm from different agencies. It was found that 10% of farmer got their training from Fisheries department & 84% from MPEDA. (Figure 1.4). It was observed that all shrimp farmers were experienced and around 60% of shrimp farmers had experience between 4 to 10 years followed by 14% farmers with farming experience between 11 to 17 years, 12 % of the farmers had experience between 18 to 24 years and 14% of the farmers had experience of 25 to 31 years (Figure 1.5).

It was observed that around 82% shrimp farms were having farm size between 1 to 10 ha followed by 8% with farm size between 11 to 20 ha. Around 6% of shrimp farms were having a farm size of 21 to 30 ha and only 2% of shrimp farms were having farm size 41 to 50 ha. (Figure 1.6).

Patil et al. (2018) in their study in Palghar district, Maharashtra reported that higher percentages of shrimp farmers (54.55%) were with experience between six to ten years. Similar results were reported by Kumaran et al. (2017) mentioning that 94.65 % farmers were with more than five-year experience in East coast of India. Shrimp farming industry was at its peak around 1994- 95 throughout India, but collapsed thereafter and has established the root once again after introduction of SPF *Litopenaeus vannamei* in 2008. This may be the reason that maximum shrimp farmers were having experience between 6-10 years. The present study findings are similar to that of Dona et al., (2016) where they reported that the education level of shrimp farmers indicated that no one was illiterate. Similar results were also found by Srinivas and Venkatrayalu (2016). Lekshmi et al., (2005) reported that 40 percent had collegiate level of education in shrimp farmers and 30 percent of shrimp farmers had primary education in Andhra Pradesh. Ogunmefun and Achike (2017) also reported that the majority (60%) of the respondents possessing secondary education and 37% were found to possess tertiary education with only very few (3%) respondents indicating to have only completed primary education.

Mohite (2007) reported that 65.79 % of the shrimp farmers had less than two hectares of farm size. The results reported in the present study are in accordance with results reported by Salunkhe (2018), Srinivas and Vankatraylu (2016), Randive (2008) and Gawade (2006). Patil et al., (2018) in their study in Palghar district, Maharashtra reported that most of shrimp farmers (40%) were having farm area between 2 and 5 ha. In South Konkan region, Maharashtra, most of the shrimp farmers were new entrants and immediate investment for bigger size farm was not possible for them. This could be the main reason for farmers opting small size farms.

Naik et al. (2020) reported most of the shrimp farmers in South Konkan region, Maharashtra (52.54%) were registered with CAA, Similar findings were reported in the present study were

### Covid 19 Impact Analysis in Shrimp Farms

India went into a lockdown in late March 2020 to control the coronavirus pandemic. Many farmers panicked and harvested their shrimp while shrimp processing plants faced cancellation and postponement of purchase orders, possible shutdown of the factories and migrant workers returning to their homes. These all had challenges in receiving the harvested shrimp.

The effect of COVID 19 was also perceived in shrimp farms of Navsari district. The impact of COVID 19 was analyzed graphically.

The study indicated that 54% of the studied farm concluded that the income was decreased due to pandemic effect. 86% of the farmers revealed that farm operation was affected while 24% of the farmers claimed that that the overall farm development was affected due to pandemic, Figure 1.7. The effect of pandemic on harvesting aspect was surveyed and it was observed that COVID 19 had a great impact on harvesting due to unavailability of accessories and workers. (Figure 1.8). The problem of COVID 19 was also observed on post harvesting period of shrimp cultures. 48% of the farmers revealed inadequate storage facility, 74% stated inadequate ice facilities and 34% of them stated that there was breakdown of cold chains (Figure 1.9).

The observation regarding the overall production during the pandemic was accessed. It was revealed that only 10% of the farms got good production whereas 64% of the farm stated that the production was averages the farms that got poor production due to lack of infrastructure during pandemic was around 20% (Figure 1.10).

Due to COVID 19 pandemic India faced a long lockdown for 6 months. In these 6 months all personal and government vehicle transportation services was disturbed. The same effect was also perceived in shrimp cultures as 10% revealed that inadequate transport facility was present and 78% of the farmers stated that there was high transportation cost. 56 % of the farmers said that there was inadequate manpower to provide transportation facilities. (Figure 1.11)

The brief data collected on impact of COVID 19 pandemic revealed that uncontrolled disease occurred during the pandemic period that made them difficult to sustain in this field post pandemic. The questions on providing guideline to farmers to sustain during pandemic revealed that only 18% got some type of guidelines and 16% of the farmers are thinking of alternative livelihood (Figure 1.12).

In India aquaculture industry plays very important role in food chain and economy. The lock down period because of COVID-19 pandemic brough great series of trouble with it, the aquaculture industry had to face various troubles relate to transportation and availability. According to Manoj et al. (2020) after the pandemic lockdown, majority of farmers were having no active fishing days. Farmers faced difficulties in different sector of farming process. Transportation problems were faced due to high cost of transportation and the farmers were bearing huge losses due to lack of proper storage facilities, transportation and prone to rot the production in the farm and harbours. The absence of transport facilities limited the movement of migratory harvest labour, technicians and supply of Agri machinery. Stephens et al., 2020 also concluded that quarantine measures were the factors that severely affected the labour availability and other farm activities. Complete lockdown in the harbours and the landing centers has greatly affected the fisher-

folks' day-to-day earnings in all coastal districts (https://www.mssrf.org/content/covid19-impact-livelihoods). Kumaran et al ,2021 in their survey reported adverse impact of COVID 19 pandemic on shrimp farming sector.
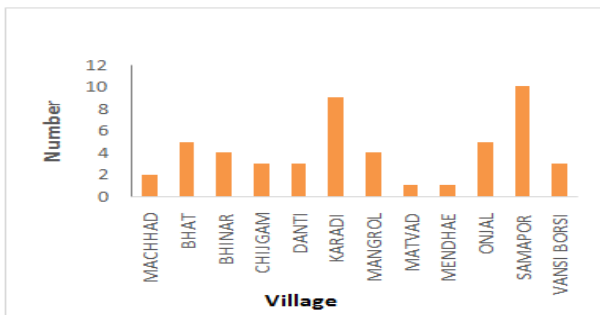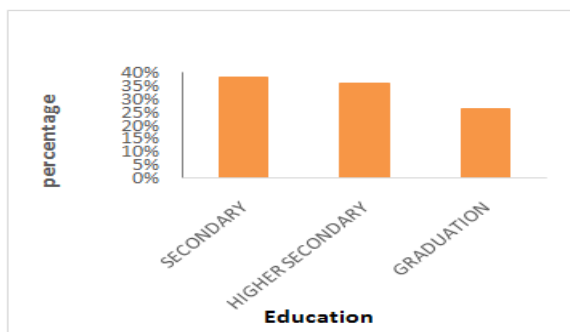

Figure 1.1 Location of farm
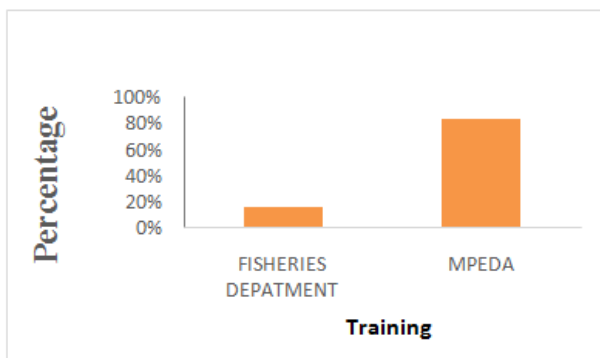

Figure 1.2 Education of Farmer


Fig. 1.3   Training


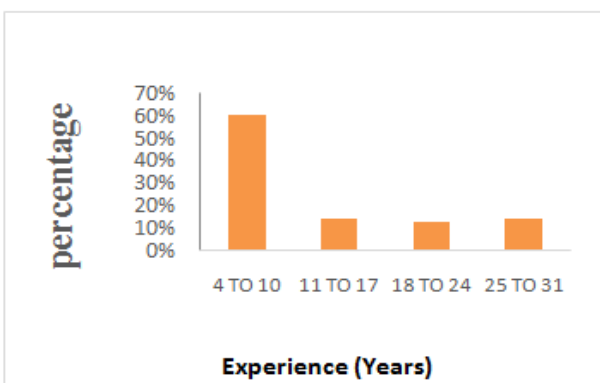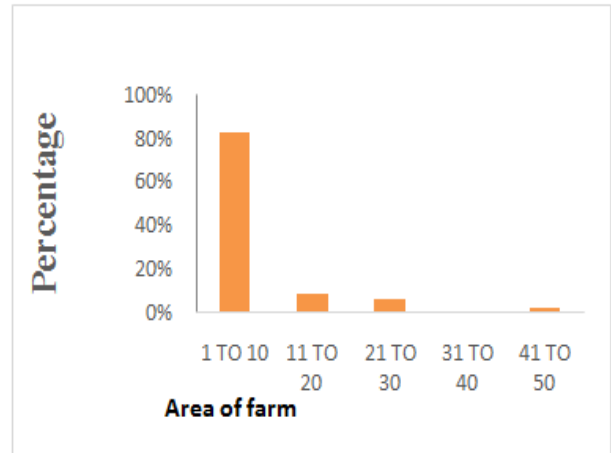Fig. 1.4 Experience of farmers


Fig.1.5 Size of Farm
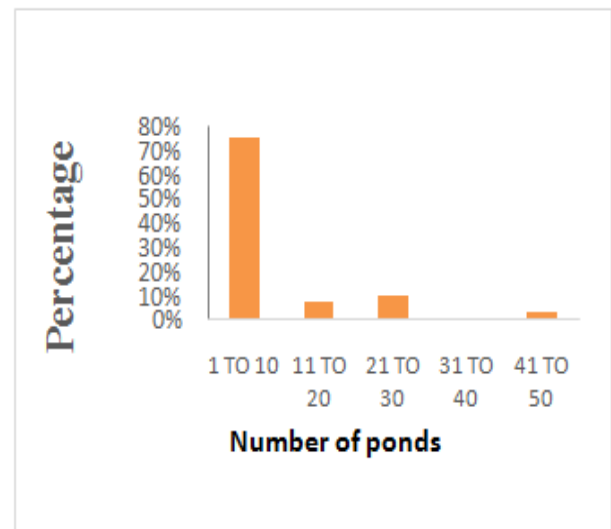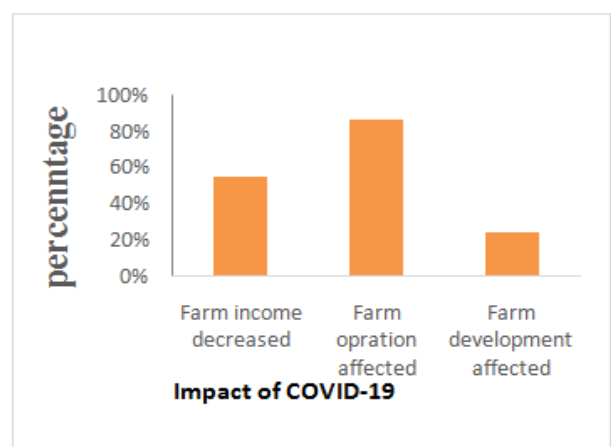

Fig.1.6 Number of ponds


Fig. 1.7 Overall impact of COVID-19 on farms
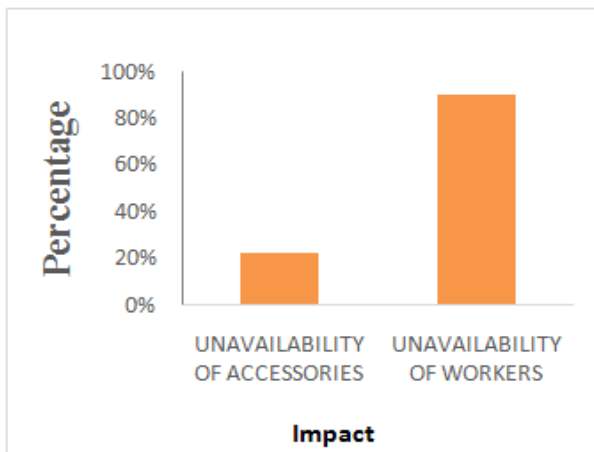
COVID-19





Fig 1.8 COVID-19 impact on accessories

Fig. 1.12  Impact on disease outbreak and other factors
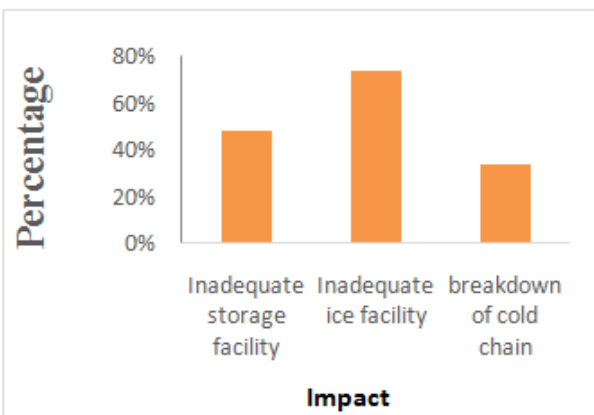


Fig.1.9 Post harvesting impact due to COVID-19
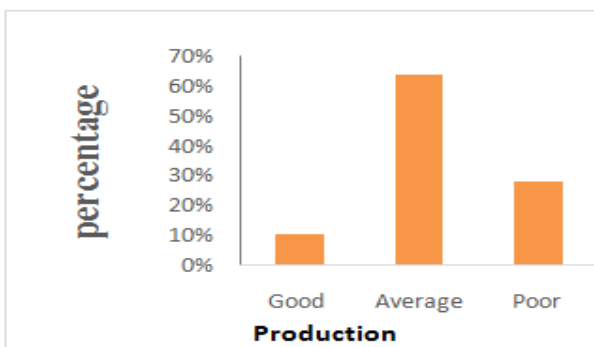


Fig. 1.10 Impact on production due to COVID-19
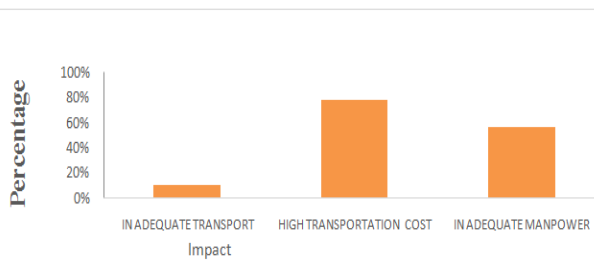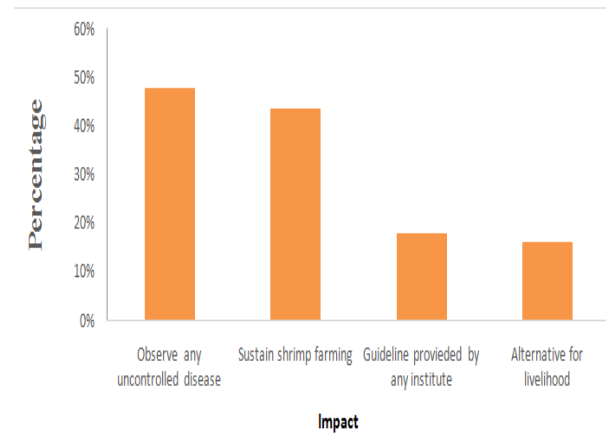


Fig. 1.11 Impact on transportation due to

**Conclusion**

The present  assessment on shrimp farmers of Navsari district has clearly indicated that COVID-19 lockdown and subsequent disruptions in the supply chain movements adversely impacted the activities in shrimp aquaculture sector and led to a direct economic loss to its different stakeholders. India's dependence on the exotic SPF *vannamei* brood stock from overseas suppliers will lead to a long-term impact if the restriction on international cargo movements continues for longer period of time. Further, limitations which forced the skilled technician and farmworkers to be confined at home and in-house migratory workers to leave for their homes, undesirably affected all the components of this sector and their daily source of revenue. Farmers and hatchery operators are looking for massive relief packages from the government to minimize the negative economic impact and sustain this dynamic agribusiness sector which earned a lucrative profit last year. This investigation has provided an initial assessment of the pandemic based on shrimp farmers perspectives. However, the situation is dynamic and further assessments may be required to fully understand the impact of this pandemic on Indian shrimp aquaculture sector.

# References

1. Barmon, B.K., Kondo, T. and Osanami, F. (2006). Impact of Rice Prawn Gher Farming on Agricultural and Household Income in Bangladesh: A Case Study of Khulna District. Japanese Journal of Farm Management, 43(1): 133-136.

2. Bennett N.J. Elena, Finkbeiner M., Ban Natalie C., Belhabib Dyhia, Jupiter Stacy D., Kittinger John N., Mangubhai Sangeeta, Scholtens Joeri, Gill David, Christie Patrick. 2020. The COVID-19 Pandemic, Small-Scale Fisheries and Coastal Fishing Communities, Coastal Management

3. Boyd, C. E. (1998). Water quality for pond aquaculture. Research and Development Series No. 43. International Centre for Aquaculture and Aquatic Environments, Alabama Agricultural Experimental Station, Auburn University, Auburn, Alabama.

4. Brito, C., Valle, B., Interaminense, J., Peixoto, S., Lima- Filho, J. V. and Soares, R. (2016). Microbiological quality of Litopenaeus vannamei culture using conventional and biofloc systems. Aquaculture research, 47(10): 3098-3108.

5. Dona P, Sheela Immanuel, Ohja SN, Ananthan PS. (2016) Occupational Needs of Shrimp Farmers in Kerala. Indian Res. J Ext. Edu September, 16(3).

6. FAO (2016). The State of World Fisheries and Aquaculture. In: Contributing to food security and nutrition for all. Rome: 200

7. Kothari, C. R., & Garg, G. (2014). Research Methodology: Methods and Techniques. New Delhi: New Age International Publishers.

8. Kumaran M, Ravisankar T, Anand P R,Vimala D D and Balasubramanian C P. (2017). Knowledge level of shrimp Farmers on better management practices (BMPs) of Litopenaeus vannamei Farming: A comparative assessment of East and West coast of India. Indian Journal of Fisheries, 64(3): 93-99.

9. Kumaran R. M. Geetha, Jose Antony, K.P. Kumaraguru Vasagam, P.R. Anand, T. Ravisankar, J. Raymond Jani Angel, Debasis De, M. Muralidhar, P.K. Patil, K.K. Vijayan. 2021. Prospective impact of Corona virus disease (COVID-19) related lockdown on shrimp aquaculture sector in India – a sectoral assessment, Aquaculture. 2021 Jan 30; 531: 735922. Published online 2020 Sep 11

10. Lekshmi, P.S., Chandrakandan, K, Kumaran, M., Balasubramani, N, (2005). Socio economic profile of shrimp fimners and its influence on the exdent of adoption of shrimp culture technologies. Fishery technology 42 (2). 225-230.

11. Lemos, D., Navarrete Del Toro, A., Cordova Murueta, J. H. F. (2004). Testing feeds and feed ingredients for juvenile pink shrimp Farfantepenaeus paulensis: in vitro determination of protein digestibility and proteinase inhibition. Aquaculture 239: 307-321.

12. Manoj K, Bengani. R and Varsani A.2020. Survey on Assessing the Impact of Covid-19 Pandemic on Aquaculture Sector, India, Journal of Interdisciplinary Cycle Research,XII(IX),192-198

13. Mohite Y T. 2007. Efficacy and constraints in Adoption of improved aquaculture Practices by shrimp farmers in Raigad District of Maharashtra. M.F.Sc. Thesis, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, India. 58 p.

14. MPEDA (2016). Species-wise fish production, Marine Products Development Authority. www.mpeda.org.in.

15. MSSRF. COVID-19 Impact on Livelihoods of Marine Fishing Communities. Available online: https://www.mssrf.org/content/covid19-impact-livelihoods-marine-fishing-communities

16. Naik B., Patil, S.V. Shirdhankar. M, Yadav B, Tibile R , Chaudhari K, Wasave, S and Yewale, V.. (2020). Socio-Economic Profile of Shrimp Farmers of South Konkan Region, Maharashtra, India. International Journal of Current Microbiology and Applied Sciences. 9. 1371-1380. 10.20546/ijcmas.2020.909.174.

17. Ogunmefun SO, Achike AI. (2017) Socioeconomic Characteristics and

Constraints of Pond fish farmers in Lagos State, Nigeria. Agricultural Science Research Journal; 7(10):304 -317.

18. Patil S, Sharma A, Ojha SN, Shirdhankar MM and Dhaker HS. (2018). Emergence of shrimp farming and profile of shrimp farmers in Palghar district, Maharashtra.Contemporary Research in India, 9 (1):37-42.

19. Randive P C. (2008). Adoption of Shrimp health management practices in the South Konkan Region of Maharashtra. M.F.Sc. Thesis, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, India. 116 p.

20. Srinivas, D. and Venkatrayalu, Ch (2016) Studies on present problems and prospects of shrimp farming in west Godavari district of Andhra Pradesh, India Advances in Applied Science Research 7(2) 49-54.

21. Salunke A B. (2018). Efficacy and constraints in adoption of Penaeus (Litopenaeus vannamei (Boone, 1931) culture practices by the farmers of North Konkan region of Maharashtra M.F.Sc.Thesis, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, India. 206 -208p.

22. Stephens E.C., Martin G., van Wijk M., Timsina J., Snow V. (2020) Impacts of COVID-19 on agricultural and food systems worldwide and on progress to the sustainable development goals. Agric. Syst. ;183:102873.

23. The fish.cgiar website.2020 [Online] Available: https://fish.cgiar.org/news-and-updates/news/fish-and-aquatic-food-systems-covid-19-updates-india

24. https://www.hakaimagazine.com/news/indias-fishers-have-been-crushed-by-covid-19

25. https://www.orfonline.org/expert-speak/impact-covid19-rural-lives-livelihoods-india 64889/

# EVOLUTION OF BIG DATA AND ITS FEATURE LEARNING USING BIG DATA ANALYTICS

**S.K. Swain**

Centurion University of Technology and Management, Odisha, India

sangrambapun@gmail.com

_____

## ABSTRACT

*Now computing is totally based on generating and assimilation of data at an unusual pace. There are thousands of web applications on the internet serving millions of masses round the world. These web applications are increasing their content at an ever-increasing rate. We rely on the internet for any of our needs; be it searching for a meaning in Google or shopping to communicate, which has resulted in such vast explosion of data. This over the explosion of data is known as Big Data. Web applications not merely aim at providing services to the user, but also in a fast and efficient manner with the increasing amount of data, it has become hard to handle, store and analyze the information. Big data analysis has become very crucial part in the business point of view due to extraction of required information from huge data collection.*

_____

*Keywords: Application Evolution, Feature Learning, Big Data Analytics.*

## 1. Introduction

The BDA history is intricately connected with that of data science. The term "big data" is initially applied by Michael Cox and David Ellsworth in 1997 in an IEEE conference paper to justify the data visualization and also to justify the challenges presented by it on computer systems. The rapid innovations and improvement obtained in IT technology by the end of the 1990s enables the origination of data in large volume. To highlight the importance of analysis, collection, interpretation, and integration of business information the business intelligence (BI) concept is created besides in what way this procedure set can aid businesses make certain determinations and acquire a clear knowledge about market activities and tendencies (Cox and Ellsworth)[1].

The evolutionary phase for big data's development was from 2001 to 2008 (RE Bryant) [2]. At first the big data was stated based on its 3Vs (volume, velocity, and variety), then it evicted to be more complex application to fulfil the necessities to deal with the information explosion. Hadoop, Database management systems and XML (Extensible Mark-up Language) Web services and are some of the Software and application developments that adds analytical modules and core function modules that concentrates on augmenting the end users usability , and allows users to handle vast quantity of data across and within the establishments collaboratively as well as in real-time.

Big data consumes huge data volumes which are deliberated as unstructured, structured and semi structured datasets that could not be captured easily, stored, handled, examined, accomplished also accessible through customary software, hardware and database management methodologies. The features of big data are usually used to define it. (L. Douglas) [3] proposed 3 measurements which describes the opportunities including the challenges of enlarging big data volumes. Obviously describing big data and its features possibly will be a continuing attempt, however still it will not have adverse impact on the execution and handling of big data. Moreover, to describe big data the 3V's have been used continuously, the other dimensions of value in addition to veracity are included to explain the data feature and integrity to suit 5 V's of big data (P. Russom) [4]. (Suthaharan S) [5] invented 3Cs: continuity, cardinality, and complexity arguing that the first 3 V's (volume, velocity, and variety) will not favour the advance detection of the big data features for classification.

## 2. Concepts and characteristics of Big Data

About the creation of Big Data several descriptions are available which are based on distinctive viewpoints, for example the perspectives which are the social movement

perspective, the process-oriented, product oriented and cognition-oriented. Presently, Web technology advances and the increased mobile and sensors devices bonded to the Internet have brought about the origination of massive data sets available on the Web which are required to be stored and processed. Now the companies so as to support the decision for their strategies are starting realizing the significance of using more data. The big data for the companies in the globally integrated economy are considered as a business priority.

A review on the Big Data has been presented by (SK Swain et al.)[6] that has determined to form value about all faces in establishments, workforce customers, or society as entire. Towards the NoSQL databases the new paradigm is moved corresponding in a considerable way besides accessible computing platforms, open-source software, and commodity servers' entrepreneurs, Researchers and businesses, likewise anticipated innovations or vehemently point to concrete that may be related to the evasion group of large data sets. At this scale the organizations endure to collect more data, the big data analysis reinforcing process will become dominant. The business executives to remain competitive must adopt the innovative techniques and developing technologies due to big data.

The perspective which is product-oriented highlights the qualities of data regarding with respect to their structures, speeds and sizes. The inspiration of this perspectives is depending on a historic vision, to relate the number of data offered with the volume recently. National Science Foundation (N.N.I. Initiative) [7] refers the Big data as: Huge, longitudinal, complex, diverse, or /and dispersed data sets created using sensors, tools. Today and in the future the available sources are online transactions, click streams, emails, videos and/many other digital sources. Moreover, the term big isn't only define the size. (MM Gobble) [8] expresses that data is big due to its excessiveness, as of its fast movement, or it is not organised suitably. The perspective which is process-oriented emphasises the originality of processes involved and required in storing, handling, accumulating, analysing and searching Big

Data. So as to highlight the processing issues of Big Data, the mandatory technical structure, particularly the scientific gadgets, programming methods, statistical, computational and scientific innovations in this perspective is also emphasized.

Thus, (T Kraska) [9] described Big Data as: Once the usual solicitation of present methods doesn't facilitate the consumers to gain sensible, economical and valuable responses for data-driven queries. Likewise, (A Jacobs) [10] mentioned Big Data as: Data that's volume makes us to view past sampled and exact approaches which are dominant at that period. The veracity as introduced by (B Feldman et al.) [11] is an alternative difficult feature. Few descriptions of Big Data are presently being on the basis of the behaviours of Big Data.

Conversely, (SB Scruggs et al.)[12] mentions that the Big Data's description is apart from the scope of these features besides must spread to its ability "to be convenient and re-claimed, add value over time, as well as originate a multi-dimensional, systems-level understanding". Data is developing at an exponential pace always on the internet. One of the difficult issues is to execute, save and examine this considerable volume of data in certain way that of least time-consuming. Big Data in industry and in skill is having more focus. The technology is shifting to data centric architecture and functional models. Basically, it's necessary to determine the architectural elements, operative models, also the crucial information models that formed Big Data Ecosystem. To explain all looks of the Big Data Ecosystem (SK Swain et al.)[13] centres on the Architecture Framework of Big Data. This has the modules such as Big Data Infrastructure, Big Data Architecture Framework, Big Data Definitions and Analytics, Big Data structures, Big Data Lifecycle Management, and models.

The perspective i.e. cognition-based, emphases on Big Data challenges regarding their limitations and the cognitive capacities. The range of commonly used software tools and hardware environments is exceeded by the data for capturing, managing, and handling it in an endurable passed period to its user populace. A formative document from McKinsey Global Organisation highlights the same matter (J.

Manyika et al.)[14]: the size of data set is away from the capacity of classic database software devices for capturing, analysing, storing and managing. Hence, Big data is conceptualized by this perspective through the statistic of surpassing human capability for comprehending suitable outcomes to the mediation requirement for enhancing the ability of interpretation. At last, the perspective of social movement lures our attentiveness to the break among the vision and realism, specifically the socioeconomic traditional and ethical moves which underlie the Big Data's existence (H. Ekbia et al.)[15]. The vision of Big Data has been emphasized by this perspective for technical innovation, ecological and biomedical study, education and nation-wide safety (OSP, Obama administration unveils) [16] and states Big Data as: The quantifying capacity that modify many features of contemporary lift for transforming the art of management (A. Ignatius) [17], otherwise to be portion of a main transforms which needs general exertion.

For conceptualizing the Big Data some of the perspectives present valuable insights and in addition quite a lot of features can be reviewed. The common measures volume, variety and velocity are acknowledged and considered (D Laney et al.)[18]: data sets size is represented by Volume. The Big Data's volume may be of terabytes or even petabytes, which is much apart the typical bounds of gigabytes and megabytes. The in and out speed of data indicates the velocity. It represents the dynamic feature of the data, the frequency of the data creation and the requirement of creating real-time outputs. The range and source of data types are termed as Variety which emphasises several information sources and the distinctive data schematics of all sources. E.g., the traffic dataset contains on roads vehicular traffics numeric information and textual data about scheduled and active events (e.g., musical and sporting events) (Y.J. Xia et al.)[19].

Moreover, some of the additional Vs, like virtual, value, variability and veracity, have been stated in literature for serving as complement features of Big Data (H. Barwick) [20](C.W. Tsai) [21](P. Zikopoulos et al.)[22]: An organizations monetary worth is considered as 'Value' that can be obtain from Big Data processing. It contains two attributes: the large potential rate and very small density rate. Veracity relates to whatever range the data can be trusted because its sources reliability. For example, some devices may be more compromised when data's are received from sensors. Instead defining by numerous Vs, (X Wu et al.)[23] likewise emphasised the features of Big Data features using the professed HACE hypothesis: Big Data initiates with enormous - volume, dissimilar, independent sources with decentralized and distributed control, also aspire to deal with challenging and developing relations between data.

### 2.1. Big data definitions

Table 2.1 shows the definitions of big data which were given by NIST Standard.

**Table 2.1 - Big Data Definitions**

| | |
|---|---|
| Volume | Measures the available quantity of data to association, which certainly doesn't have to possess all of it only if it can retrieve it. |
| Velocity | Measures the streaming, aggregation and data formation speed. |
| Variety | Measures the intensity of representation data – text, images, video, audio, etc. |
| Veracity | Measures the ability of data understanding – noise, biases, anomaly and so on. |
| Value | Represents the data's utility in decisions making. |

### 2.2. The paradigms of Big Data

A novel paradigm i.e., the fourth paradigm of scientific research was provided by the behaviors of big data. The historical visions for the four existing scientific paradigms are shown in TABLE 2.3. A data- intensive science was prompted by this new paradigm. The major problem of this data-intensive science was shifted from calculation to data and also from outcomes to thinking along with data. The curation, analysis, and capture were the three basic behaviors that were normally

taken into consideration by (AJ Hey et al.)[24]. The big data was processed to attain the knowledge from data; this respective data was obtained to help the intelligent decision. At the same time, the data interpretation/visualization was identified as an essential task. Based on (Chen and Zhang) [25], the data interpretation/visualization was considered as a separate task not like the analysis process. The existence of this data was obtained in all shapes and scales of resources (also include individuals' lives). A huge range of procedures

like integration, representation, and data cleaning were highly covered by the curation. It also includes the policies and essential metadata to perform the integration and longevity. The data analysis process includes some activities like analysis, databases utilization, and modelling throughout the workflow pipeline. A newly developing database for a mentioned stream should give solution to the 20 important queries that highly concerned by researchers is claimed by (AJ Hay et al.)[24].

**Table 2.2 - Four Scientific Research Paradigms**

| Paradigm | Time | Methodology |
|---|---|---|
| Experimental Science | 1000 years ago | Natural phenomena depiction |
| Theoretical Science | Last few 100 years | Newton's laws, Maxwell's expressions and so on. |
| Computational Science | Last few decades | Simulation of complex phenomena |
| Data-intensive science | Today | Various sources are used to capture and generate data; data collaboration is supported by Science, analysis, visualization, assessment |

This table has been adopted from (AJ Hay et al.)[24]

When the big data was met by social science, a new discipline referred as computational social science (or e-social science) was developed. An enormous inter-discipline that was involved in this computational social science analyses and apply data along with the aid of big data technologies and techniques (R.M. Chang) [26]. For instance, in the computational organization science the perspective of researcher's were extended on organizational, social, and policy systems, then the computational models were leveraged, subsequently, it combines the science, network, science, social, and computer science. Likewise, in e-business, a large number of novel methods were developed for the research environments like consumer behaviour, managerial and human decision-making process, market interactions and operational processes. These methods were developed by taking the valuable data gathering costs in the social networks environment, digital entertainment and mobile telephony, blogs, and also consider the innovative abilities which found difficult to execute. By considering that, a paradigm shift was developed in scientific research, due to

the enforcement of organizational environments and novel business practices. The data spectrum obtained in this new paradigm support the high value decisions by developing a novel advanced technique, and this data spectrum may extents the meso-level, macro-level to the micro-level.

### 2.3. Big data applications

The useful values were provided by this big data analysis procedure through suggestions, judgments, decisions, or supports. An enormous amount of applications were included in this data analysis process, and these applications were found to be regularly changing and extremely complex. An evolutionary process in data source is initially reviewed in this section. Subsequently, the six major data analysis fields like text analysis, network analysis, mobile analysis, structured data analysis, multimedia analysis and website analysis are then examined. Finally, several key application fields of big data were introduced.

### 3. Application evolutions

In recent years, the big data analysis was

introduced as an advanced analytical equipment, whereas it contains complex programs and large-scale under particular analytical process. During the past decades, the applications of data driven were developed. For example, the BI was developed as a prevailing technique as early as 1990s, for various business solicitations and also for network search engines in terms of huge data mining process that was developed in early 21$^{st}$ century. The influential and potential applications obtained from various sectors and its respective examination and data are also deliberated in below sections.

### 3.1. Evolution of Commercial Applications

The business data obtained in earlier days was generally identified as a structured data. The companies gathered this data from legacy system and store them in RDBMSs. An analytical techniques that are applied in this technique was developed in 1990s, whereas this technique was found to be more simple and intuitive e.g., in the forms of dashboard, reports, search-basis business intelligence, data mining, interactive visualization, predictive modelling, queries with condition, online transaction processing, and score cards (RL Sallam et al.) [27]. From the 21st century, a unique opportunity was delivered by the WWW (World Wide Web) and networks for organizations to have direct interactions with the customers and also to have an online presentation. The website mining and text analysis process perform some process like customer trade analysis, market structure analysis, product layout optimization, and product suggestions.

### 3.2. Evolution of Network Applications

The WWW and email services were highly provided by the former generation of the Internet. Some of the process like web page analysis, Text analysis, and data mining were provided to perform the mining process on e-mail contends and also to develop a search engine. The applications that are developed in recent days are highly web-based, irrespective of their arena as well as design goals. The significant proportion of the global data volume was accounted by the network data. Web was identified as a mutual stand for

interrelated pages, full of different types of data like videos, interactive contents, images, text, and audio, etc. So, at that particular moment, a huge amount of advanced technologies were applied for emerged data of unstructured or semi-structured. For example, the valuable information from the images was extracted by image analysis process, (e.g., face recognition). An automatic video surveillance system for law enforcement, military, and business applications were applied with the multimedia analysis technologies. Since 2004, various opportunities like upload, create, and share contacts were provided to each user by some online social media like online communities, social multimedia websites, social networking services, Internet forums, and blogs.

### 3.3. Evolution of Scientific Applications

Scientific research that is performed in various sectors like oceanology, environmental research, astrophysics, and genomics attains huge data with maximum throughput instruments as well as sensors. The BIGDATA program was recently announced by the U.S. NSF (National Science Foundation) to elevate the efforts to extract the insights and knowledge from huge collections of complex digital data. Platforms of Big data were developed and valuable results were obtained by few scientific research disciplines. For example, in biology physical computing resources, virtual machine resources, data service, network infrastructure, inter- operative analysis software, coordination environment, and inter-operative analysis software were applied by iPlant (SA Goff et al.) [28] to assist the students, researchers, and educators, in inspiring plant sciences. Huge varieties like experimental data, reference or specification data, observation data, model or analog data, and other derived data were included in this iPlant. Over the previous couple of years, the big data has attained huge importance in various industries. It cannot be stored and process by former databases as it includes large and huge data sets. Big data process has the high capacity to handle such huge and large data sets because the large dataset was processed during the processing phase in a required time.

Text analysis was still identified as infancy, but it was found to be a promising one. Because in various companies, 80% of data were obtained in unstructured form, where various analysis processes were work only for the structured data.

## 4. Feature learning on big data

Here, some of the works based on the feature learning respect to big data which are related to our work is illustrated.

(Min Chen et al.)[29] presented a method for learning the features of medical image data. The researches of this article introduced a structure respect to deep learning for feature learning of medical image with unlabelled data. This framework efficiently learns features of medical images with the minimal amount of labelled data. The method proposed in this article is used for some task like classification, similarity check, and lung nodule recognition. From the experimental results of this method shown that their method is much fine than that of other approaches. The executions of auto-encoder approach were good, but it was affected by the quality of data. This issue is caused by ignoring the role of expert. On their future work, they planned to overcome this issue by integrating the domain knowledge and data-driven feature.

The task like image retrieval, image classification and object detection and segmentation are handled on big data with various methods. (Jamil Ahmad et al.)[30] presented an article for classifying the features of multimedia big data. Here the authors extract the features and transform it into hash codes by using the sensitivity property. This hash codes uses neighbour search procedures for the retrieval of multimedia data from big data. Two steps were used in this approach. Initially on first step, the introduced feature selection method chooses the features which they have maximum diversity. They found more than 1800 features from the 4000 features of images on their experiment. On the second step of the proposed system, with the selected feature the fast Fourier transform is estimated and higher frequencies will be binarizes with mean frequency. The method of this article aims to describe the selected multimedia feature as a signal and the feature

vector is estimated with the FFT. The performance of this method earned higher performance than the other classic approaches. The researchers of this article telling that the performance of this method is weak only when using the smaller hash codes and additionally it is not suitable for sparse features, otherwise this method is better and executes good for deep features. They planned to make their method to support sparse features and improve the performance on their future work.

A new scheme of feature selection that will be optimal for the learning of big data is presented by (Adrian Barbu et al)[31]. The method used in this research was put on for improving different loss function, arrangement, ranking and application in regression. The researchers telling that their method is very simple and easy for implement. The over fitting problem solved by enforcing the second order prior on piecewise linear retort function. The experimental assessment of this paper was performed with some existing methods and they yield better performance on regression, classification and ranking and their method is highly scalable and efficient.

For the feature learning corresponding to big data in industrial IOT (Internet of Things) (Qingchen Zhang et al.)[32] presented a model of adaptive dropout deep computation with crowdsourcing. The main advantages of the model in this article was, preventing the over fitting of hidden layers, the parameter training and technique of crowdsourcing. These able to build an efficient distribution function and also it will monitor the available training samples. The results of this model exhibited that the offered model got finer execution than former crowdsourcing algorithms. The framework introduced in this paper successfully avoided the over fitting and efficiently collecting the samples of parameter training for feature learning in IoT big data. On their future work, some best methods are planned to apply on their model for improving the performance.

(Dacheng Tao *et al.*)[33] presented an outline for improvement of image superiority in big data images. The method recommended for this article, takes five factors of image into

account for the enhancement process. The authors of this article extract more than 15 features from the image and they estimated the visual quality of image with the regression module. These are analysed and learned from big data sets. These big data sets were huge in size than the similar image data sets. The researchers of this article conducted experimental setup of their model with nine datasets and performance are measured in three categories. The performance of their method is much better than FR and RR algorithms. But the IQA of the proposed method is slightly lower than FR and RR algorithms. On their feature work, they improve the IQA frame for increasing the performance of their method.

An intelligent fault diagnosis process was identified as a most promising tool in mechanical big data, as it has high ability to provide accurate results for diagnosis process and also contains the capacity to process the gathered signals rapidly and effectively. The existing diagnosis methods, manually extract the features based on diagnostic expertise and prior knowledge. An important merit of this traditional method was human ingenuity, but these methods were found to be labor-intensive and time-consuming. An artificial intelligence approach applied by the concept of unsupervised feature learning to study the topographies from raw data was highly inspired by (Y Lei et al.) [34], so a two-phase learning method was introduced in this method to perform the intelligent diagnosis process in machines. In the initial phase, sparse filtering and an unsupervised two- layer neural network was implemented to study the features directly from the signals which are obtained from mechanical vibration. According to this learned features, the health condition was classified in the second phase by applying the softmax regression. The performance evaluation of this process was performed by applying a locomotive bearing and motor bearing dataset respectively. This diagnosis method with motor bearing dataset shows high accuracy and superior performance in fault diagnosis than the other traditional approaches. Involvements of learning technique reduce the human labor and perform the fault diagnosis process more

easily while handling the big data. (Q Zhang et al.) [35] introduced a model of deep computation to study the features on big data in this the tensor was applied to make the complex connections of heterogeneous data. Here, the tensor destination was applied in the layer of output by way of the average sum-of-squares error term of the renovation error to completely learn the basic data distribution. A HBP (high-order back-propagation) algorithm was suggested in this method for training the parameters. The existing BP algorithm was extended from the vector space to the high-order tensor space for developing this HBP algorithm. Here, four various datasets were applied to perform the comparison process along with existing multimodal deep learning and stacking auto-encoder models. The experimental outcome of this feature learning methods was found to be more efficient when evaluated with SANE, STL-10, INEX, and CUAVE datasets.

The deep learning merits were applied for feature learning by (YBengio et al.) [36] whereas this deep learning was obtained as the layered architecture as same as the human brain. The simple topographies were extracted by deep learning with the help of raw data, likewise via multiple layers; the more complex features were learned (K. Hwang et al.) [37]. By performing the continuous optimization process in both backward and forward propagation, a considerable number of features were obtained at the final stage by multi-iteration learning. This feature learning process was categorized into two types they are unsupervised as well as supervised learning. The illustration data was transmitted from an input for prediction process to the layer of top via supervised learning. The connection parameters that were obtained between several pair of layers were optimized by applying BP. This optimization process was performed by reducing the cost function value among the predicted and target value. The most familiar neural network-based CNN (Y. Le Cun et al.) [38] were applied to represent the features through supervised learning.

CNN was frequently implemented in speech recognition (M. Chen et al.) [39], text analysis, and image analysis (M. Chen et al.) [39], etc. Particularly, in the image analysis field, CNN

provide huge success, in face recognition (Y. Sun et al.)[40], scene parsing (C. t)[41], cell segmentation (H. Su)[42], neural circuit segmentation (D. Ciresan et al.)[43], analysis of images the breast (P. Fonseca)[44] (A. R. Jamieson)[45] and brain lesion segmentation (K. Kamnitsas et al.)[46] (A. Patel et al.)[47]. For instance, a novel 3D-CNN was introduced to classify the poly candidates on circulating tumour cell (CTC). In (T. Uemura et al.)[48] (W. Shen et al.)[49] (X. Li et al.)[50], and advanced convolutional networks were introduced to categorize the lung nodules from medical images by performing supervised feature learning process. (M Gao et al.)[51] and (T Schlegl et al.)[52], some of the CNN-based feature learning methods to categorize the lung tissues based on the CT images obtained from lungs.

The unlabelled data present in unsupervised learning process was applied for feature learning process, whereas only a minimum amount of data were applied to fine-tuning the parameters, they are as RBM (restricted boltzmann machine) (G. E. Hinton)[53,] deep belief network (G. E. Hinton et al.)[54], auto encoders (Y. Bengio et al.)[55] and stacked auto encoders (P. Vincent et al.)[56]. An auto encoder process for pulmonary nodule classification and unsupervised feature learning were proposed by (D Kumar et al.)[57]. To analyse the breast images, a convolutional autoencoder process was presented by (Kalleberg et al.)[58], and similarly, a RBM-based design was developed by (Li et al.)[59] for lung tissue classification. The analysis process in lung CT was proposed by (Tulder et al.)[60] along with convolutional restricted Boltzmann machines.

A large number of algorithms for unsupervised feature selection was introduced to chosen the informative features from unlabelled data. The feature selection process was identified as a commonly applied approach in unsupervised feature learning. The features that are conserving the data likeness or having manifold structure designed from the entire feature space was selected (Zhao and Liu)[61], (Cai et al.)[62], however, it fails to indirectly include the discriminative information within the data, so it cannot be applied directly in this shapelet learning

problem. Previously existing unsupervised feature learning algorithms adopt the features one by one, and also the significance of several features was estimated individually (He et al.)[63], (Zhang et al.)[64], but feature correlation removal was identified as a major drawback. The classical method performs the feature selection by concurrently manipulating both feature correlation and discriminative information process. Maximum discriminative features were selected by UDFS (Unsupervised Discriminative Feature Selection) (Yang et al.)[65] for representing the data; furthermore, it also deliberated the manifold structure. The discriminative information were normally encoded with labels for feature selection, so, the prediction of good cluster indicators as pseudo labels was found to be essential to perform the unsupervised feature selection.

A large number of studies were performed on the intelligent fault diagnosis process of rotating machinery intending to promptly deal with the immense fault data and the accurate diagnosis outcomes were provided automatically. Frequently, ANN (artificial neural networks) based approaches were applied along with these studies, which for features extraction use signal processing approaches and for classifying faults, the features are given as input to ANNs. However these approaches successfully functioned in an intelligent fault diagnosis process of rotating machinery, but there are two defects exist. (1) The features are extracted manually according to the sufficient previous understanding regarding signal processing methods and diagnostic capability. Furthermore, concurring to a specific diagnosis issue these manual features are extracted and is undoubtedly inapt for other concerns, (2) The shallow based ANN frameworks were included in this process, as it restricts the ANNs ability of learning the difficult non-linear interactions in fault diagnosis concerns.

In artificial intelligence as an innovation, deep learning maintains the ability to deal with the above- mentioned shortages. Through deep learning, deep NNs (DNNs) employed the deep architectures, in preference to shallow ones, might be determined to collect the valuable information from the valued complex

non-linear functions and the raw data and estimated complex non-linear functions. An innovative intelligent technique was delivered by (F Jia et al.)[66] based on DNNs to handle the deficits of the aforesaid intellectual diagnosis approaches. The datasets obtained from planetary gearboxes and rolling element bearings was applied by this method to authenticate its effectiveness. These datasets include immense measured signals concerning distinctive health statuses under several operating conditions. From the outcomes it's realized that the proposed technique even though adaptively mines accessible fault physiognomies from the obtained signals, likewise attains excellent diagnosis accuracy related with the prevailing approaches.

Inefficient and unreliable human analysis is replaced by the intelligent fault diagnosis techniques, intensifying the effectiveness of fault diagnosis. The capability of multilayer nonlinear mapping highly supports the deep learning process to improve its accuracy in an intelligent fault diagnosis process. A novel method named as Deep Convolutional NNs (DCNNs) was suggested by (W Zhang et al.)[67] along with WDCNN (Wide First-layer Kernels). As input this approach utilizes raw vibration signals (to generate more inputs data augmentation is used), and the wide kernels at the initial convolutional layers were applied for smothering high frequency noise and also for feature extraction. Small convolutional kernels in the previous layers were used to support multiple layer nonlinear mapping. The AdaBN model was updated to enhance the competence of domain modification.

For automatic pattern recognition, (A Kumar et al.) [68] offered a fault diagnosis according to agenda by enduring the challenges that were presented by data inequity problem obtained in big datasets by employing RHadoop programming atmosphere. The Fault diagnosis performed in the production method is a real-world example where the class-imbalance topic is extremely suitable. The regular operating behaviour was presented by majority of information that obtained from system whereas, faulty operating performance is restricted. The upholding approaches were condition-based method don't function accurately on such datasets and therefore, it is

challenging to form consistent patterns for the precise fault diagnosis. To deal with this issue, considering the proposed frameworks first part, numerous methods for tackling the data inequity difficult, and then collective radial basis kernel SVM and for solving the drawback of big data imbalance the SMOTE (Synthetic Minority Over-sampling Technique) classifier is employed. Also, with conventional data imbalance solver methods such as under-sampling and SMOTE the proposed approaches oversampling performance is compared. In this frameworks second phase, the classifier output of SVM is replaced instead of target value of dataset to become stable in nature. In the final phase, the logistic regression were trained to perform the automatic pattern recognition process, the modified dataset is used moreover for predicting the faults by means of a steel plate manufacturing dataset in the RHadoop programming situation.

To detect the fault in real-time and to identify the industrial plants, a two-stage algorithm has been offered by (B Costa et al.)[69]. The work is fully dependant on the assessment of specific characteristics utilizing a novel evolving classifier procedure as well as recursive density evaluation. The suggested detection phase is dependent on the data space density formation, and it isn't as good as probability density function, however is a suitable measure to detect anomaly/outliers. A Cauchy function expresses this density and can be determined in a recursive manner, which improve its computational as well as memory power capable and, so, relevant to on-line solicitations. A self-developing classifier system or auto class is functioned based on fuzzy rules and it is proposed in the detection or diagnosis phase. When first rule base exists, Auto Class can develop or enhance it on the basis of the newly arrived faulty state data. With the functioning time improvement of the sulphur hexafluoride (SF6) electrical devices, the distinct amount of release possibly will happen inside the device. Due to this the effectiveness of equipment's insulation will weaken and produce severe impairment on the device. So, this one is of viable impact for analysing fault and assessing state of SF6 electrical device. In the current ages, data

acquisition monitoring regularity of SF6 electrical devices has been always enhanced and the gathering space has always been extended, thus enormous data can be collected in the substation database.

A two-level model for fault diagnosis was introduced by (Hongxia et al.)[70] to instantly handle enormous SF6 electrical device condition monitoring data. At initial, the monitoring data is pre-processed in the previous training of the fault diagnosis model, for different missing values the first and different data filling methods are implemented. Then, on the Hadoop platform the fault diagnosis algorithms are parallelized. At last, the time taken for the fault diagnosis of SF6 electrical equipment in stand-alone mode and cluster mode is related by simulation, and the benefits of cluster mode in processing massive data are verified.

## 5. Conclusion

Because of the numbers of methods are contributing to big data, day to day there is an increase in the popularity of big data is happened. For facing the various necessities of users, providing a perfect classification method for big data is essential. In many fields numerous issues are solved by using various approaches of big data. As already explained in the literature survey more number of researches are performed in various fields of big data. Now the present research is given according to the research gaps. Sequentially, the purposes of the research have been attained. The present research and its outcomes will provide future direction to other researchers.

## 6. References

1. Cox, Michael, and David Ellsworth. "Application-controlled demand paging for out-of-core visualization." In Proceedings. Visualization'97 (Cat. No. 97CB36155), pp. 235-244. IEEE, 1997.
2. Bryant, R.E., Katz, R.H., Lazowska, E.D., 2008. Big-data computing: creating revolutionary breakthroughs in commerce, science, and society computing. Computing Research Initiatives for the 21st Century. Computing Research Association (Available at http://www.cra.org/ccc/files/docs/init/Big_Data.pdf).
3. L. Douglas."3D Data Management: Controlling Data Volume, Velocity and Variety" (PDF). Gartner. Retrieved 6 February 20.
4. P. Russom. "Big Data Analytics." TDWI Best Practices Report, Fourth Quarter 2011. TDWI Research. 2011.
5. Suthaharan, S. (2014). Big Data Classification: Problems and Challenges in Network Intrusion Prediction with Machine Learning. Performance Evaluation Review, 41(4): 70-73.
6. Manas Ranjan Senapati, Sangram Keshari Swain, Srinivas Prasad, A Review of Big Data and Its Current Research Directions, International Journal of Engineering, Science and Mathematics (IJESM) 8, no 6 (2017).
7. N.N.I. Initiative, Core techniques and technologies for advancing big data science and engineering (BIGDATA) (2015).
8. M.M. Gobble, Big Data: the next big thing in innovation, Res. Technol. Manag. (2013): 64–66.
9. T. Kraska, Finding the needle in the big data systems haystack, IEEE Intern. Comput. (2013): 84–86.
10. A. Jacobs, The pathologies of big data, Commun. ACM 52 (2009): 36–44.
11. B. Feldman, E.M. Martin, T. Skotnes, Big data in healthcare–hype and hope, Dr. Bonnie 360 degree, Bus. Dev. Digit. Heal. 2012 (2013) 122–125 http://www.riss.kr/link?id=A99883549.
12. S.B. Scruggs, Karol Watson, Andrew I. Su, Henning Hermjakob, J.R. Yates 3rd, M.L. Lindsey, P. Ping, Harnessing the heart of big data, Circ. Res. 116 (2015): 1115–1119.
13. Manas Ranjan, Senapati Sangram Keshari Swain, Srinivas Prasad, A Review Paper On Architecture Of Big Data , Journal of Advanced Research in Big Data

Management System (IJARBMS) 1, no (2017): 1-10.J. Manyika, M. Chui, B. Brown, J. Bughin, R. Dobbs, C. Roxburgh, A.H. Byers, Big Data: The Next Frontier For Innovation, Competition, and Productivity. Report, McKinsey Global Institute, 2012.

14. H. Ekbia, M. Mattioli, I. Kouper, G. Arave, A. Ghazinejad, T. Bowman, V.R. Suri, A. Tsou, S. Weingart, C.R. Sugimoto, Big data, bigger dilemmas: a critical review, J. Assoc. Inf. Sci. Technol. 66 (2015): 1523–1545.

15. OSP, Obama administration unveils "big data" initiative: Announces $200 million in new R&D investments (accessed December 2015).

16. A. Ignatius, from the editor: big data for skeptics, Harv. Bus. Rev. 10 (2012): 12-12.

17. D. Laney, 3D Data Management: Controlling Data Volume, Velocity and Variety, Research Note 6, META Group, 2001.

18. Y.J. Xia, J.L. Chen, C.H. Wang, Formalizing computational intensity of big traffic data understanding and analysis for parallel computing, Neurocom- puting 169 (2015): 158–168.

19. H. Barwick, The "four Vs" of Big Data. Implementing Information Infrastructure Symposium (accessed December 2015).

20. C.W. Tsai, ''Big data analytics: A survey,'' J. Big Data, vol. 2, no. 1, pp. 1–32, 2015

21. P. Zikopoulos, C. Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw-Hill Osborne Media, 2011.

22. X. Wu, X. Zhu, G.-Q. Wu, W. Ding, Data mining with big data, IEEE Trans. Knowl. Data Eng. 26 (2014): 97–107.

23. A.J. Hey, S. Tansley, K.M. Tolle, The Fourth Paradigm: Data-Intensive Scientific Discovery, Microsoft Research, Redmond, WA, 2009.

24. C.P. Chen, C.-Y. Zhang, Data-intensive applications, challenges, techniques and technologies: a survey on Big Data, Inf. Sci. 275 (2014): 314–347.

25. R.M. Chang, R.J. Kauffman, Y. Kwon, Understanding the paradigm shift to computational social science in the presence of big data, Decis. Support Syst. 63 (2014): 67–80

26. Sallam RL, Richardson J, Hagerty J, Hostmann B, Magic quadrant for business intelligence platforms. CT, Gartner Group, Stamford (2011).

27. Goff SA, Vaughn M, McKay S, Lyons E, Stapleton AE, Gessler D, Matasci N, Wang L, Hanlon M, Lenards A et al, The iplant collaborative: cyberinfrastructure for plant biology. Front Plant Sci 34(2) (2011): 1–16.

28. Chen, Min, Xiaobo Shi, Yin Zhang, Di Wu, and Mohsen Guizani. "Deep features learning for medical image analysis with convolutional autoencoder neural network." IEEE Transactions on Big Data (2017).

29. Ahmad, Jamil, Khan Muhammad, Jaime Lloret, and Sung Wook Baik. "Efficient Conversion of Deep Features to Compact Binary Codes using Fourier Decomposition for Multimedia Big Data." IEEE Transactions on Industrial Informatics (2018).

30. Barbu, Adrian, Yiyuan She, Liangjing Ding, and Gary Gramajo. "Feature selection with annealing for computer vision and big data learning." IEEE transactions on pattern analysis and machine intelligence 39, no. 2 (2017): 272-286.

31. Zhang, Qingchen, Laurence Tianruo Yang, Zhikui Chen, Peng Li, and Fanyu Bu. "An Adaptive Droupout Deep Computation Model for Industrial IoT Big Data Learning with Crowdsourcing to Cloud Computing." IEEE Transactions on Industrial Informatics (2018).

32. Gu, Ke, Dacheng Tao, Jun-Fei Qiao, and Weisi Lin. "Learning a no-reference quality assessment model of enhanced images with big data." IEEE transactions on neural networks and learning systems 29, no. 4 (2018): 1301-1313.

33. Lei, Yaguo, Feng Jia, Jing Lin, Saibo Xing, and Steven X. Ding. "An intelligent fault diagnosis method using unsupervised feature learning towards mechanical big data." IEEE Transactions on Industrial Electronics 63, no. 5 (2016): 3137-3147.

34. Zhang, Qingchen, Laurence T. Yang, and Zhikui Chen. "Deep computation model for unsupervised feature learning on big data." IEEE Transactions on Services Computing 9, no. 1 (2015): 161-171.

35. Y. Bengio, A. Courville, and P. Vincent, "Representation learning: A review and new perspectives," IEEE transactions on pattern analysis and machine intelligence, vol. 35, no. 8, pp. 1798–1828, 2013.

36. K. Hwang, M. Chen, "Big Data Analytics for Cloud/IoT and Cognitive Computing," Wiley, U.K., ISBN: 9781119247029, 2017.

37. Y. LeCun, L. Bottou, Y. Bengio, and P. Haffner, "Gradient-based learning applied to document recognition," Proceedings of the IEEE, vol. 86, no. 11, pp. 2278–2324, 1998.

38. M. Chen, P. Zhou, G. Fortino, "Emotion Communication System," IEEE Access, IEEE Access, DOI: 10.1109/ACCESS.2016.2641480, 2016.

39. Y. Sun, X. Wang, and X. Tang, "Deep learning face representation from predicting 10,000 classes," in Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pp. 1891–1898, 2014.

40. C. Farabet, C. Couprie, L. Najman, and Y. LeCun, "Learning hierarchical features for scene labeling," IEEE transactions onpattern analysis and machine intelligence, vol. 35, no. 8, pp. 1915–1929, 2013.

41. H. Su, Z. Yin, S. Huh, T. Kanade, and J. Zhu, "Interactive cell segmentation based on active and semi- supervised learning," IEEE transactions on medical imaging, vol. 35, no. 3, pp. 762– 777, 2016.

42. D. Ciresan, A. Giusti, L. M. Gambardella, and J. Schmidhuber, "Deep neural networks segment neuronal membranes in electron microscopy images," in Advances in neural information processing systems, pp. 2843–2851, 2012.

43. P. Fonseca, J. Mendoza, J. Wainer, J. Ferrer, J. Pinto, J. Guerrero, and B. Castaneda, "Automatic breast density classification using a convolutional neural network architecture search procedure," in SPIE Medical Imaging. International Society for Optics and Photonics, vol. 9414, pp. 2801–2808, 2015.

44. A. R. Jamieson, K. Drukker, and M. L. Giger, "Breast image feature learning with adaptive deconvolutional networks," in SPIE Medical Imaging. International Society for Optics and Photonics, vol. 8315, pp. 601–613, 2012.

45. K. Kamnitsas, C. Ledig, V. Newcombe, S. Joanna, D. Andrew, K. David, R. Daniel, and G. Ben, "Efficient multi-scale 3D CNN with fully connected CRF for accurate brain lesion segmentation," in Medical Image Analysis, vol. 37, pp. 61-78, 2017.

46. A. Patel, S. van de Leemput, M. Prokop, B. Ginneken, and R. Manniesing, "Automatic Cerebrospinal Fluid Segmentation in Non-Contrast CT Images Using a 3D Convolutional Network," SPIE Medical Imaging. International Society for Opticsand Photonics, vol. 10134, pp. 201–206, 2017.

47. T. Uemura, H. Lu, H. Kim, R. Tachibana, T. Hironaka, J. Nappi, and H. Yoshida, "Classification of Polyp Candidates on CTC Based on 3D-CNN," in International Forum on Medical Imaging in Asia (IFMIA 2017), pp.103-105, 2017.

48. W. Shen, M. Zhou, F. Yang, D. Yu, D. Dong, C. Yang, Y. Zang, and J. Tian, "Multi-crop convolutional neural networks for lung nodule malignancy suspiciousness classification," Pattern Recognition, vol. 61, pp. 663-673, 2016.

49. X. Li, Y. Kao, W. Shen, X. Li, and G. Xie," Lung Nodule Malignancy Prediction Using Multi-task Convolutional Neural Network," SPIE Medical Imaging. International Society for Optics and Photonics, vol. 10134, pp. 241–247, 2017.

50. M. Gao, U. Bagci, L. Lu, A. Wu, M. Buty, H.-C. Shin, H. Roth, G. Z. Papadakis, A. Depeursinge, and

51. R. M. Summers et al., "Holistic classification of ct attenuation patterns for interstitial lung diseases via deep convolutional neural networks," Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization, pp. 1–6, 2016.

52. T. Schlegl, S. M. Waldstein, W.-D. Vogl,

U. Schmidt-Erfurth, and G. Langs, "Predicting semantic descriptions from medical images with convolutional neural networks," in International Conference on Information Processing in Medical Imaging. Springer, pp. 437–448, 2017.

53. G. E. Hinton, "Training products of experts by minimizing contrastive divergence," Neural computation, vol. 14, no. 8, pp. 1771–1800, 2002.

54. G. E. Hinton and R. R. Salakhutdinov, "Reducing the dimensionality of data with neural networks," Science, vol. 313, no. 5786, pp. 504–507, 2006.

55. Y. Bengio, P. Lamblin, D. Popovici, H. Larochelle et al., "Greedy layer-wise training of deep networks," Advances inneural information processing systems, vol. 19, p. 153-160, 2007.

56. P. Vincent, H. Larochelle, Y. Bengio, and P.-A. Manzagol, "Extracting and composing robust features with denoising autoencoders," in ACM Proceedings of the 25th International conference on Machine learning, pp. 1096–1103, 2008.

57. D. Kumar, A. Wong, and D. A. Clausi, "Lung nodule classification using deep features in ct images," in 12th. IEEE Conference on Computer and Robot Vision (CRV), pp. 133– 138, 2015.

58. M. Kallenberg, K. Petersen, M. Nielsen, A. Y. Ng, P. Diao, C. Igel, C. M. Vachon, K. Holland, R. R. Winkel, N. Karssemeijer et al., "Unsupervised deep learning applied to breast density segmentation and mammographic risk scoring," IEEE transactions on medical imaging, vol. 35, no. 5, pp. 1322–1331, 2016.

59. Q. Li, W. Cai, and D. D. Feng, "Lung image patch classification with automatic feature learning," in 2013 35th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), pp. 6079–6082, 2013.

60. G. Tulder, M. Bruijne M," Combining generative and discriminative

69. Costa, Bruno Sielly Jales, Plamen Parvanov Angelov, and Luiz Affonso Guedes. "Fully unsupervised fault detection and identification based on recursive density estimation and self-evolving cloud-based classifier." Neurocomputing 150

representation learning for lung CT analysis with convolutional restricted boltzmann machines," IEEE transactions on medical imaging, vol. 35, no. 5, pp. 1262–1272, 2016.

61. Zhao and Liu, 2007] Zheng Zhao and Huan Liu. Spectral feature selection for supervised and unsupervised learning. In ICML, pp. 1151–1157, 2007.

62. Cai et al., 2010, Deng Cai, Chiyuan Zhang, and Xiaofei He. Unsupervised feature selection for multi- cluster data. In KDD, pages 333–342, 2010

63. He et al., 2005] Xiaofei He, Deng Cai, and Partha Niyogi. Laplacian score for feature selection. In NIPS, pages 507– 514, 2005.

64. Zhang et al., 2015] Peng Zhang, Chuan Zhou, Peng Wang, Byron J Gao, Xingquan Zhu, and Li Guo. E- tree: An efficient indexing structure for ensemble models on data streams. IEEE Transactions on Knowledge and Data Engineering, 27(2):461–474, 2015.

65. Yang et al., 2011] Yi Yang, Heng Tao Shen, Zhigang Ma, Zi Huang, and Xiaofang Zhou. l2, 1-norm regularized discriminative feature selection for unsupervised learning. In IJCAI, pages 1589–1594, 2011.

66. Jia, Feng, Yaguo Lei, Jing Lin, Xin Zhou, and Na Lu. "Deep neural networks: A promising tool for fault characteristic mining and intelligent diagnosis of rotating machinery with massive data." Mechanical Systems and Signal Processing 72 (2016): 303-315.

67. Zhang, Wei, Gaoliang Peng, Chuanhao Li, Yuanhang Chen, and Zhujun Zhang. "A new deep learning model for fault diagnosis with good anti-noise and domain adaptation ability on raw vibration signals." Sensors 17, no. 2 (2017): 425.

68. Kumar, Ajay, Ravi Shankar, Alok Choudhary, and Lakshman S. Thakur. "A big data MapReduce framework for fault diagnosis in cloud-based manufacturing." (2015): 289-303.

70. Miao, Hongxia, Heng Zhang, Minghua Chen, Bensheng Qi, and Jiyong Li. "Two-Level Fault Diagnosis of SF6 Electrical Equipment Based on Big Data Analysis." Big Data and Cognitive 3, no. 1 (2019): 4.

# EMPIRICAL STUDY OF RELATIONSHIP OF WORKING CAPITAL MANAGEMENT AND PROFITABILTY OF INDIAN AUTOMOBILE COMMERCIAL VEHICLES MANUFACTURING INDUSTRY

**A. Raval[1], A. Dave[2], A. Joshi[3] and T. Dave[4]**

[1,2,3,4]School of Liberal Studies, Pandit Deendayal Energy University, Raisan, Gandhinagar, Gujarat, India
[1]avaniraval04@gmail.com, [2]ashvin_dave25@yahoo.co.in, [3]Ashish.joshi@rediffmail.com,
[4]tndaveahmedabad@gmail.com

_____

## ABSTRACT

*This research study aims to examine working capital management practice carried out by six commercial vehicles of automobile industry listed on BSE/NSE. The study tries to undertake the data evaluation of selected variables for the tenure of ten years i.e. 2010-2019. The aim of this study is get to know association between dependent and independent component. Dependent Variable is a return on equity and Independent Variables is a Fixed Assets Turnover Ratio, Long Term Debt Equity Ratio and Current Ratio. Matrix of Co-efficient of Correlations, Descriptive and Regression has been used for analysis. It is found that there is positively significant association between Fixed Assets Turnover Ratio and return on equity. The result shows that rest of the variable has negatively significant relationship between long term debt equity ratio and return on equity and rest of the two variables has positively insignificant relation among Fixed Assets Turnover Ratio, current assets and current ratio.*

_____

*Keywords: commercial vehicles, profitability and working capital management.*

## Introduction

Financial manager must see and pass his time to every day internal operation, relating to current assets and current liabilities of the companies. Financial managers have to take care to get the maximum profit because its huge portion of their valuable time is dedicated to working capital problems. One of the most important things represents by investment in current assets i.e. the total investment in asset. Financial manager should pay special care to the management of current assets on a regular base. Working capital management faces very critical condition for all companies particularly for small companies. Normally small companies invest in current and may not much invest in fixed assets. In India small companies faces serious problem of collecting their debts. Working capital management in the role paly of current liabilities in financing current assets is far more important in case of small companies. As Different for large companies, they face problems in increasing long term finances.There is direct association among a company's growth and its requirement of working capital management. Requirement of the company's for sales growth to invest more in debtors and inventory. The sales grow regularly then requirement become very fast and normal. The financial manager should be alert of such requirements and finance them speedily. Regular growth in sales needs extra investment in fixed assets. The finance manager should pay specific courtesy to the levels of current assets and the financing of current assets.

## Literature Review

Princy N.K, Sreekrishnan P. (2017) analysed the performance of ULCCS Ltd. for the time period of five years with the span of 2011-12 to 2015-16. The variables considered Current Ratio, Quick Ratio, Absolute Liquid Ratio, Net Working Capital Ratio, Cash To Current Assets Ratio, Cash To Working Capital Ratio, Inventory To Networking Capital Ratio, Current Assets To proprietors Fund Ratio, Current Assets To Fixed Assets Ratio, Working Capital Turnover Ratio, Fixed Assets Turnover Ratio, Current Assets Turnover Ratio, Total Assets Turnover Ratio, Inventory To Current Assets Ratio, Gross Profit Ratio, Net Profit Ratio, Cash To Sales Ratio, Inventory To Sales Ratio, Inventory To Turnover, Inventory Holding Period, Gross Profit Margin Ratio, Gross Working Capital To Sales Ratio. They are using ratio analysis trend analysis, schedule of changes in working capital and common size balance sheet. Result

indicates that the efficiency of working capital management is worthy.

Ben Le (2019) examined 497 companies for the period of one decade with the span of 2007 to 2016 has been taken for analysis. researcher consider some component i.e., Age, capital expenditure, cash dividend, cash conversion cycle, days payable outstanding, days sales inventory, days sales outs tanding, government ownership, growth, interest, leverage, market to book ratio, net working capital, return on invested capital, sales, size and stock return volatility etc. It was concluded that a significantly negative association among Net working capital and companies valuation, risk and profitability.

Dr. Aniruddha das and Debasree dutta (2019) examined three firms in automobile industry listed on NSE firms over a period of five years with the span of 2012-13 to 2017-18 has been taken for analysis. They had taken current ratio, quick ratio, inventory turnover ratio, debtor's turnover ratio and asset turnover ratio as variables. They were using ratio analysis for analyzing the data. It was found that Maruti Suzuki India ltd. had constantly increased their debtor's turnover ratio while rest of the two firms debtors turnover ratio had decrease.

Mahdi Salehi, Nadia Mahdavi, Saeed Zarif Agahi Dari, Hossein Tarighi (2019) Examined 91 companies listed on the Tehran stock exchange over a time period of eight years with the span of 2009 to 2016 has been taken for analysis. The surplus stock return as dependent variable; finance and investment in working capital and returns ratio to share value, dividends paid and changes in cash as independent variables; and earning before deducting invest and taxes, financial leverage and financial cost as control variables. The applied descriptive statistics, correlation matrix, multi collinearity analysis and conclusive statistics for analysis. The study found that there was a negative & significant association among in cash and stock excess return. It was notice that there was no relationship among changes in working capital and stock surplus return.

## Research Methodology

This study has measured only six commercial vehicles of automobile industries over a time period of ten years i.e. 2009 to 2019. The evidence was acquired from Capitaline database. The aim of this study is get to know association between dependent and independent component. Dependent Variable is a Return on equity and Independent Variables is a Fixed Assets Turnover Ratio, Long Term Debt Equity Ratio and Current Ratio. Matrix of Co-efficients of Correlations, descriptive and regression has been used for analysis.

## Objective

The objective of this study is to know and assess the extent of effect and the relationship among dependent and independent variable of the business enterprise in the commercial vehicle automobile industry.

## Hypothesis

H0: Fixed Assets Turnover Ratio has no effect on Return on Equity

H1: Fixed Assets Turnover Ratio has effect on Return on Equity

H0: Long Term Debt Equity Ratio has no effect on Return on Equity

H1: Long Term Debt Equity Ratio has effect on Return on Equity

H0: Current Ratio has no effect on Return on Equity

H1: Current Ratio has effect on Return on Equity

## Interpretation

1.  Table – A obtain the regression coefficient. It is specifying that direction; standardized Beta, significance level, values and VIF are remark in Table – A. Table – A displays that Fixed Assets Turnover Ratio, Long Term Debt Equity Ratio and current ratio as independent variables has association with Return on equity. The β of Fixed Assets Turnover Ratio as presented in Table – A, stands at +0.256 viz. indicate that Fixed Assets Turnover Ratio has positive relationship with Return on equity. The value of significance level is 0.001. It is notice that the significance coefficient beta (β) is statistically significance.

Therefore null hypothesis (FAR) is rejected and H1 be accepted.

2. Table – A measured the cost of Long Term Debt Equity Ratio i.e. -0.826 it is revel that β has negative relationship with Return on equity. The value of significance level is 0.000 it means β is statistically clearly significant. Thus null hypothesis (LTDER) be accepted and H1 be rejected.

3. The β of Current Ratio as presented in Table – A, stands at -0.162 viz. point out that Current Ratio has negative relationship with Return on equity. The value of significance level is 0.036 It means that the significance coefficient beta (β) is statistically significance. Therefore null

hypothesis (CR) be accepted and H1 be rejected.

4. Table – B indicate that the matrix of co-efficient of correlations between independent variables i.e. FAR, LTDER and CR have been considered by karl-person coefficient of correlation. It is precisely displays that all component of co-efficient of correlations' value has not more than +0.4.

5. Table – C obtainable the element of descriptive statistics. The outcomes presented this studied will be more suitable to the organisations whose data sets resemble the descriptive method indicate in Table – C.

### Table – A: Regression Co-efficients

|  | Regression Co-efficients | | t | Significance Level |
|---|---|---|---|---|
|  | Direction | Value |  |  |
| Constant |  | 0.214 |  |  |
| FAR | + | 0.256 | 3.529 | 0.001 |
| LTDER | - | 0.826 | -11.245 | 0.000 |
| CR | - | 0.162 | -2.148 | 0.036 |

**Dependent variable: ROE**
**Independent variables: FAR, LTDER, CR**

### Table – B: Matrix of Co-efficients of Correlations

|  | FAR | LTDER | CR |
|---|---|---|---|
| FAR | 1.000 | -0.421 | 0.467 |
| LTDER | -0.421 | 1.000 | -0.487 |
| CR | 0.467 | -0.487 | 1.000 |

### Table – C: Descriptive statistics

| Variables→ | ROE | FAR | LTDER | CR |
|---|---|---|---|---|
| Mean | 0.126 | 3.37 | 0.37 | 1.11 |
| Std. Deviation | 0.30 | 2.84 | 0.53 | 0.47 |

### Findings

1. It is finding that there is insignificantly positive association among Fixed Assets Turnover Ratio and Return on equity and the significance coefficient beta (β) is statistically significant.

2. Further find that Long Term Debt Equity Ratio has negatively association with Return on equity and significant co-efficient beta is statistically significant.

3. The Current Ratio has positive association with profitability and significance coefficient beta is statistically relevant.

### Conclusion

The research disclosed relationship between Fixed Assets Turnover Ratio, Long Term Debt Equity Ratio and current ratio and return on equity that there is positively significant association between Fixed Assets Turnover Ratio and return on equity. The result shows

that rest of the variable has negatively significant relationship between long term debt equity ratio and return on equity and rest of the two variables has positively insignificant relation among Fixed Assets Turnover Ratio, current assets and current ratio.

## References

1.  Dr. Aniruddha Das, D. D. (2019). Working Capital Management and Cash Flow Analysis of Selected Indian Companies in Automobile Industry. International Journal of Management, Technology And Engineering, 9(3), 1144-1151.
2.  Princy N. K, P. (2017). A Study on Working Capital Management of Uralungal Labour Contract Co-Operative Society (ULCCS) Ltd. IJEDR, 5(3), 1179-1182.
3.  Le, B. (2019). Working capital management and firm's valuation, profitability and risk Evidence from a developing market. International Journal of Managerial Finance, 15(2), 191-204.
4.  Mahdi Salehi, N. M. (2019). Association between the availability of financial resources and working capital with stock surplus returns in Iran. International Journalof Emerging Markets, 14(2), 343-361.

# BLOCKCHAIN AND DIGITALIZATION OF LAND ADMINISTRATION USING DISTRIBUTED LEDGER SYSTEM

## S. Charith G[1], H. Reddy S[2] and R.K. Rathode[3]

[1, 2, 3]Department of Computer Sciences Engineering, Bharat Institute of Engineering and Technology, Hyderabad
[1]saicharith2005@gmail.com

---

## ABSTRACT

*Blockchain is the one among the most important technical invention in the last two decades. This technique has paved way to many tech giants to combat the problem of security and digital identity issues. Blockchain technology includes cryptography and digital voting has a vast number of applications. Blockchain itself is known for cryptocurrency undermining and other applications. The paper argues that one should look beyond the currency applications and investigate the vast usage of blockchain in e-governance. The paper presents a brief framework of distributed ledger systems in the field of land administration which provides trustworthy record keeping. Our research has concluded that inclusion of blockchain technology in land administration can overcome the drawbacks of the traditional methods. This is the platform where one can abolish the problems facing in the land registration, not only in India as well as many parts of the world. Hence using blockchain Technology to save the land record transaction is the way to create the immutable records. This technology has added additional features to the platform of land-records.*

---

*Keywords: Blockchain, e-governance Land registration, Land administration, Manipulation.*

## Introduction

Today's blockchain is like the steam engine in 1698. extraordinary and game-changing. In the past few years, economists thought of introducing distributing ledger technology in the field of land administration system. Which brought revolutionary changes in the well profound land registry system, by establishing a trustworthy and well-functioning land record system.

In decades of practicing manual records, which left the information wide open for fraud and corruption. To overcome the drawbacks in the traditional method which is slow and cumbersome. blockchain and distributed ledger systems have come into the light. blockchain provides a secured record system without any need for a trusted third party. while drafting this paper most accurate and precise information has been consulted, which provided information that insecurity, manipulation of records, corruption, double or multiple registrations are the major problems faced by the taxpayers in the traditional method. blockchain is based on cryptography just like bitcoin which enables its capacities beyond any other technology.

In simple terms, A blockchain is a continuously growing, distributed, shared ledger of blocks, which are sealed cryptographically with a digital firewall generated by a hashing function. Each block is "chained" to the previous one by referring to its hash value. The computers, or nodes, that connect to the blockchain verify that the record is valid per the rules of the governing. In 2016 the Swedish government introduced blockchain in their administration system, which digitized their record with the decreased paper work Lantmateriet save $106 million per annum. using the descriptions of the current state of play of various proofs of concept in countries that are piloting a blockchain-based Land Administration and by relating these developments to the practices of well-functioning modern Land Administrations. It has to be noticed here that developments are growing at a rapid pace and (blockchain) technology is changing almost all the time. This paper, therefore, gives a temporary overview of the recent developments and possibilities(1).

## Land registration

Land registration refers to a system whereby a government entity records ownership and land-related rights. These Land-records provide evidence of title, facilitate transactions, and prevent fraud. According to the World Bank, 70% of the world's population lacks access to land titles. For the government, records of land

---

ownership are necessary to collect taxes, provide services, and set up its territorial authority. The World Bank has shown its efforts in improving land registration in several countries. In emergent nations the provocation is twofold. On one hand, securing land property rights is a crucial factor in encouraging economic development. On the other hand, in developing countries, land records are typically kept on paper in a unify location(2).

Currently, the process will be computerized, and a Land Information system will be developed to improve estimation and Land Title Registration According to the land Act 1999, three land occupancy rules are identified; the constitutional rights of occupancy, the customary freedom, and other informal rights. To ensure property rights security and realize the benefits from it, governments need to perform three functions that build on each other, specifically (i) unambiguous definition and enforcement of property rights; (ii) provision of reliable information; and (iii) cost-effective management of land-related externalities.

**The following are the steps for the process of land registration:**

1. First Investigate the Land Title Exist in Land Registry
2. Go to the Land and Survey the land
3. Get the confirmation of land Title
4. Get the recording of the property's Global Positioning System (GPS) coordinates.
5. Next, Enter the collected data and information into the land title database.
6. Issuing the Proofs of property ownership to the rightful property owner.
7. Therefore, the land Registration process has been ended.

## Flaws in Treditional Land Administration System

The following are flaws faced in Land Records(figure 1): -

1. **Lack of Professional Approach:** - The process of providing land records is primarily for land revenue collection. The village-level land revenue accountant and the land revenue inspector tend to display apathy towards cross-referencing and verification of data.

2. **Lack of Standardization: -** The DILRMP system is dependent upon the data and information received from the village level government staff. The village-level government maintains a sizeable handwritten amount of data with them, which leads to a lack of standardized data, complex to retrieve data, and wear-tear of handwritten data.

3. **Manipulation: -** The registered information is not standardized due to a lack of teamwork between the various departments who were handling land records and property ownership data. Further, the process of updating the Land-records is lengthy and clumsy. Therefore, the nature of ownership is often not reflected in many of the records, hence making it strenuous to trace if any peculiar entry has been made.

4. **Lack of Coordination: -** There is a lack of communication and coordination between various sectors such as land records management, land registration, judiciary, taxation, etc. Land registration provides an assent between the two parties on public notice, but the registry is silent on the legal validity of the underlying transaction. Therefore, the title to the underlying land is purely tentative.

5. **Litigations: -** The title registration is the open challenge in a court of law, which is a tentative nature. Currently, there are nearly 30 million pending cases, in which 70% are related to land and property disputes.

6. **Fraud and Black Money: -** Property fraud is one of the significant problems facing in land records. A report from the Controller and Auditor General (CAG) of India describes that in 2015 nearly 1.5 lakh cases were pending under the Registration Act. Besides, one more major mode of parking is black money. Black money is usually dumped through the Benami (false name) transactions. These two are the major flaws that we are facing today in Land-Records.
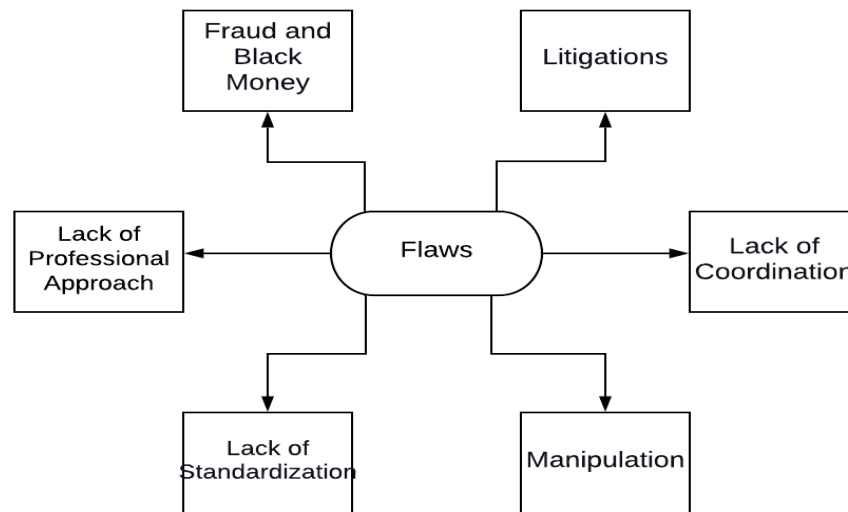
**Figure 1: Flaws in traditional land administration**

**Blockchain Methodology(1-3)**

**Blockchain**- Blockchain can be defined as a shared ledger that stores data (or) information about the transaction in a distributed way.

**Working-** By this definition, we can explain it easily, that these transactions are performed within a blockchain between the people, here the blockchain is formed by various participant's computers (acting as nodes).Here, each block in the blockchain references to the previous one and also has contents of data, its own hash, and also the hash of the previous block (figure 2). Each hash can be compared to a fingerprint as it's unique and can be generated using a string of text using a mathematical function (4-5).
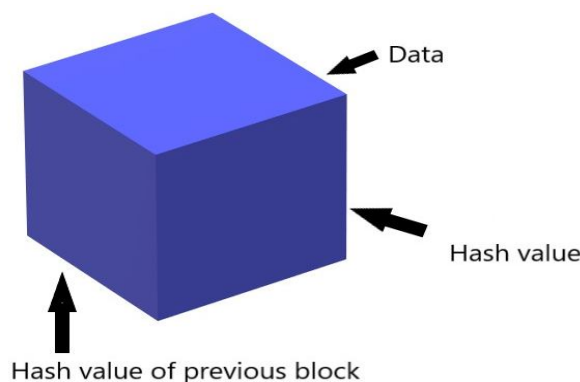


**Block**
**Figure 2: Methodology of blockchain**

In a blockchain, if any of the block's hash value is to be changed, it can make the whole blockchain invalid, thereby it acts as a great tool for identifying the change in data, which are stored in each block(6).
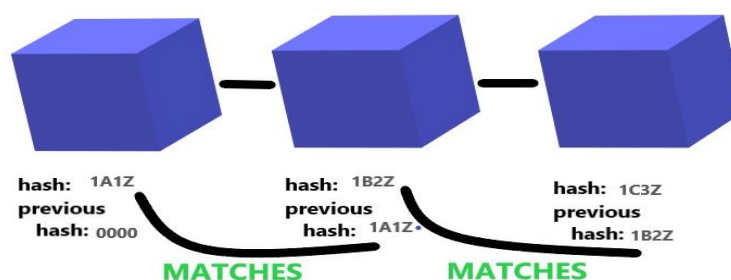


**Figure 3: Depiction of valid blockchain**

In figure 3, every hash value matches its previous hash value. So, it's a valid blockchain.
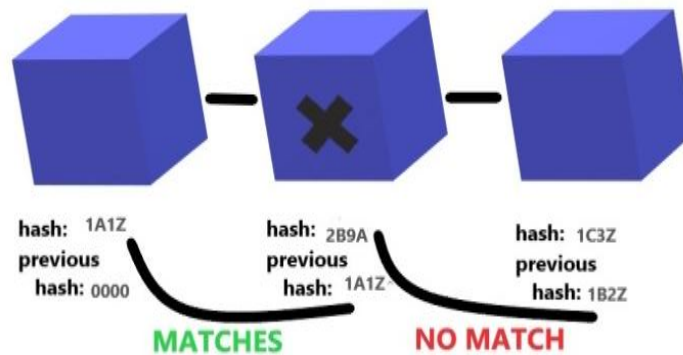


**Figure 4: Representation of invalid blockchain**

In figure 4, due to the change in the hash value in the single block, the whole blockchain becomes invalid(6).

However, the joining of any new block is allowed in this peer-to-peer network, and that block also gets the whole copy of the blockchain. Effective hashing and proof-of-work mechanisms with Distributed storage of data help to prevent any forgery (or) fraud(4-5). When a document is stored in the blockchain a mathematical module automatically generates a hash value, which makes the identity of the document unique. when two documents contain a single hash value, they are likely to be neglected. this hash values make it easy to access the document. Most importantly this method is fully secured, whenever an alteration is made to a document in the blockchain its hash value also changes making it impossible to go unnoticed, by this way one can detect when the document is altered or missing, implementing this method in the land administration system which results in authenticity and accountability of the land-related documents. Blockchain replaces the centralized system with a distributed database that helps protect the central repositories from replication or duplication (1). blockchain provides accuracy, availability, and authenticity. It's trustworthy management system and administration in the land registry gain a lot of people's trust and support.

### Introducing Block Chain To Land Administration

Blockchain can be used in different methods to process information. each method differs from one another in privacy and trust. one of the simplest ways to use blockchain is by sorting the hash value of the document (7).
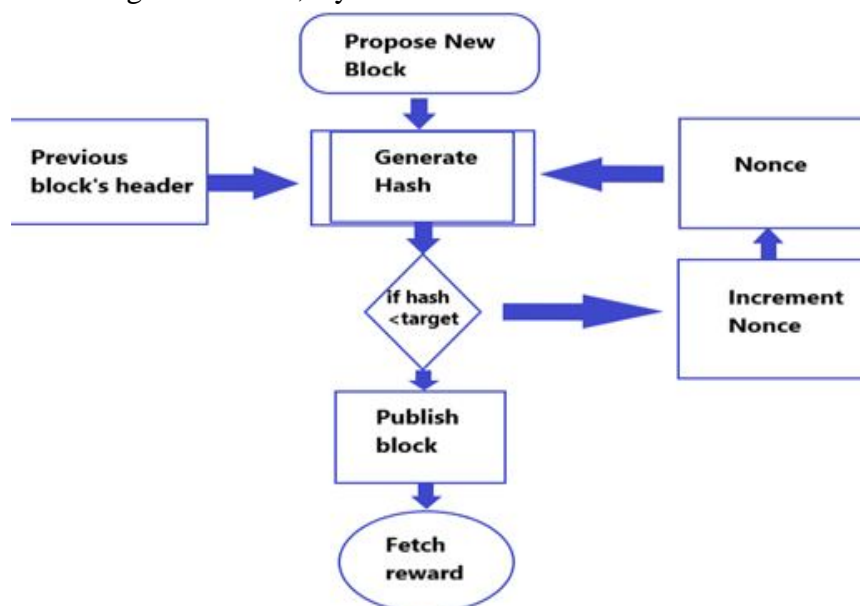


**Figure 5: Flow chart showing the blockchain technology**

In general, there is the other method to implement blockchain in the land registry here

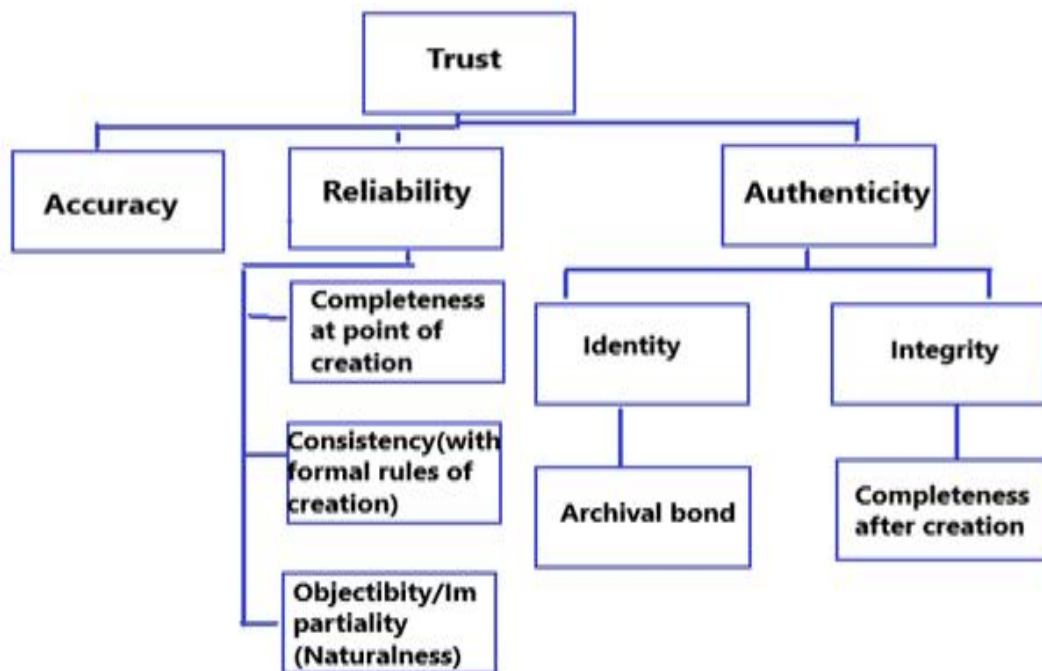people used complex concepts like off chains and smart contracts.



**Figure 6: Flow chart showing the trust worthiness of blockchain technology**
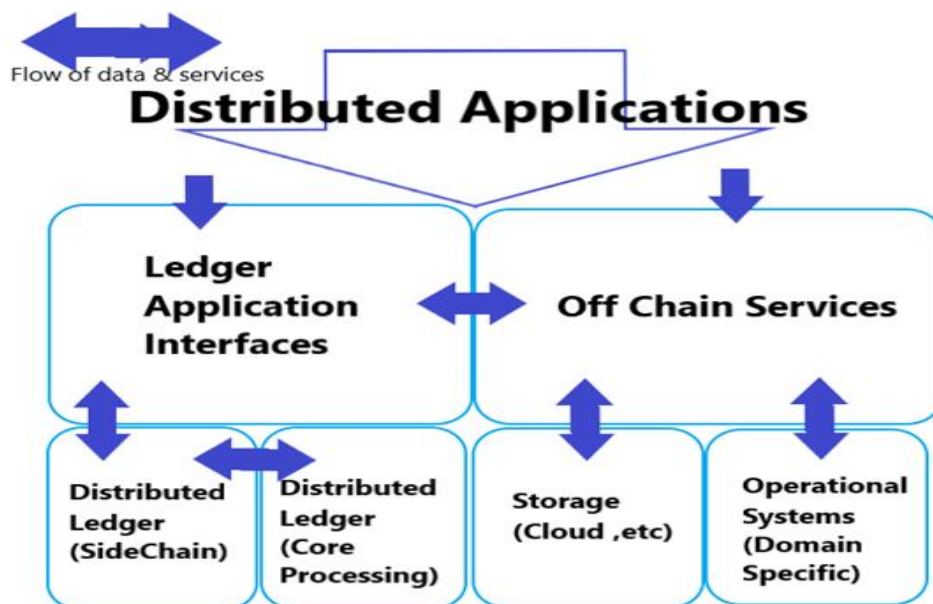


**Figure 7: Distributed applications of blockchain technology**

Here all the transactional data of the land is stored in off chains (stored out of blockchain) which are later transfers into the blockchain using smart contracts. smart contracts are user created business rules such as transfer of ownership and eligibility of lease. These smart contracts present in distributed ledger determines what transaction to be recorded in the blockchain.These also have the ability to read and write through program interfaces to

data stores that are separate from the blockchain itself and can be updated when transactions occur(4-5).

**Conclusion**

The article under consideration presents in the upcoming year that Blockchain technology will play an important role in the industry. Now there are many systems which is based on Blockchain technology which is already in existence. There are many problems such as

collaboration of brokers or middleman, time delays, etc. This is the platform where we can abolish the problems facing in the land registration, not only in India as well as Many parts of the world. Hence using blockchain Technology to save the land record transaction is the way to create the immutable records. This technology has added additional features to the platform of land-records.

## Future Scope

Blockchain technology would bring great impact on Land Registration by making it more efficient. Switching to blockchain technology would make land registry falsification-free distributed ledger open for anyone to view. It can help by preventing fraudulent to interfere between a buyer and seller. The operation of a blockchain is a shared responsibility. The suitable governance and encouragement for operation has to be set up. The goal is to make the solution public source to a large range. This methodology will also need to incorporate with current systems and procedures, especially banks and real estate agents, and the Land Registry in order to assure that the service works with the collaborators involved in the procedures(6).

## References

1. Jacob Vos, Christiaan Lemmen, Bert Beentjes, Blockchain-Based Land Administration Feasible, Illusory or A Panacae? https://www.researchgate.net/publication/316595854_Blockchain-based_Land_Administration_Feasible_Illusory_or_Panacae

2. Tien Tuan Anh Dinh, Rui Liu, Meihui Zhang, Beng Chin Oo, Untangling Blockchain: A Data Processing View of Blockchain Systems, IEEE Transactions On Knowledge and Data Engineering, VOL. 30, NO. 7, JULY 2018 https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8246573

3. Marten Risius Kai Spohrer, A Blockchain Research Framework, 14 August 2017, US Government 2017 https://s3.amazonaws.com/academia.edu.documents/58091770/A_blockchain_Research_Framework_treated.pdf?response-content-disposition=inline%3B%20filename%3DAblockchain_Research_Framework_treated.pdf

4. Victoria L. Lemieux, Blockchain and Distributed Ledgers as Trusted Recordkeeping Systems: An Archival Theoretic Evaluation Framework, Future Technologies Conference (FTC) 2017. https://www.researchgate.net/publication/317433591

5. "Designing a Land Records System for The Poor," (report, United Nations Human Settlements Programme, 2012),12, http://stdm.gltn.net/docs/Designing-a-Land-Records-System-for-The-Poor.pdf

6. Telia company, Chroma Way and Kairos Future, The Land Registry in the blockchain - testbed, A development project with Lantmäteriet, Landshypotek Bank, SBAB, march 2017

7. Christiaan Lemmen, Jacques Vos and Bert Beentjes (2017), Ongoing Development of Land Administration Standards: Blockchain in Transaction Management, EPLJ; 6(3): 478–502. https://doi.org/10.1515/eplj-2017-0016

8. Christidis, K. and Devetsikiotis, M. ( 2016) Blockchains and Smart Contracts for the IoTs, IEEE Access, Special section on the plethora of Research in IoT. https://www.researchgate.net/profile/Kamanashis_Biswas/publication/311716550_Securing_Smart_Cities_Using_Blockchain_Technology/links/5a2682d5a6fdcc8e866becfb/Securing-Smart-Cities-Using-Blockchain-Technology.pdf

9. Distributed Ledger Technology: beyond block chain. Report. UK Government Chief Scientific Adviser, Government Office for Science.

# AN IMPACT OF TEACHING STYLE OF LEADERSHIP ON SENIOR SECONDARY STUDENTS

**R.K. Pathak[1] and D. Saxena[2]**
[1,2]Institute of Education and Research, Mangalayatan University, Aligarh

_____

## ABSTRACT

*The teacher, plays an important role to plan and give direction to students' life. He appears to be in leading position for the students in view of the content that follows the activities to make themselves as decision maker. His / her works treated as the impact on styles of leadership in class room teaching. the leadership can affect their psychological development in their personality enhancement for further activities within these certain objectives.1. If teacher-students' relations are based on co-operation and involvement then the students' level of satisfaction towards the activity performed. The Analysis of the teacher-student relationship in relation with the way the students feel this interaction. 2. The exploration of the pupils' opinions regarding the characteristics of the desired teacher. Research hypotheses: 3. If teacher-students' relations are based on co-operation and involvement then the students' level of satisfaction towards the activity performed. Research hypotheses: Students get the feeling they are in control of the activities of leadership that they are about to exist in their personality. If the teacher creates the style of leadership. It may communicate and transmit the skills, of self-development. The sample has been taken from 200 senior secondary school students. Conclusions: a teacher sets up his / her relations with the students is the most important concerned subject like assimilation; suggesting; lifelong training programmes, preparing of modules on pupil-focused learning. The training of teachers for pupil-focused counselling should be in the moderate way to complete the modules for personal development and teachers-students based programme for students learning destined to teachers.*
_____

***Keywords:*** *leadership style, teacher-student relationship, student-focused learning*

## Introduction

### 1- The authoritative leadership Style

It is a style in which a teacher can make all the leadership activity and take decision for his organisation. He performs and share his overall planning with assessment of criteria for performance in groups and individual. These activities of leadership provide him a process, plans and strategy in the field of education where he can maintain a position of a leader. The field in which the teacher is engage should be authoritative where he can freely take the hole management and leadership style to show off his activities and personality. This provides the students to choose the teacher who can prepare them to study with full authority and embarrassment.

### 2- Democratic Leadership Style

In this style the teacher proves him-self as a democratic leader who does not participate neither too much not to less not to less in the further activities of teaching. He avoids making decision along but invited the group of participants to settle a matter of organisation. The students can learn such opportunity to chose such feature of teaching with an advice to sought regarding the fulfilment the task. The leading behaviour of a teacher can suggest to best alternatives to the students. The first is to let them decide to resolve the issue of the common things as well and the second is to observe a common criterion of assessment of students. This democratic quality of a teacher gives students to act in such a way to organisation a member of a group and to lead it.

### 3- The Laissez-faire Leadership Style

This style is a teacher means he is a follower of passivity. He is a passive leader who limits his participation in various activities. He gives students to take all initiatives and establishes friendly attitude with students. He is a man of non-involvement behaviour and cannot takes division in the mean-time. He hesitates on such occasions when some offering, suggestion and advice relevant to topic has been given to him as a task.

## 2. Research hypotheses

If teacher students' relations are based on co-operation in enrolment regarding to the aim of students' satisfaction level towards those activities which increase the level of understanding the problems of each other. Teacher students' relations are based on

_____

participation and increasement where the students feel that they are in control of the management or the teacher to convey the activities the duties to perform. The teacher exhibits the real communication and relating skills in his vocation to him self as an ideal teacher. This conduct of relations between teacher and students gives a support to each other that can enhance the satisfactory level in teaching and other activities.

## 4-Research Methodology

The research was conducted on the base of study about the different style in class room teaching. The leadership style in the class room performed the various analysis of teacher students' relations, characteristics monitoring and other way to established interaction that can influence students' attitude and behaviour. The methodology is on the level of satisfactions that can estimate the capacity and pedagogic talent in the students. This process of research method can be conducted through opinion poll enquiries by the help of questionnaire to average the highest and lowest extend in students who have essential merits to be an ideal teacher.

The following seven questions are different variants so the students can answer the best corresponds to his opinion.

Q-1 Do you appreciate that the activity carried on in the class room under teacher coordination?

Q-2 Are these co-orations among the students and teacher can fulfil the task of class room teaching?

Q-3 Do the class room students prove them self as a capable of interpersonal awareness and communication?

Q-4 Do the leadership teaching provide the equal opportunities to all participant.

Q-5 How the democratic leadership can change the environment of teaching class.

Q-6 How are the various activities will be helpful for both teacher and students while teaching through laissez-faire leadership style.

Q-7 Are the students of the class mutually intergraded and accepted the challenge to solve the task together.

## Data Analysis

It is according to the provided the data of students of teacher exhibit in awareness and communication at the level of class reached up to 60% satisfactory while compare to overburden of work minimise to 60% and maximise to 70% through the medium of extend that is necessary to know a good communication needs to be appreciable in their personal requirement. Further activities of class room teaching will be carried on under the guidance of teacher. It is considerable that the percentage of the students over 50% that the relation between the teacher and students provide a co-operation in completing data. While it is mention that a teacher will be powerful and the students feel the dominant the class while the teacher try to work in relation of equality. In such condition we found there is no co-operation among the members. The teacher should use the technique to motivate the students and encouraged them with full appreciation. The final analysis of the study where the teacher students' relation should according to the criteria over the activities in which they are to deploy. The certain result may be identified from the appreciation.

a) Are the class mates mutually integrated to solve the task?

b) What is the percentage of appreciation between students and teacher relationship?

c) The standout views that lead to the following consideration.

The authoritative teacher those whose work style is to impose themselves not to cooperate with students. Students should not feel the sense of unity thus they offer the positivity to be more persevering the certain aspect the class room teaching.

The democratic style a relay important for the students and teacher for a good communication and establishing a proper understanding among them. Therefore, it is their talent to prove in the class room.

The laissez-faire leadership teaching style is not appreciable in condition because it left the impression form the teacher to be passive on sides either be a teacher or an advisor to the students.

## Conclusion

As a witness in the different context leadership style. It is predominant in all aspects in all analysis of teacher students' relationship comes to feel increase and motivated to participate in future action. It is affirmed that the perception of the level of students may varied while they work individual and while they work in groups. As for the identification the students felling of unity and their tendence to appreciate the relations and their development so far in future.

There for the analysis of the characteristic of teacher and conduct while establishing the relation with students is an important element of his character. It attributes him to be an ideal teacher if he has these qualities like good communicator intelligence in working, friendly behaviour and fairness and patience. The portrait of the ideal teacher even he has quality of leadership and focus vision on students would be an idea teacher and his quality will be explorable.

## References

1. Bamburg, J. and Andrews, R. (1990). School goals, principals and achievement, School Effectiveness and School Improvement, 2(3), 175–191
2. Bateman, T. S. and Organ, D. W. (1983). Job satisfaction and the good soldier: The relationship between affect and employee 'citizenship, Academy of Management Journal, 26(4), 587-595
3. Blase, J. and Blaze, J. (1999). Effective instructional leadership: Teachers' perspectives on how principals promote teaching and learning in schools, Journal of Educational Administration, 38(2), 130-141
4. Bogler, R. (2001). The Influence of Leadership Style on Teacher Job Satisfaction, Educational Administration Quarterly, 37(37), 662-683
5. Day, C., Harris, A. and Hadfield, M. (2001). Challenging the orthodoxy of effective school Leadership, International Journal of Leadership in Education, 4(1), 39–56
6. Flores, M. A. (2007). The impact of school culture and leadership on new teachers' learning in the workplace, International Journal of Leadership in Education: Theory and Practice, 7(4), 297-318
7. Ford, M. A. (1992). Motivating humans: Goals, emotions and personal agency beliefs. Newbury Park, CA: Sage
8. Fullan, M. (2001). Leading in a Culture of Change. San Francisco: Jossey Bass Fullan, M. (2002). The change leader, Educational Leadership", 59(8), 16–20
9. Hall, B. W., Pearson L. C., and Carroll, D. (1992). Teachers' long-range teaching plans: A discriminated analysis, Journal of Educational Research, 85(4), 221-225
10. Hallinger, P. (2000). A review of two decades of research on the principalship using the Principal Instructional Management Rating Scale, Paper presented at the annual meeting of the American Educational Research Association, Seattle, Washington
11. Hallinger, P. (2003). Leading educational Change: reflections on the practice of instructional and transformational leadership, Cambridge Journal of Education, 33(3), 329-351
12. Hallinger, P. and Murphy, J. (1986). The social context of effective schools, American Journal of Education, 94(3), 328–355
13. Harris, A. and Lambert, L. (2003). Building Leadership Capacity for School Improvement. London: Open University Press
14. Heller, H., W., Clay, R. & Perkins, C. (1993). The relationship between teacher job satisfaction and principal leadership style Journal of School Leadership, 3(1), 74-86

# EVOLVING OTT PLATFORMS - AN EMPIRICAL STUDY ON OTT TRENDS BASED ON DEMOGRAPHICS OF PEOPLE IN MUMBAI REGION

## K.D. Bhojwani

Department of Commerce, Smt. Chandibai Himathmal Mansukhani College, Ulhasnagar

_____

## ABSTRACT

*Coronavirus pandemic came like a gushing sea wave and swept away our normal lives. Suddenly, everything changed; the way we lived, the way we communicated, the way business was done, the consumption patterns and what not. First time in the history of mankind was such a situation witnessed, that the Government had no choice but to impose a complete lockdown. People had no choice but to stay indoors. Pandemic brought with itself a plethora of problems. Health, monetary, social, and many more. People were striving hard to understand and adapt to the sudden change in the lifestyle that Corona had gifted to all of us. There were different ways how people were dealing with these pandemic blues. On one hand, there was leisure and free time but on the other hand, there was loss of income, fear of disease, abrupt stay at home norm which disturbed the mind ad psyche of people. Suddenly, it was felt that we all had more time at our disposal than ever. Leisure time became an important component of our lives during this pandemic. With the curiosity to know more about the impact that corona virus was making on our everyday lives and the urge to take the pandemic blues in the stride, the media consumption, especially the digital media gained momentum. People again would have garnered in front of the television like earlier, but the culture had changed now. Solo watching, changing preferences about the content, personalized timing, integration of information and entertainment at one place and moreover customized and bizarre media consumption are the new highlights that could be seen. The OTT platforms proved to be rainbow amidst the clouds of pandemic for many and provided the much needed rejuvenation and emotional stance to the overburdened pandemic-hit lives. This paper is an attempt to examine the emerging trend of digital media consumption through OTT platforms. The research also endeavors to find out the difference in the usage of OTT platforms based on demographic factors like Gender, Age and Occupation. The research has been done using both primary and secondary data. Statistical tools like percentages and Anova had been used to analyze the data. Graphs and charts are used for effective data presentation.*

_____

**Keywords:** *Pandemic, Entertainment, OTT platforms, new normal, digital media*

## Introduction

### Corona's deadly Pandemic wave

COVID-19, a new disease hailed from Wuhan, China created shock waves across the entire world including India. It has spread to 192 countries of the world. The sudden global pandemic turned lives upside down for the entire world as the intensity and cure against the virus was certainly unknown. The virus is said to be so severe that one infected person can infect around 400 people in a period of 30days. To slowdown the spread of virus and to break the chain of infection, the only solution what the Government could see was the strict Lockdown; a situation where people are required to strictly remain indoors which would enable people to maintain social distancing. Not only is the disease life threatening, but it also posed challenges in the form of fear of isolation, social isolation, loss of income, economic slowdown and many more challenges. People started struggling to meet ends. The chaos outside forced people to stay indoors. Strangely, there was even more chaos inside the mind. Grudged, anxious, worried, gloomy minds seared all around. Business closures, Curfews, movement restrictions, social distancing became household words.The household routines also changed. The homemakers were managing almost without the help of maids, household help. Cooking, cleaning, managing home and the physical and mental health of the family members became the extended responsibilities of households. COVID, in a way, proved to be boon to the deserted families and so called busy family members. It brought families closer, cooking and cleaning became a shared affair. Working for home and from home became the new norm.

Since there was complete closure, schools, colleges, malls, theatres, gardens and restaurants showed closed doors. Even religious places were closed as a precautionary measure to contain the effect of corona virus. There was no means of entertainment to the people outside their homes. COVID not only

brought physical distancing but resulted in social distancing as well. Mankind is said to be the most adaptive specie on the earth. Alternative modes of survival started emerging. Education became online, routine medical service went online, virtual communities popped up and people started beating the blues through virtual reunions, virtual birthday celebrations, family meets online and so on. The virus not only slowed down the economic and social activities but also slowed down our lives.

### Media Consumption During Pandemic-the Rising Star 'OTT Platforms'

Suddenly, it was felt that we all had more time at our disposal than ever. Leisure time became an important component of our lives during this pandemic. With the curiosity to know more about the impact that corona virus was making on our everyday lives and the urge to take the pandemic blues in the stride, the media consumption, especially the digital media gained momentum. Board Games, re-runs of many popular TV shows garnered high TRPs. Amidst the traditional entertainers, OTT platforms became the shooting star. Over The Top media services are the media services provided directly to the viewers surpassing the traditional channels, cable connections, satellites and broadcast platforms. Pandemic proved to be a boon for the OTT platforms. Temporary closure of theatres and cinemas drove people towards spending more time on digital media consumption at home especially on social media platforms and Over the Top Content like web series, documentaries, etc. An FLYX survey showed that there had been a 4four fold increase in the time spent on media consumption and 5fold increase in the subscription expenditure during the pandemic outbreak. Obviously, there was a meteoric rise in the OTT content releases and subscriptions. OTT platforms brought in an innovative entertainment culture boosting solo watching, availability of multilingual, innovative, uncensored content, personalized timing, integration of information and entertainment at one place, Moreover, increased usage of smartphones and affordable data packages are the new highlights that could be seen. With the surge in the number of platforms, innovative and engaging content, facility of without break content watch, fremiums, the OTT platforms garnered massive viewership by providing the much needed rejuvenation and emotional stance to the overburdened pandemic-hit lives.
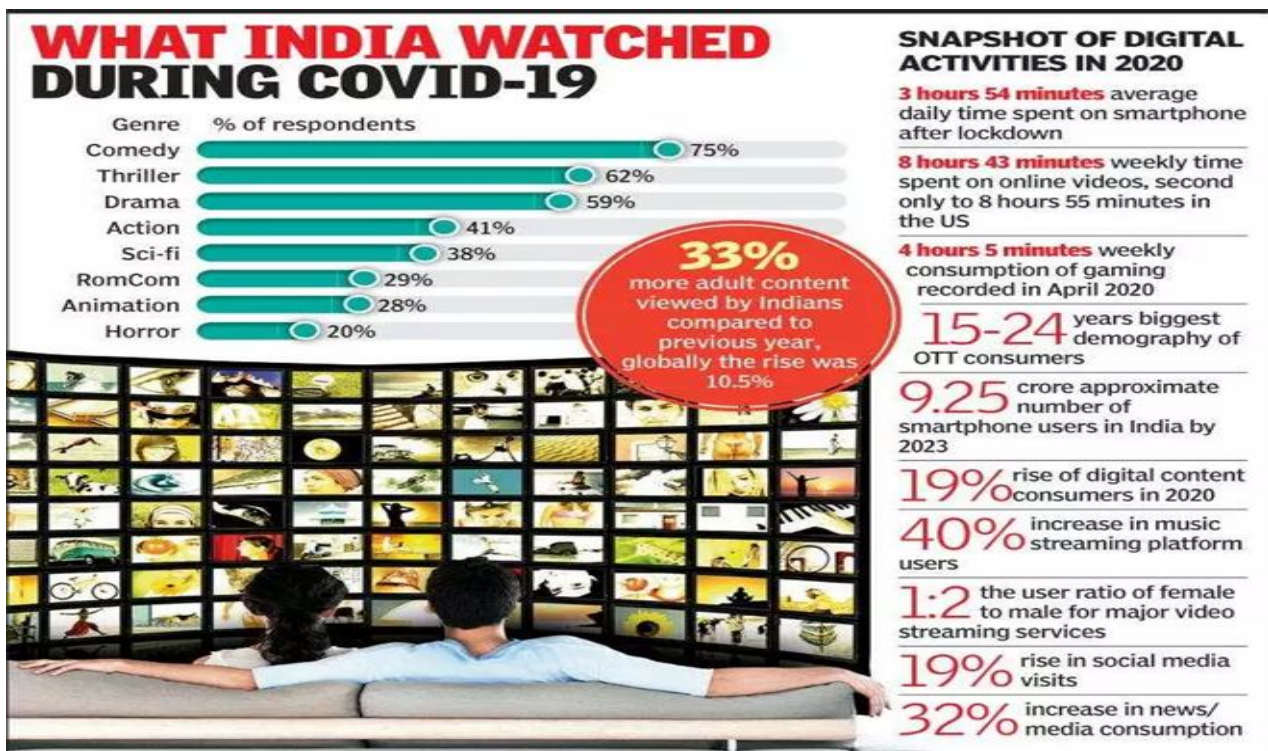


A snapshot of What Indians watched most during lockdown.
Source: Times of India dated 11th March 2021

## Review of Literature

(Saini,2020) has observed that there's a noticeable rise in the adoption of OTT platform especially in the current pandemic times because of the cross-cultural unlimited information and original content. Besides this, the increasing use of smart phones and affordable data plans have acted as icing to the cake and have done a lot to drive consumers towards adoption of OTT platforms.

(Dahiya, December 2020) finds that OTT platforms with their diverse content and multi-lingual approach, solo viewership has spurred the much imagined change that the Indian media consumers always wanted and with more curated content and diverse approach, the OTT platforms will become more popular in the times to come. Pandemic boosted the need to become tech savvy and use these digital media more effectively.

(Singharia, 2021) have studied two parameters and have prepared a model stating that Customer engagement and Quality of Service experience are the key factors in promoting satisfaction of viewers and has also found that habit moderates between satisfaction and willingness to pay and subscribe for these OTT channels.

A recent research study was conducted by Omnicom Mediagroup on 1000 respondents from major metro cities of India to provide insights into the evolving media consumption habits of the Indians, It states that Television re-runs, video streaming, gaming apps, Youtube, social media are a hit and that there is an exponential rise in the number of people watching content on various OTT platforms across all geographies of India. An article published in The Hindu in December 2020 states that when India was under severe lockdown, one of the industries which had undergone serious growth were the OTT platforms with their innovative flavours and curated content.

A recent article in Fortune India states that video streaming services will receive a high uptick as people are forced to stay indoors amid pandemic and it has also included Kotak report that says that these OTT platforms are expecting to grow at a CAGR of 48% between FY18 and FY23 to reach $3.1 billion.

A recent OTT survey report published in Times of India conducted by MICA and Communications Craft revealed a lot of startling statistics of increased viewer's engagement with OTT platforms and it also concluded that OTT platforms are the clear winners amongst all the entertainment industry players because of the curated content and customized recommendations that they can provide to the viewers and help them counter the pandemic blues.

## Gap Analysis

The above literature review reveals that various studies have been conducted on the rise in the consumption of digital media through OTT platforms. However, a precise study in the Mumbai region analyzing the demographic factors such as Gender, Age and occupation has not been done. Thus, this study will help us to analyze the rising trend of media consumption via OTT platforms in context of demographic factors of people living in Mumbai.

## Objectives of Study

The present study aims to achieve the following objectives:

1. To examine the awareness level about OTT platforms among the people living in Mumbai region.
2. To study the key trends around OTT adoption trigged by COVID-19 and to identify the various OTT platforms that have emerged as shooting stars during the pandemic crisis.
3. To evaluate whether there is a difference in the adoption of OTT platforms between the male and female respondents.
4. To evaluate whether age impacts the adoption and usage of OTT platforms.
5. To examine whether occupation impacts the usage of OTT platforms.

## Research Design and Methodology

This research paper is aimed at examining the evolving OTT platforms during this difficult pandemic times. It will help us to understand and evaluate the OTT platform usage by Mumbaikars in context of their demographic factors.

The study is based on both primary and secondary data. To achieve the above-mentioned objectives, a mix of quantitative and qualitative research analysis was adopted. The researcher carried out a detailed primary research to study consumer preferences and trends regarding OTT adoption supported by secondary research. The primary data is collected using digital survey method. The responses were collected randomly from 200 Mumbaikars(100 males and 100 females between the age group of 18-65years. For thorough understanding and getting a deeper insight, extensive literature review of secondary data is done which were available in the form of research papers, news articles, reports, etc.

Findings are presented with the help of charts, graphs and other relevant diagrams. Anova has been used to test whether there is a significant difference in the usage and adoption of OTT platforms among Mumbaikars with respect to their gender, age and occupation.

### Hypothesis of Study

H0: There is no significant difference in the consumption of digital media through OTT platforms between males and females.
H1: There is a significant difference in the consumption of digital media through OTT platforms between males and females.
H0: There is no impact of age on usage/adoption of OTT platforms.
H1: Age impacts the usage /adoption of OTT platforms.
H0: There is no significant difference in the usage of OTT platforms among the people of different occupations.
H1: There is a significant difference in the usage of OTT platforms among the people of different occupations.

### Findings, Analysis, and Interpretation

Based on the data collected through digital survey, the researcher has tried to evaluate the awareness level and their digital media consumption patterns and thereby the trends in usage of the OTT platforms amidst pandemic by the people of Mumbai with respect to their demographic characteristics. An in-depth analysis of the data, observation on the consumption patterns with respect to digital media consumption around the researcher has also been done for deeper understanding of these trends. The first complete lockdown was witnessed in March 2020 and the data for the research has been collected in March 2021, the trend for OTT media consumption has been set by that time, hence, the insights are neutral and balanced.

### Demographic Representation:

### Gender:

The questionnaire was sent to 225 people randomly to people of different age group ranging from 18-70 years. It was responded by 209 respondents. The data was tabulated and processed and incomplete responses were discarded. 100 male responses and 100 female responses are considered for the purpose of research study.

### Age:

The research is largely responded by younger audience, around 63% of the respondents are in the age group of 18-35 years.
38% of the respondents are in the age group of 18-25 years followed by
25 % of the population in the age group of 26-35 years
29% of the population in the age group of 36-50 years
7.42% of the respondents above the age of 51 years.

### Occupation:

The survey had grouped people based on four categories: homemakers, salaried, self-employed and students. Of the total responses:
Around 14% respondents were home-makers.
40 % respondents were salaried people.
13 % respondents were self-employed and
33% respondents were students.

### Media Consumption Patterns:



AVG.TIME SPENT ON MEDIA CONSUMPTION

- Upto 2 hrs a day
- 2-4 hrs a day
- 4-6 hrs a day
- more than 6 hrs a day

A major chunk of the respondents (46%) are spending around 2 hours on consumption of media whereas around 32 % of the respondent are spending between 2-4 hours everyday on media consumption while there are 17% of the respondents spending around 4-5 hours on media
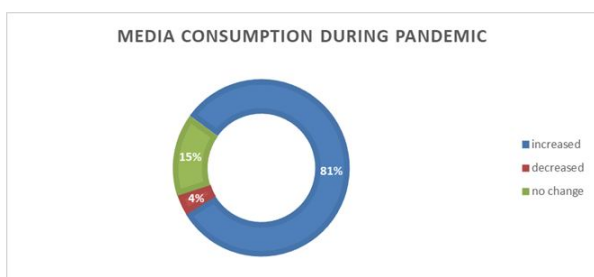


Mode of media consumption
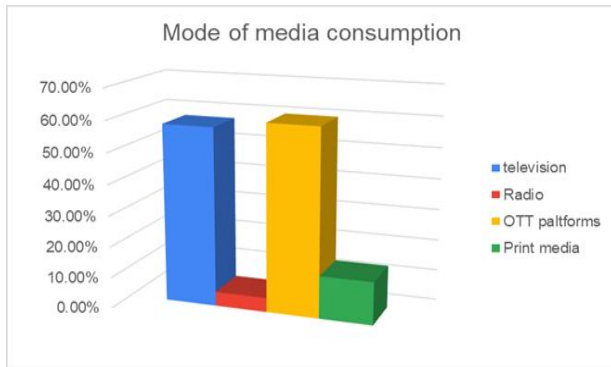
The above chart shows that majority of the respondents have now adopted OTT platforms closely competing with Television. Print media is still preferred by 14% of the population followed by a small percentage of population (around 4%) still using radio as a mode of media consumption.

**Awareness About OTT Platforms**



Awareness about OTT platforms
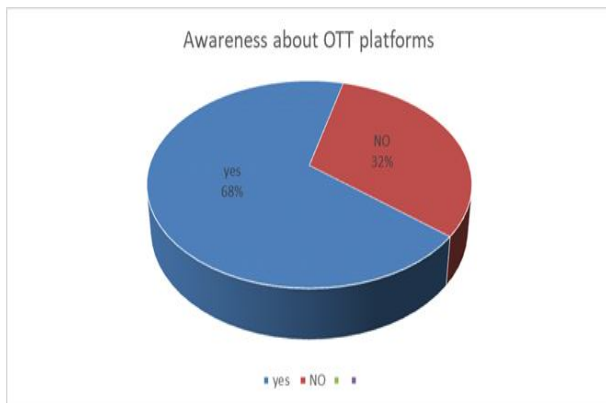
In order to ascertain the awareness level of the respondents towards the term OTT platforms, it was found that around 68% of the respondents were well aware of the term Over the Top platforms.

**Media Consumption During Pandemic**



MEDIA CONSUMPTION DURING PANDEMIC

Pandemic and the lockdown forced people to stay indoors which increased the digital media consumption of people is quite evident from the responses elicited from the survey. More than 80% of the people admitted that their screen time and media consumption has gone up during the lockdown imposed by the government during the pandemic.

**Reasons for Increasing Screen Time**

When asked about the reasons of increased screen time, the following were the responses in the order of their importance:

1. Restricted outdoor activities and social gatherings (32.1%)
2. Increased accessibility and use of internet (26.2%)
3. Facility of entertainment on the smartphones (16.1%)
4. Availability of more leisure time and flexibility of work from home (14.4%)
5. Better content available online specially on OTT platforms (11.2%)



Reasons for increased digital media consumption
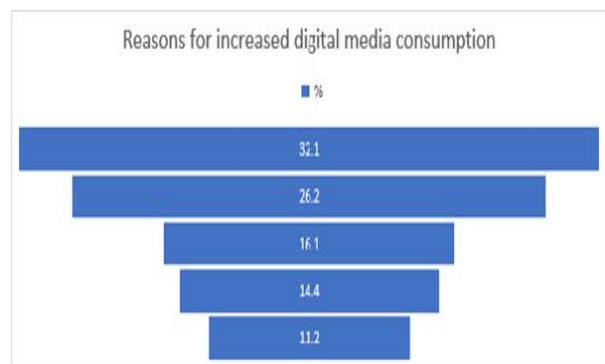
**Testing of Hypothesis**

The study was primarily made to study the digital media consumption via the OTT platforms among the people living in Mumbai with respect to their demographic profile.

Following three parameters were studied:

1. **Difference in the consumption of digital media with respect to gender**

| Age | male | female | |
|---|---|---|---|
| 18-25 | 34 | 42 | |
| 26-35 | 25 | 25 | |
| 36-50 | 29 | 30 | |
| 51 and above | 12 | 3 | |
| | 100 | 100 | sum |
| | 25 | 25 | mean |

## Anova One factor Test

| SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| Groups | Count | Sum | Average | Variance | | |
| male | 4 | 100 | 25 | 88.66667 | | |
| female | 4 | 100 | 25 | 266 | | |
| | | | | | | |
| ANOVA | | | | | | |
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 0 | 1 | 0 | 0 | 1 | 5.987378 |
| Within Groups | 1064 | 6 | 177.3333 | | | |
| | | | | | | |
| Total | 1064 | 7 | | | | |

On the basis of the descriptive statistics and Anova single factor test, it is found that F value is less than F critical value, hence in this case the null hypothesis is rejected, and the alternate hypothesis is accepted. It means that there is a significant difference in the media consumption pattern between the males and females in Mumbai Region.

**2. Difference in the digital media consumption with respect to their Age**

| Age | male | female |
|---|---|---|
| 18-25 | 34 | 42 |
| 26-35 | 25 | 25 |
| 36-50 | 29 | 30 |
| 51 and above | 12 | 3 |
| Total | 100 | 100 |

## Anova One Factor Test

| SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| Groups | Count | Sum | Average | Variance | | |
| 18-25 | 2 | 76 | 38 | 32 | | |
| 26-35 | 2 | 50 | 25 | 0 | | |
| 36-50 | 2 | 59 | 29.5 | 0.5 | | |
| 51 and above | 2 | 15 | 7.5 | 40.5 | | |
| | | | | | | |
| ANOVA | | | | | | |
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 991 | 3 | 330.3333 | 18.10046 | 0.008621 | 6.591382 |
| Within Groups | 73 | 4 | 18.25 | | | |
| Total | 1064 | 7 | | | | |

Based on descriptive statistics and application of Anova one factor test, it is found that F value is greater than F critical value which clearly indicates that the null hypothesis i.e., there is no difference in the digital media consumption with respect to age is accepted.

Digital media is consumed by people of all ages however, the younger population is more attracted towards it.

2. Difference in the digital media consumption with respect to their occupations

| SUMMARY | | | | | | |
|---|---|---|---|---|---|---|
| Groups | Count | Sum | Average | Variance | | |
| homemaker | 2 | 28 | 14 | 288 | | |
| salaried | 2 | 80 | 40 | 2 | | |
| self-employed | 2 | 28 | 14 | 242 | | |
| students | 2 | 64 | 32 | 0 | | |

| ANOVA | | | | | |
|---|---|---|---|---|---|
| Source of Variation | SS | df | MS | F | P-value | F crit |
| Between Groups | 1032 | 3 | 344 | 2.586466 | 0.190517 | 6.591382 |
| Within Groups | 532 | 4 | 133 | | | |
| Total | 1564 | 7 | | | | |

Based on descriptive statistics and application of Anova one factor test, it is found that F value is less than F critical value which clearly indicates that the null hypothesis i.e., there is no difference in the digital media consumption with respect to occupation is rejected.

The digital media is consumed differently by people belonging to different occupations. It can be also seen from the statistics that the majority of the digital media consumers (80) are salaried people followed by students (64).

## Key Findings

Based on observations during the lockdown period, the primary data collected and the insights from the secondary data, following are the major findings:

Pandemic came as a boon to the digital media industry especially the OTT platforms. The screen time of the people in Mumbai went up drastically as people had very limited other indoor entertainment options.

Television is still a popular choice of the people of Mumbai however, OTT platforms have followed the league very closely. There is a spike in the number of people on the OTT platforms due to many reasons such as innovative content, ease of watching it on the smartphones, multi-lingual and global content, flexibility of time and so on.

It is observed that there is a significant difference in the media usage on OTT platforms in terms of gender and occupation. However, it is found that the media usage is not significantly different in terms of different age groups. It means people of all age groups have been consuming digital media through OTT platforms.

It is also observed that during lockdown family time also became a learning time wherein youngsters started making the elderly aware about the ease and convenience of digital media and use of OTT platforms. In a way 'Reverse Parenting' could be observed.

Amazon Prime, Netflix, Disney Hotstar were on the preferred list. Many respondents use multiple OTT platforms for entertainment.

Due to the blurring line between work and home during lockdown, the work-life balance seems to be disturbed and hence another trend which is also mentioned as a concern "binge watching" has emerged.

## Conclusion

The pandemic has caused a severe disruption in all walks of our life. Technology has emerged as a major saviour in times of pandemic and lockdown. Every sector bled badly due to the pandemic and shutdown of businesses. Retail, education, medical, and many such sectors survived and could do the business only because of the integration of technology. Entertainment sector suffered a major setback as all the theatres, were closed and people were forced to stay indoors. A silver lining in the form of 'OTT platforms" emerged. OTT platforms have emerged as parallel cinema brought at the fingertips of people. They have succeeded savoured the much hit and scared people with a tinge of freshness in the entertainment, a flavour of innovative content with multi-lingual flexibility and the ease to watch anytime anywhere the most seasoned performances on the so called small screen -our mobile phones.

People of all genders, across all ages and occupations have been hooked by these OTT platforms. Hotstar, Netflix, Amazon Prime and many such platforms have become a household name. For some because they helped them in watching the old goodies and refreshing their nostalgic memories and for some due to the new flavour that these platforms served which enriched the viewer's entertainment experience. In times to come, these Platforms will reach to even greater zenith and would continue to entertain people with more enriched experience.

**Limitations and Future Scope of Study**

The study is confined to Mumbai region and the current research is based on the responses of only 200 Mumbaikars. The Research may show different results in different parts of the country.

Many other aspects like the reasons for popularity of OTT platforms and the emerging issues out of it and how exactly has it helped people in these times of pandemic can be further explored to know if these kind of entertainment platforms can bring relief to the much depressed and anxious pandemic-hit minds.

## References

1. Bhavsar, R. (2018). The Burgeoning Digital Media Consumption: A Challenge for Traditional Television and Advertising Industries-An Analysis. Amity Journal of Media & Communications Studies (AJMCS), 8(1).

2. Dahiya, G. S. (2020). Role of Covid as a catalyst in increasing adoption of OTTs in India: A study of evolving consumer consumption patterns and future business scope. Journal of Content, Community and Communication, 298-311.

3. Dasgupta, D., & Grover, D. (2019). Understanding adoption factors of over-the-top video services among millennial consumers. International Journal of Computer Engineering and Technology, 10(1).

4. Saini, N. (2020). Usage of OTT Platforms During Covid-19 Lockdown: Trends, Rationale and Implications. PalArch's Journal of Archaeology of Egypt/Egyptology, 17(6), 4212-4222.

5. Singharia, G. G. (2021). Consumption of OTT Media Streaming in COVID-19 Lockdown: Insights from PLS Analysis. Vision, Sage Publication, 36-46.

6. https://images.assettype.com/afaqs/2020-07/f0c952e7-1861-4883-986f5eccbaf75436/COVID_19___Newsletter___Impact_on_Media_Consumption_OMG_India.pdf

7. https://www.thehindu.com/society/ott-to-the-top-for-ott-platforms-2020-was-a-time-for-serious-growth/article33411204.ece accessed on 30th March 2021

8. https://www.livemint.com/news/india/media-and-entertainment-firms-rely-on-tech-to-beat-covid-blues-11609175112490.htm accessed on 30th March 2021

9. https://www.fortuneindia.com/technology/ott-prospects-bright-amid-covid-19-blues/104273 accessed on 30th March 2021

10. https://brandequity.economictimes.indiatimes.com/news/media/indian-ott-market-to-reach-5-billion-in-size-by-2023-report/66708675 accessed on 30th march 2021

# FINANCIAL LITERACY AND DETERMINANTS OF INVESTMENT BEHAVIOR: A BIBLIOMETRIC ANALYSIS

**R. Katoch and M. Goyal**

Lovely Professional University, Phagwara, India

_____

## ABSTRACT

*With an intention to present a quantitative and qualitative knowledge on emerging subject of Financial literacy in association with investment behavior, this bibliometric analysis has been done.  This study comprises of 104 articled published in journals from 2002 to 2021. Scopus database is used to fetch relevant data. The most prominent authors, journals, countries, and themes have been acknowledged using bibliometric analysis and content analysis has been done on the basis of identified clusters through author keywords. This study will help policy makers, academicians, and researchers to understand the knot of financial literacy and investment behavior in a better manner. It will lead them to identify the future subjects of research in this domain.*

_____

*Keywords: Bibliometric Analysis, Financial Literacy, Financial Knowledge, Financial education, Investment behavior, Investment preferences.*

## Introduction

Financial literacy is defined as the "knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life" (OECD, 2014). Whereas Investment is the placement of a fund that investor has today, hoping that it will bring benefits in the future with more returns. Investment behavior means how a person is putting his money into various options to maximize the returns. In this study, association between financial literacy and investment behavior is analyzed. According to Hilgert et al., (2003), Financial Literacy has a significant impact on individual financial behaviors and if one has proper knowledge about the matter will yield favorable results. Various factors like age, gender, country, education experience affects investment behavior. Along with these factors, financial literacy is studied by various researchers in past. This paper will compile their contributions based on sources of publications, authors, timeline of various publications and keywords.

## 2. Literature Review

Volpe et al. (2002) insighted that online investors should have more awareness in comparison to offline investors as they are more exposed to financial misinformation and manipulation. They conducted their study by collecting responses from 530 online investors and examined different demographic variables. They concluded that financial literacy level differs with people's education, age, income, and experience. Moreover, this has been analyzed that investors with low income had less knowledge than the high-income investors.

Volpe and Chen (2006) have conducted a survey of 212 benefit administrators who were in charge-in US-based companies of personal finance programs to study the issues of personal finance.  Their results revealed that estate planning and  investment were the least important areas. The respondents also indicated that  working adults were least knowledgeable about these topics that they viewed as least important. In general, the study indicated that the level of knowledge of working adults was relatively low.

Singh and Sharma (2016) studied concept of financial literacy and its effect on behavior of investments for efficient financial planning. For this study, primary data was collected from 150 teachers and thereafter, analyzed using the descriptive statistics, chi-square test. After this analysis, they concluded a strong relationship between financial knowledge and investment behavior, for making a valid informed decision.

Carpentier and Suret (2012) conducted a survey of 1,814 Canadian investors, who keep their own stock portfolios, for assessing the level of knowledge and rationality of investors. They concluded that investors are generally not

aware of gaps in their financial understanding. However, indirectly, these gaps are recognized gaps by expecting to attain returns below than or equal to those of the market index.

Calcagno and Monticone (2015) analyzed that financial literacy is a 'part and parcel' of financial decision making, and young population have desire of getting financial qualification. Majority of college students want to gain more education on managing finances, also many candidates would like to get information about financial management subjects in high school, and less part would desire to get such knowledge in college.

Rabeea Rizvi & Afsheen Abrar (2015) found that indicators like age, income, language, and orientation of education plays a substantial role in defining the investor's investment style. However, financial literacy and accounting formation are the most persuading factors in the decision-making behavior of individual investors.

Many researchers are evaluating various investment behavior factors and their dependent or 'related' factors which ties their knot to level of financial literacy.

This given bibliometric analysis will glorify this aspect of financial knowledge and its impact on investment behavior.

## 3. Objectives of Study

The underlying objective for this study is to state the existing research on financial literacy and investment behavior, with the following set of questions decoding scope of this field:

Q1: What are the present publication trends in this field, in terms of authors, journals, disciplines, affiliated countries and economy?

Q2: Which are the influential studies and themes of research in financial literacy and its impact on investment behavior?

This paper is designed in the sections, where section 4 will deal with research methodology chosen for this bibliometric analysis. Section 5 gives a detailed analysis of research in this domain in terms of publication trends from year 2002 to 2021, then various sources through which this domain articles got published. In addition, it identifies the prominent authors who have done incredible work in this domain. Keyword analysis is also done with the support

of related literature. In the end, this study's conclusion is included in Section 6.

## 4. Research Methodology

### 4.1 Database, Keywords, and Selection Process

For this study, data was fetched in March 2021 from the Scopus database, includes publications from top journals and is well suited for the bibliometric analysis. This data deals published articles from year 2002 to 2021. A string of most-appropriate keywords is used to search in Title, Abstract and Keywords tab in Scopus, and those keywords are shown in Table 1:

**Table 1: Keywords searched**

| Keywords Searched | |
|---|---|
| Financial Literacy | Or |
| Financial Knowledge | Or |
| Financial Behavior | Or |
| Financial Education | Or |
| Financial Attitude | And |
| Portfolio Management | Or |
| Investment Behavior | Or |
| Investment Patterns | Or |
| Financial Decisions | Or |
| Wealth Management | Or |
| Risk Management | Or |
| Risk Aversion | Or |

This yielded in 579 search results. After that 'Open Access' filter was applied, and duplicates removed which resulted in 178 papers. Selection of papers were done from retrieved data on basis of 'only English', only final published articles. After reading title and abstracts, appropriate and best suited articles were chosen for the bibliometric analysis related to business, management, economics, econometrics, and finance. 104 articles were finally accepted for this research. Figure 1 displays the exact data retrieval process:
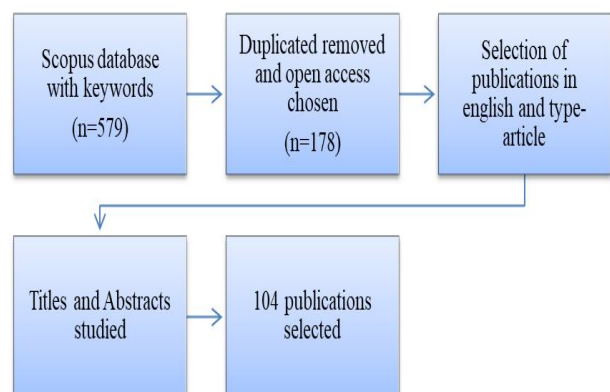
## 4.2 Analysis Method

Bibliometrics is one of the most practiced approach to analyze the history of any research domain, contributions by the authors and affiliations to various countries and source journals. Along with it, systematic literature reviews are used to analyze the gaps in the research. To dive deep into this topic, a bibliometric analysis is done, followed by the content analysis. In this paper, content analysis is done based on 'author keywords' retrieved from the help of VOS viewer software. Also, publication sources, trends from 2002 to 2021, countries contributions and prominent authors in this field have been analyzed. Data of years, authors, sources and contributing countries has been used directly loaded from the search on Scopus and related graphs.

VOS Viewer sources a map in which the relatedness of items can be explained by the distance among them. More the distance between the items, the less related they are and vice-versa. This stands on the concept of "visualization of similarities" (VOS). Citation, co-citation on basis of authors, and keyword analysis have been accomplished through the VOS viewer.
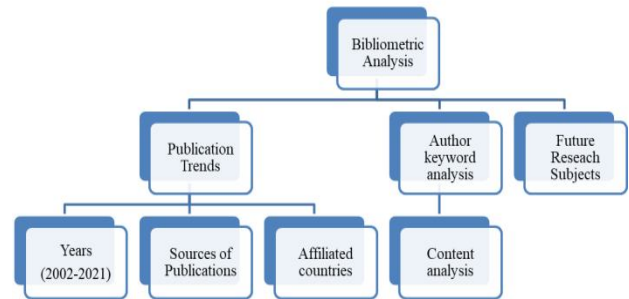


Along with this, recent papers from 2017 to 2021 will also be discussed. Gap analysis will be performed to find future research domains.

## 5. Findings

### 5.1 Publication Trend (Time)
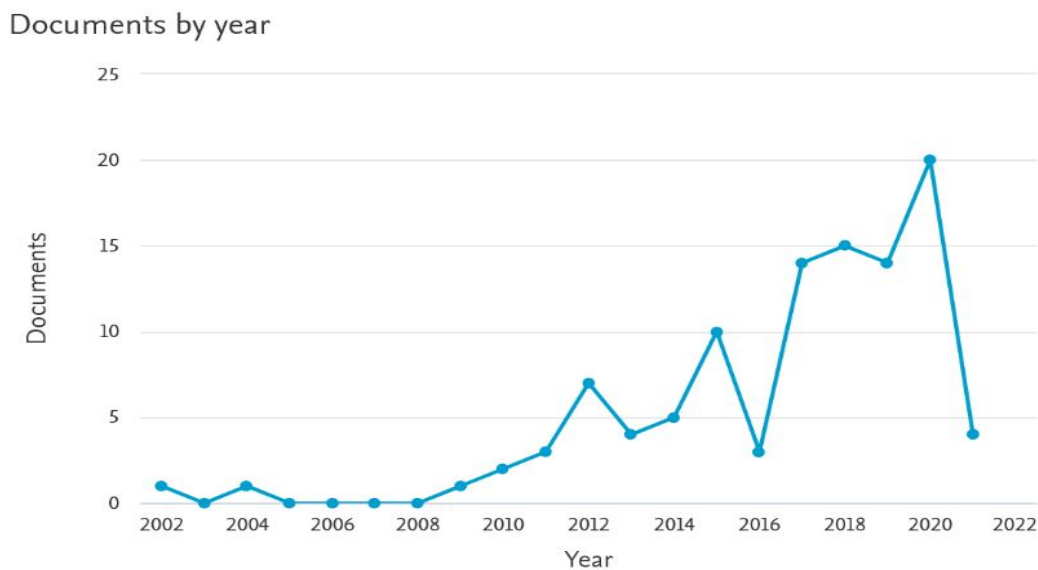


Following graph and table illustrates the trend of publications available in the Scopus data on the financial literacy and investment behavior in the period 2002-2021. An upsurge can be seen in the publications from 2002 from just one to 20 in year 2020 and 4 publications in the three months of 2021 itself. Research on Financial Literacy has paced up after the global financial crisis began in 2008, leading to extreme household debt, liquidity crunch and surging losses. OECD (2009) considered it to be a 'teachable moment' for all economies and focused on the significance of financial education. Thereafter, this topic became 'hot cake' for researchers. Al-Tamini and Kalli (2009) had found out, based on primary data analysis of 290 UAE investors, that financial literacy is far less than required in UAE. And this study is considered to the first to be conducted in UAE in 2009. So, this can be seen that research took place after the global crisis 2008.
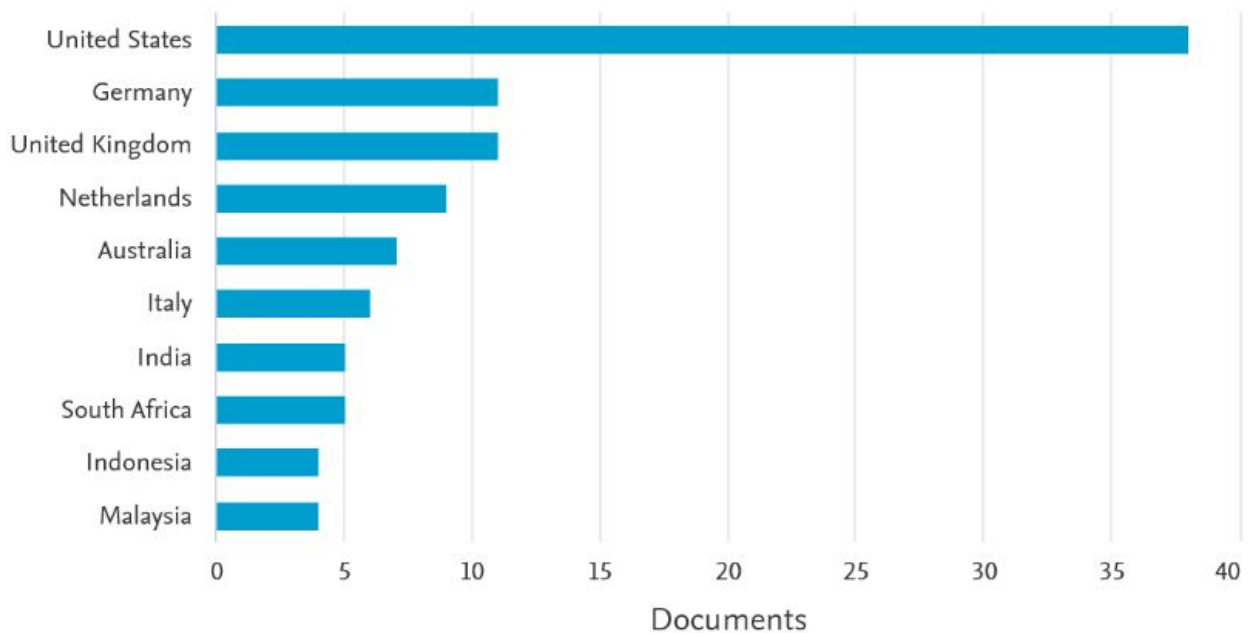
| YEAR | |
|------|-----|
| 2021 | 4 |
| 2020 | 20 |
| 2019 | 14 |
| 2018 | 15 |
| 2017 | 14 |
| 2016 | 3 |
| 2015 | 10 |
| 2014 | 5 |
| 2013 | 4 |
| 2012 | 7 |
| 2011 | 3 |
| 2010 | 2 |
| 2009 | 1 |
| 2004 | 1 |
| 2002 | 1 |

Netherlands, Australia, Italy, India, South Africa, Indonesia, Malaysia, and Spain. Table shows many other countries which are taking part in this research domain. Therefore, it can be analyzed that researchers are considering this field of research 'important'.

| COUNTRY/TERRITORY | | | |
|-------------------|----|---------------|---|
| United States | 38 | Thailand | 2 |
| Germany | 11 | Bangladesh | 1 |
| United Kingdom | 11 | Brazil | 1 |
| Netherlands | 9 | Cote d'Ivoire | 1 |
| Australia | 7 | Czech Republic | 1 |
| Italy | 6 | France | 1 |
| India | 5 | Hungary | 1 |
| South Africa | 5 | Ireland | 1 |
| Indonesia | 4 | Kenya | 1 |
| Malaysia | 4 | New Zealand | 1 |
| Spain | 4 | Norway | 1 |
| Canada | 3 | Pakistan | 1 |
| Poland | 3 | Palestine | 1 |
| Sweden | 3 | Qatar | 1 |
| China | 2 | Slovakia | 1 |
| Croatia | 2 | Tanzania | 1 |
| Saudi Arabia | 2 | Uganda | 1 |
| Singapore | 2 | Undefined | 1 |
| Switzerland | 2 | Albania | 1 |

## 5.2 Affiliated Countries

From the following table, the United States of America has contributed maximum in the financial literacy field in association with the investment patterns of the people. After that, Germany and United Kingdom have done significant research to find a valid relation between these two factors. Other countries those have played a distinguishable role are
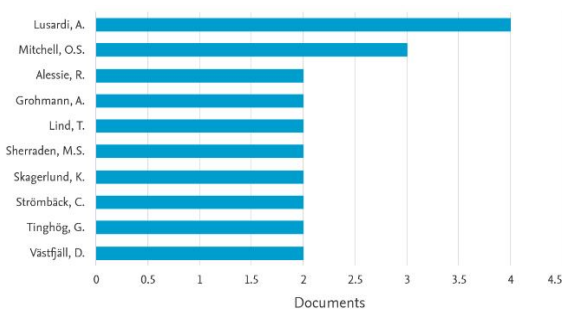


## 5.3 Authors

Lusardi. A has done prominent work in this subject of financial literacy and Investment decisions. He has written four articles, 'Risk Literacy', second with Van Rooij M., Alessie R. titled "Financial Literacy and Stock Market Participation" (citied by 773). Other paper was written with Mitchell O.S. in 2011 titled as "Financial literacy around the world: An

overview" (cited by 399). The fourth paper is written by Bucher-Koenen T., Lusardi A., Alessie R., van Rooij M. together, named as "How Financially Literate Are Women? An Overview and New Insights". After that, Michell, O.S contributions can not be ignored. Other paper he has written is "How financial literacy and impatience shape retirement wealth and investment behaviors" with Hastings.

| AUTHOR NAME | |
|---|---|
| Lusardi, A. | 4 |
| Mitchell, O.S. | 3 |
| Alessie, R. | 2 |
| Grohmann, A. | 2 |
| Lind, T. | 2 |
| Sherraden, M.S. | 2 |
| Skagerlund, K. | 2 |
| Strömbäck, C. | 2 |
| Tinghög, G. | 2 |
| Västfjäll, D. | 2 |
| Yoong, J. | 2 |
| Zia, B. | 2 |
| Van Rooij, M. | 2 |



| SOURCE TITLE | |
|---|---|
| Journal of Consumer Affairs | 7 |
| Journal of Pension Economics and Finance | 6 |
| Australasian Accounting Business and Finance Journal | 4 |
| International Journal of Consumer Studies | 3 |
| Investment Management and Financial Innovations | 3 |
| Journal of Banking and Finance | 3 |
| Journal of Consumer Research | 3 |
| Journal of Financial Therapy | 3 |
| Management Science | 3 |
| Asian Academy of Management Journal | 2 |
| Cogent Economics and Finance | 2 |
| Corporate Ownership and Control | 2 |
| Economics and Sociology | 2 |
| Journal of Asian Finance Economics and Business | 2 |
| Journal of Behavioral and Experimental Economics | 2 |
| Journal of Behavioral Decision Making | 2 |
| Journal of Economic Behavior and Organization | 2 |
| Journal of Economic Psychology | 2 |
| Pacific Basin Finance Journal | 2 |
| Review of Finance | 2 |
| South African Journal of Economic and Management Sciences | 2 |

## 5.4 Sources of Publication

The 104 publications have been analyzed, dispersed across 66 journals. Following table shows list of most prominent 21 journals publishing on financial literacy and investment behavior. Journal of Consumer Affairs is one of the most productive platforms to publish the research, followed by Journal of Pension

Economics and Finance. Financial literacy is a subject-matter of consumers' interest and validates its existence well within the scope of these journals.
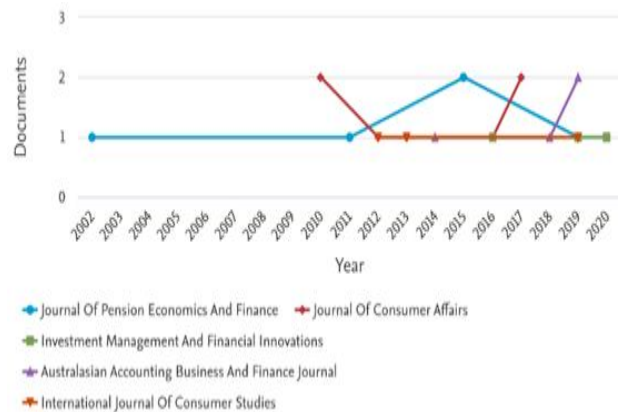


## 5.5 Keyword Analysis

In this section, Author keywords are studied. The author keywords signify the subjects of research articles (Comerio and Strozzi, 2019). VOS Viewer has been used for the keyword analysis to explore the most popular themes in financial literacy and investment behavior. A total of keywords 352 were identified in 104 papers. Following table shows the top keywords present in financial literacy research from 2002 to 2021. "Financial literacy" is the most frequently used keyword, with 44 occurrences, which indicates that this word alone is used as a 'termed concept' in the literature. Other frequently used words are Financial Education, Financial behavior, Financial Knowledge, Financial Attitude. This can be signified that these words are being used interchangeably due to lack of clear distinction and standardized meaning. This also implies 'Financial Literacy' is the most 'preferred word' in research.

| Keyword | Occurrences |
|---|---|
| Financial Literacy | 44 |
| Financial Education | 8 |
| Financial Behavior | 6 |
| Financial Knowledge | 6 |
| India | 4 |
| Financial Attitude | 5 |
| Gender | 5 |
| Financial Decisions | 4 |
| Saving | 4 |
| Financial Decision Making | 4 |
| Overconfidence | 5 |
| Risk Aversion | 5 |
| Risk Diversification | 3 |
| Stock market participation | 3 |
| Wealth Management | 3 |
| Household Finance | 3 |
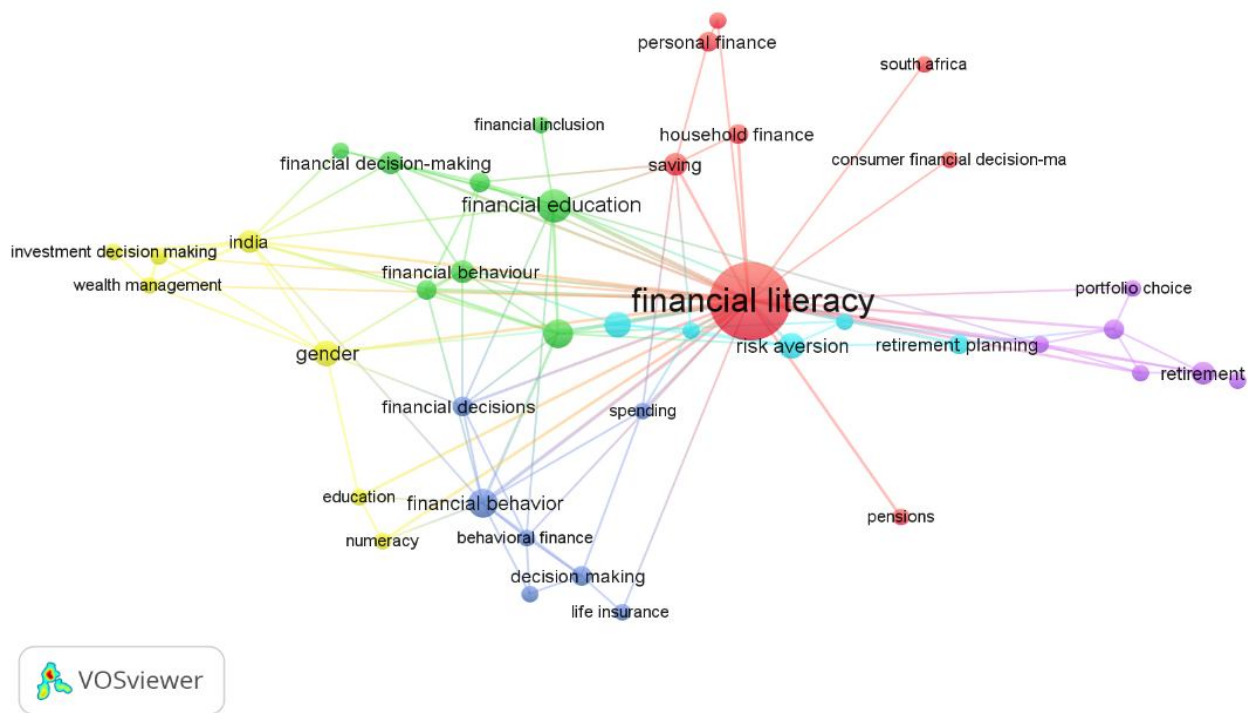
The above network of keywords shows the most often used keywords on financial literacy and investment behavior, created using VOS viewer with the threshold of minimum 2 keywords. Bubble size represents the occurrences of the word. So, this can be inferred that financial literacy is the most frequent word, having the largest bubble.

### Cluster-wise Content Analysis

| Cluster 1: | Cluster 4: |
|---|---|
| Financial Attitude | Investment |
| Financial Behavior | Overconfidence |
| Financial Capability | Retirement Planning |
| Financial Decision making | Risk Aversion |
| Financial Inclusion | Risk Tolerance |
| Financial Knowledge | **Cluster 5** |
| Savings | Gender |
| Financial Education | Education |
| **Cluster 2:** | India |
| Behavioral Finance | Investment Decision Making |
| Decision Making | Wealth Management |
| Financial Behaviour | Wealth |
| Financial Decisions | Numeracy |
| Life Insurance | Women |
| Self-control | **Cluster 6:** |
| Spending | Consumer Financial Literacy |
| **Cluster 3:** | Financial Literacy |
| Finance | South Africa |
| Household Portfolio | Pensions |
| Portfolio Choice | Debt |
| Retirement | Household Finance |
| Risk Diversification | Personal Finance |
| Stock Market Participation | Saving |

These clusters of keywords are retrieved from VOS viewer.

**Cluster 1**: Estimators of Financial Literacy

In various research papers, words like 'Financial Literacy' and 'Financial Capability', are used interchangeably and hardly any universal distinction is there among them.

Agrawalla et al., (2015) has found that urban India Young Adults possess inferior 'financial knowledge', 'financial attitude' over all and superior to other counterparts in the country. Focus intervention is need of the hour to improve 'financial attitude'. Also, financial attitude is negatively affected by living in joint families and positively, if "consultive decision making" impacts positively. Singh et al., (2020) has studied three variables of financial literacy, those are "financial knowledge", "financial attitude" and "financial behavior" and found that "financial attitude" and "financial behavior" are better estimators in explaining financial literacy. Financial literacy is also a core element of household finance that makes it possible for households to plan their finances (Bernheim, 1995; Lusardi and Mitchell, 2007).

Banks et al., (2015) argued that the importance of individuals having the financial education to successfully navigate multifaceted financial decisions later in life should not be underestimated. Also, short term financial education programs increased knowledge in financial matters but, no evidence has been found in distinguishable increase in savings (Lührmann M., Serra-Garcia M., Winter J., 2015). Prioritizing financial education helps in "youth empowerment" through increasing their income, handling their money through planned spending and savings, fostering "financial

inclusion" through recognition of financial products, management of risk and protection (Ribaj A., Meçe M., Cinaj V., Kadrimi I., 2020).

**Cluster 2**: Behavioral Finance and investment decisions

Lind et al., (2017) found that people, who have good self-control, are more likely to save money from every paycheck, have well general financial behavior, feel less worried about financial matters, and feel more secure in their current and future financial situation. Also, it has been examined that stronger financial self-control is positively linked with savings for and after retirement (Daoudi et al., 2020). Consumer financial investments are largely depended upon the behavioral characteristics like overconfidence, perception, future financial security assumption, etc. Overconfidence or over estimation of one's individual financial awareness relative to one's actual knowledge together with relative knowledge of peers clarifies investment decisions better than actual knowledge of a person. The relation between overconfidence and investment is strong to the degree of individual "risk aversion", and the riskiness of the investment projects (Pikulina et al., 2017).

Rasool N. & Ullah S. (2020) found that there is negative relational between financial literacy and behavioral bias, as with a surge in level of financial literacy, the possibility of investor facing behavioral biases decreases.

**Cluster 3**: Financial Literacy and Risk Aversion

Lusardi. A et al. (2011) found that financial literacy affects financial decision-making, those with low literacy are much less likely to invest in stocks. Whereas that most respondents in their research displayed basic financial knowledge and have some grasp of concepts such as Time value of money, interest compounding, inflation. When this studied in older population of Singapore, found that less than half of respondents are aware about the "risk diversification" but, have knowledge about interest compounding and inflation (Mitchell O.S., 2021)

Also, the financially literate people are more likely to plan for retirement, but the effects of financial literacy on retirement planning tend to be underestimated. In sum, financial literacy is important to retirement security (Lusardi A. & Mitchell O.S., 2011).

**Cluster 4**: Financial Literacy and Retirement Planning

The gender differences, being very basic as well as more advanced measures of financial literacy, is important because they are linked to economic behavior, including retirement planning and wealth accumulation. Women are likely to spend time in widowhood as live longer than men. Therefore, refining women's financial literacy is essential to help them for retirement and promoting their financial security (Lusardi A. et al., 2017).

Mahdzan et al. (2017) found that future expectations significantly affect the chance of planning for retirement. Also, people with higher level of financial literacy and lower risk aversion are more probable to hold those assets, which carry high risk, in their retirement portfolios.

**Cluster 5**: Gender gap in investment decision making and wealth management.

Fonseca et al. (2012) examined potential explanations for the gender gap with the role of marriage and financial decision maker. They found that financial decision-making patterns of couples is not centralized in one spouse whereas it is relative education level of spouses. Monticone C. (2010) indicated that wealth has a positive but little effect on the degree of financial knowledge.

Agrawalla et al., (2015) argued that gender stereotypes are important in finance, limiting women to attain top positions in banking and sustaining against a strong masculine culture. Also, their analysis indicated that the few women who reach to the top, tend to accomplish on average 'better' than men, under uncertainty. Where as Mishra. R (2018) indicated no significant difference found in level of stock market participation based on gender, marital status, and occupation with tested using ANOVA.

Sharma M. & Kota H.B. (2019) highlighted that in India, when it comes to investment decisions, both husband and wife equal share responsibility for making investment decisions. Women have more influence on investment products like bank deposits, five-year tax saving fixed deposits, precious metals, PPF, national pension system, life insurance, post

office saving schemes, mutual funds, and commodities, whereas the dominance of a male spouse is sounder in products like equity shares, real estate, deposits, debentures, bonds, pension schemes, and derivatives.

**Cluster 6**: Household Financial decision making

Lusardi A. (2015) examined "risk literacy" and subsequent financial decisions and found individuals more knowledgeable about risk are expected to have "precautionary savings" and retirement plans. Gogolin et al., 2017)

concluded that happiness, trust, and being socially active, are independently vital determinants of "household financial decision-making" and suggested that cultural values can be brought from a 'generalized national level' to the individual level to enhance the understanding of household financial decision-making.

**5.6 Co-Citation-Based on Authors**

Following network chart shows that Lusardi, A. has been co-cited maximum times. He has done significant research in this domain.
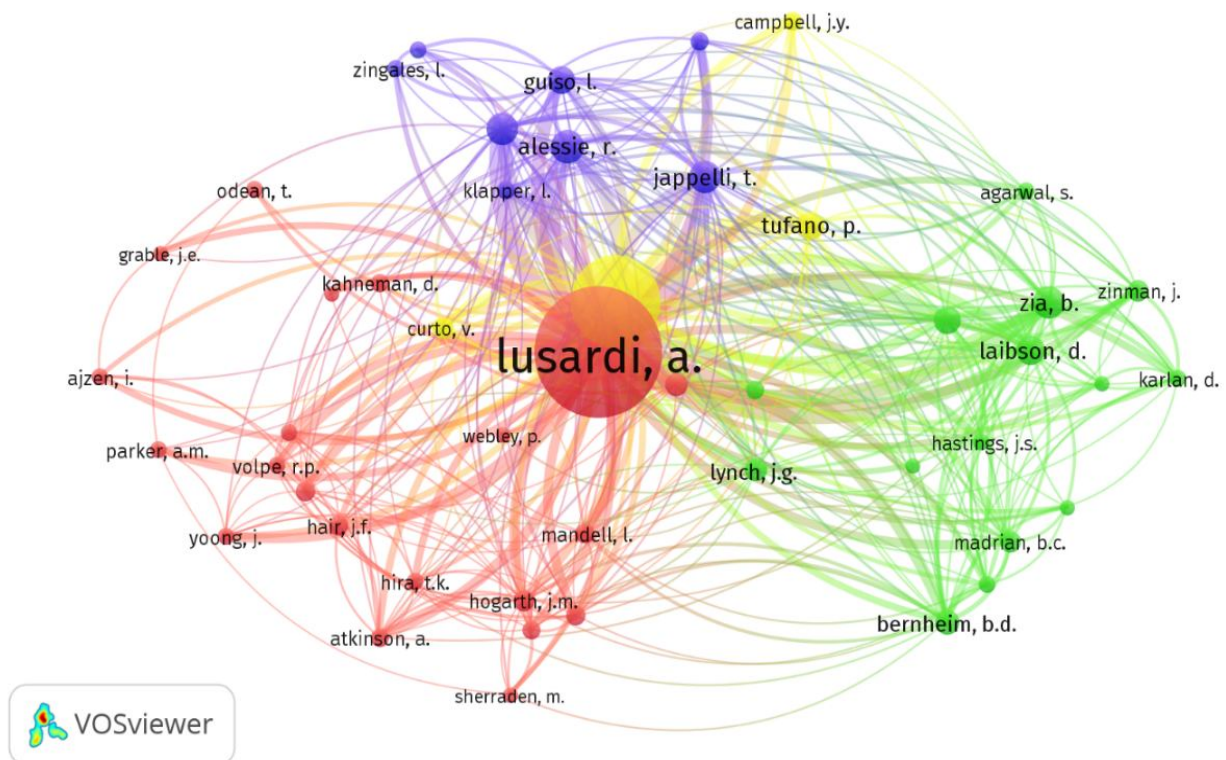


# 6. Future Research Prospects

We can see that investment behavior of any person depends on financial literacy to a large extent. This relationship can not be ignored. And, how this investment decisions going to impact an economy as a whole can create a significant difference in the growth of it. It is suggested that proper analysis is required to access the financial literacy level of population and how they channelize their savings to gain returns. There is a need to determine what affects their investment behaviors other than literacy level, like peer group, occupation, experience, field of study they are educated in and to how much extent they are willing to shift from their 'ancient investment allocations' to

new portfolio options after getting knowledge in the field or at very firsthand, whether they want to change investment decisions or not.

# 7. Conclusion

Investment decision-making becomes easy with the sound financial knowledge (literacy), and therefore, losses can be evaded or can be minimized in future. While making an investment, investors face many problems which leads to wrong investment decision. These are risk, uncertainty and choice overload faced by every investor, whether financial professional, experienced investor or a household. Higher financial literacy will lead to a great risk acceptance. The investor with financial literacy will be acquainted with the

technical jargons and know-how and make investor to take sound decision regarding making of an efficient portfolio.

With the intention to review the existing literature systematically, this study stems valuable insights on financial literacy and investment decision making. Such knowledge has ever-increasing significance in our everyday financial decisions. This academic work reveals a consistent absence or deficiency of financial literacy across all populations, from developed to developing countries and hence, lack in making efficient investment of money. In general, there are considerable efforts of the researchers to investigate the subject. But There is a lot of scope of input to theoretical development, contextual coverage, and methodologies. Financial literacy and investment pattern is a subject with vast implications for economic health of a country as a whole and its development can lead the way to competitive and steady economies.

## References

1. Abu Daqar, M. A. M., Arqawi, S., & Karsh, S. A. (2020). Fintech in the eyes of millennials and generation Z (the financial behavior and fintech perception). Banks and Bank Systems, 15(3), 20-28. doi:10.21511/bbs.15(3).2020.03

2. Agarwalla, S. K., Barua, S. K., Jacob, J., & Varma, J. R. (2015). Financial literacy among working young in urban india. World Development, 67, 101-109. doi:10.1016/j.worlddev.2014.10.004

3. Aggarwal, N., & Singh, H. (2019). Women and wealth: Financial propinquity to business success. Australasian Accounting, Business and Finance Journal, 13(2), 69-87. doi:10.14453/aabfj.v13i2.5

4. Ahmad, G. N., Widyastuti, U., Susanti, S., & Mukhibad, H. (2020). Determinants of the islamic financial literacy. Accounting, 6(6), 961-966. doi:10.5267/j.ac.2020.7.024

5. Al Balushi, Y., Locke, S., & Boulanouar, Z. (2019). Determinants of the decision to adopt islamic finance: Evidence from oman. ISRA International Journal of Islamic Finance, 11(1), 6-26. doi:10.1108/IJIF-02-2018-0020

6. Ali, Z. (2018). A correlational study on savings, spending, investment and insurance among students at tertiary levels. Journal of Social Sciences Research, 2018(Special Issue 2), 143-147. doi:10.32861/jssr.spi2.143.147

7. Almenberg, J., & Gerdes, C. (2012). Exponential growth bias and financial literacy. Applied Economics Letters, 19(17), 1693-1696. doi:10.1080/13504851.2011.652772

8. AMONHAEMANON, D., & VORA-SITTA, P. (2020). From financial literacy to financial capability: A preliminary study of difference generations in informal labor market. Journal of Asian Finance, Economics and Business, 7(12), 355-363. doi:10.13106/JAFEB.2020.VOL7.NO12.355

9. Arthur, C. (2012). Financial literacy education for citizens: What kind of responsibility, equality and engagement. Citizenship, Social and Economics Education, 11(3), 163-176. doi:10.2304/csee.2012.11.3.163

10. Banks, J., Crawford, R., & Tetlow, G. (2015). Annuity choices and income drawdown: Evidence from the decumulation phase of defined contribution pensions in england. Journal of Pension Economics and Finance, 14(4), 412-438. doi:10.1017/S1474747215000256

11. Barcellos, S. H., Carvalho, L. S., Smith, J. P., & Yoong, J. (2016). Financial education interventions targeting immigrants and children of immigrants: Results from a randomized control trial. Journal of Consumer Affairs, 50(2), 263-285. doi:10.1111/joca.12097

12. Bayer, P. J., Bernheim, B. D., & Scholz, J. K. (2009). The effects of financial education in the workplace: Evidence from a survey of employers. Economic Inquiry, 47(4), 605-624. doi:10.1111/j.1465-7295.2008.00156.x

13. Belas, J., Smrcka, L., Gavurova, B., & Dvorsky, J. (2018). The impact of social and economic factors in the credit risk management of sme. Technological and Economic Development of Economy, 24(3), 1215-1230. doi:10.3846/tede.2018.1968

14. Berg, G., & Zia, B. (2017). Harnessing emotional connections to improve financial decisions: Evaluating the impact of financial education in mainstream media. Journal of the European Economic Association, 15(5), 1025-1055. doi:10.1093/jeea/jvw021

15. Blanco, L. R., Baker, J. A., Friedman, J. A., Singh, K. T., Brown, A. F., Moon, S. D., . . . Pregler, J. (2020). Perspectives on finances and mental health among low-income latinas. Journal of Financial Therapy, 11(2), 52-78. doi:10.4148/1944-9771.1221

16. Bourova, E., Anderson, M., Ramsay, I., & Ali, P. (2018). Impacts of financial literacy and confidence on the severity of financial hardship in australia. Australasian Accounting, Business and Finance Journal, 12(4), 4-24. doi:10.14453/AABFJ.V12I4.2

17. Bruine de Bruin, W., Vanderklaauw, W., Downs, J. S., Fischhoff, B., Topa, G., & Armantier, O. (2010). Expectations of inflation: The role of demographic variables, expectation formation, and financial literacy. Journal of Consumer Affairs, 44(2), 381-402. doi:10.1111/j.1745-6606.2010.01174.x

18. Bucher-Koenen, T., Lusardi, A., Alessie, R., & van Rooij, M. (2017). How financially literate are women? an overview and new insights. Journal of Consumer Affairs, 51(2), 255-283. doi:10.1111/joca.12121

19. Carlin, B. I., Jiang, L., & Spiller, S. A. (2018). Millennial-style learning: Search intensity, decision making, and information sharing. Management Science, 64(7), 3313-3330. doi:10.1287/mnsc.2016.2689

20. Carpena, F., Cole, S., Shapiro, J., & Zia, B. (2019). The ABCs of financial education: Experimental evidence on attitudes, behavior, and cognitive biases.

Management Science, 65(1), 346-369. doi:10.1287/mnsc.2017.2819

21. Castro-González, S., Rey-Ares, L., Fernández-López, S., & Daoudi, D. (2020). The effect of self-control upon participation in voluntary pension schemes. Economics and Sociology, 13(1), 11-23. doi:10.14254/2071-789X.2020/13-1/1

22. Clark, R. L., Hammond, R. G., & Vanderweide, D. (2019). Navigating complex financial decisions at retirement: Evidence from annuity choices in public sector pensions. Journal of Pension Economics and Finance, 18(4), 594-611. doi:10.1017/S1474747218000410

23. Cueva, C., Iturbe-Ormaetxe, I., Ponti, G., & Tomás, J. (2019). Boys will still be boys: Gender differences in trading activity are not due to differences in (over)confidence. Journal of Economic Behavior and Organization, 160, 100-120. doi:10.1016/j.jebo.2019.02.027

24. Ćurak, M., Pepur, S., & Kovač, D. (2020). Does financial literacy make the difference in non-life insurance demand among european countries? [Stvara li financltska pismenost razlike u potražnji za neživotnim osiguranjima među europskim zemljama?] Ekonomski Pregled, 71(4), 359-381. doi:10.32910/ep.71.4.3

25. Davoli, M., & Rodríguez-Planas, N. (2020). Culture and adult financial literacy: Evidence from the united states. Economics of Education Review, 78 doi:10.1016/j.econedurev.2020.102013

26. Dewi, V. I., Febrian, E., Effendi, N., Anwar, M., & Nidar, S. R. (2020). Financial literacy and its variables: The evidence from indonesia. Economics and Sociology, 13(3), 133-154. doi:10.14254/2071-789X.2020/13-3/9

27. Dholakia, U., Tam, L., Yoon, S., & Wong, N. (2016). The ant and the grasshopper: Understanding personal saving orientation of consumers. Journal of Consumer Research, 43(1), 134-155. doi:10.1093/jcr/ucw004

28. Diepstraten, M., & van der Cruijsen, C. (2019). To stay or go? consumer bank switching behaviour after government

interventions. Journal of Banking and Finance, 106, 16-33. doi:10.1016/j.jbankfin.2019.05.023

29. Ding, X., & Yang, Z. (2020). Monetary policy tightening, accounting information comparability and bank borrowing. China Journal of Accounting Studies, 8(1), 1-34. doi:10.1080/21697213.2020.1764200

30. Drexler, A., Fischer, G., & Schoar, A. (2014). Keeping it simple: Financial literacy and rules of thumb. American Economic Journal: Applied Economics, 6(2), 1-31. doi:10.1257/app.6.2.1

31. Ekanem, I. (2013). Influences on the behaviour of black and minority ethnic (BME) communities towards debt and bankruptcy. International Journal of Consumer Studies, 37(2), 199-205. doi:10.1111/j.1470-6431.2012.01104.x

32. Emmons, W. R., & Noeth, B. J. (2013). Economic vulnerability and financial fragility. Federal Reserve Bank of St.Louis Review, 95(5), 361-388. doi:10.20955/r.95.361-388

33. Fong, J. H., Koh, B. S. K., Mitchell, O. S., & Rohwedder, S. (2021). Financial literacy and financial decision-making at older ages. Pacific Basin Finance Journal, 65 doi:10.1016/j.pacfin.2020.101481

34. Fonseca, R., Mullen, K. J., Zamarro, G., & Zissimopoulos, J. (2012). What explains the gender gap in financial literacy? the role of household decision making. Journal of Consumer Affairs, 46(1), 90-106. doi:10.1111/j.1745-6606.2011.01221.x

35. Gamble, K. J., Boyle, P. A., Yu, L., & Bennett, D. A. (2015). Aging and financial decision making. Management Science, 61(11), 2603-2610. doi:10.1287/mnsc.2014.2010

36. GARBINSKY, E. N., GLADSTONE, J. J., NIKOLOVA, H., & OLSON, J. G. (2021). Love, lies, and money: Financial infidelity in romantic relationships. Journal of Consumer Research, 47(1) doi:10.1093/JCR/UCZ052

37. Gathergood, J., & Weber, J. (2017). Financial literacy, present bias and alternative mortgage products. Journal of Banking and Finance, 78, 58-83. doi:10.1016/j.jbankfin.2017.01.022

38. Gerrans, P., & Hershey, D. A. (2017). Financial adviser anxiety, financial literacy, and financial advice seeking. Journal of Consumer Affairs, 51(1), 54-90. doi:10.1111/joca.12120

39. Giannetti, C., Madia, M., & Moretti, L. (2014). Job insecurity and financial distress. Applied Financial Economics, 24(4), 219-233. doi:10.1080/09603107.2013.872759

40. Gogolin, F., Dowling, M., & Cummins, M. (2017). Individual values and household finances. Applied Economics, 49(35), 3560-3578. doi:10.1080/00036846.2016.1262528

41. Grohmann, A. (2018). Financial literacy and financial behavior: Evidence from the emerging asian middle class. Pacific Basin Finance Journal, 48, 129-143. doi:10.1016/j.pacfin.2018.01.007

42. Grohmann, A., Kouwenberg, R., & Menkhoff, L. (2015). Childhood roots of financial literacy. Journal of Economic Psychology, 51, 114-133. doi:10.1016/j.joep.2015.09.002

43. Guiso, L., & Viviano, E. (2015). How much can financial literacy help? Review of Finance, 19(4), 1347-1382. doi:10.1093/rof/rfu033

44. Hala, Y., Abdullah, M. W., Andayani, W., Ilyas, G. B., & Akob, M. (2020). The financial behavior of investment decision making between real and financial assets sectors. Journal of Asian Finance, Economics and Business, 7(12), 635-645. doi:10.13106/JAFEB.2020.VOL7.NO12.635

45. Hastings, J., & Mitchell, O. S. (2020). How financial literacy and impatience shape retirement wealth and investment behaviors. Journal of Pension Economics and Finance, 19(1), 1-20. doi:10.1017/S1474747218000227

46. Huang, J., Nam, Y., & Sherraden, M. S. (2013). Financial knowledge and child development account policy: A test of financial capability. Journal of Consumer Affairs, 47(1), 1-26. doi:10.1111/joca.12000

47. Hudson, C., Young, J., Anong, S., Hudson, E., & Davis, E. (2018). Investment behavior: Factors that limit

african-americans' investment behavior. Journal of Financial Therapy, 9(1), 21-46. doi:10.4148/1944-9771.1127

48. Kosfeld, M., & Schüwer, U. (2017). Add-on pricing in retail financial markets and the fallacies of consumer education. Review of Finance, 21(3), 1189-1216. doi:10.1093/rof/rfw051

49. León, A. K., & Pfeifer, C. (2017). Religious activity, risk-taking preferences and financial behaviour: Empirical evidence from german survey data. Journal of Behavioral and Experimental Economics, 69, 99-107. doi:10.1016/j.socec.2017.05.005

50. Levy, M. R., & Tasoff, J. (2017). Exponential-growth bias and overconfidence. Journal of Economic Psychology, 58, 1-14. doi:10.1016/j.joep.2016.11.001

51. Liu, F., Yilmazer, T., Loibl, C., & Montalto, C. (2019). Professional financial advice, self-control and saving behavior. International Journal of Consumer Studies, 43(1), 23-34. doi:10.1111/ijcs.12480

52. Lotto, J. (2020). Understanding sociodemographic factors influencing households' financial literacy in tanzania. Cogent Economics and Finance, 8(1) doi:10.1080/23322039.2020.1792152

53. Love, D., & Phelan, G. (2015). Hyperbolic discounting and life-cycle portfolio choice. Journal of Pension Economics and Finance, 14(4), 492-524. doi:10.1017/S1474747215000220

54. Luca, D. (2018). Does prevention as an investment strategy explain the intention to purchase guarantees for unit-linked life insurance? Journal of Financial Services Marketing, 23(3-4), 153-167. doi:10.1057/s41264-018-0052-y

55. Lučić, A., Barbić, D., & Uzelac, M. (2020). The role of financial education in adolescent consumers' financial knowledge enhancement. [Financijskim obrazovanjem do povećanja znanja o financijama potrošača adolescenata] Market-Trziste, 32(Special Issue), 115-130. doi:10.22598/mt/2020.32.spec-issue.115

56. Lührmann, M., Serra-Garcia, M., & Winter, J. (2015). Teaching teenagers in finance: Does it work? Journal of Banking and Finance, 54, 160-174. doi:10.1016/j.jbankfin.2014.11.009

57. Lusardi, A. (2015). Risk literacy. Italian Economic Journal, 1(1), 5-23. doi:10.1007/s40797-015-0011-x

58. Lusardi, A., & Mitchell, O. S. (2011). Financial literacy around the world: An overview. Journal of Pension Economics and Finance, 10(4), 497-508. doi:10.1017/S1474747211000448

59. Magendans, J., Gutteling, J. M., & Zebel, S. (2017). Psychological determinants of financial buffer saving: The influence of financial risk tolerance and regulatory focus. Journal of Risk Research, 20(8), 1076-1093. doi:10.1080/13669877.2016.1147491

60. Mahdzan, N. S., Mohd-Any, A. A., & Chan, M. -. (2017). The influence of financial literacy, risk aversion and expectations on retirement planning and portfolio allocation in malaysia. Gadjah Mada International Journal of Business, 19(3), 267-289. doi:10.22146/gamaijb.24441

61. Maté-Sánchez-Val, M., López-Hernandez, F., & Mur-Lacambra, J. (2017). How do neighboring peer companies influence SMEs' financial behavior? Economic Modelling, 63, 104-114. doi:10.1016/j.econmod.2017.01.023

62. Mbhele, T. P. (2012). The study of venture capital finance and investment behaviour in small and medium-sized enterprises. South African Journal of Economic and Management Sciences, 15(1), 94-111. doi:10.4102/sajems.v15i1.168

63. Mishra, R. (2018). Financial literacy, risk tolerance and stock market participation. Asian Economic and Financial Review, 8(12), 1457-1471. doi:10.18488/journal.aefr.2018.812.1457.1471

64. Monticone, C. (2010). How much does wealth matter in the acquisition of financial literacy? Journal of Consumer Affairs, 44(2), 403-422. doi:10.1111/j.1745-6606.2010.01175.x

65. Moreno-Herrero, D., Salas-Velasco, M., & Sánchez-Campillo, J. (2018). The knowledge and skills that are essential to make financial decisions: First results from PISA 2012. FinanzArchiv, 74(3), 293-339. doi:10.1628/fa-2018-0009

66. Mutezo, A. (2013). Credit rationing and risk management for SMEs: The way forward for south africa. Corporate Ownership and Control, 10(2 B,CONT1), 153-163. doi:10.22495/cocv10i2c1art1

67. Nanziri, E. L., & Leibbrandt, M. (2018). Measuring and profiling financial literacy in south africa. South African Journal of Economic and Management Sciences, 21(1) doi:10.4102/sajems.v21i1.1645

68. Ngek, N. B. (2016). Performance implications of financial capital availability on the financial literacy - performance nexus in south africa. Investment Management and Financial Innovations, 13(2), 354-362. doi:10.21511/imfi.13(2-2).2016.10

69. Nicolini, G., & Haupt, M. (2019). The assessment of financial literacy: New evidence from europe. International Journal of Financial Studies, 7(3) doi:10.3390/ijfs7030054

70. Nomi, M., & Sabbir, M. M. (2020). Investigating the factors of consumers' purchase intention towards life insurance in bangladesh: An application of the theory of reasoned action. Asian Academy of Management Journal, 25(2), 135-165. doi:10.21315/aamj2020.25.2.6

71. Okello Candiya Bongomin, G., Munene, J. C., & Yourougou, P. (2020). Examining the role of financial intermediaries in promoting financial literacy and financial inclusion among the poor in developing countries: Lessons from rural uganda. Cogent Economics and Finance, 8(1) doi:10.1080/23322039.2020.1761274

72. OECD. (2005). Improving financial literacy: Analysis of issues and policies. Paris: OECD Publishing.OECD. (2009). Financial literacy and consumer protection: Overlooked aspects of the crisis. Paris, France: OECD Publishing.

73. OECD. (2014). PISA 2012 technical background. In OECD (Ed.), PISA 2012 Results: Students and money: Financial literacy skills for the 21st Century (Vol. VI, pp. 123–145). Paris: OECD Publishing.

74. OECD. (2016). OECD/INFE international survey of adult financial literacy competencies (technical report). Paris: OECD.

75. OECD. (2017). PISA 2015 results: Students' financial literacy. Paris: OECD Publishing.

76. OECD. (2018). G20/OECD INFE policy guidance on digitalisation and finan-cial literacy. Paris, France: OECD Publishing

77. Owusu, J., Ismail, M. B., Osman, M. H. B. M., & Kuan, G. (2019). Financial literacy as a moderator linking financial resource availability and SME growth in ghana. Investment Management and Financial Innovations, 16(1), 154-166. doi:10.21511/imfi.16(1).2019.12

78. Parker, A. M., de Bruin, W. B., Yoong, J., & Willis, R. (2012). Inappropriate confidence and retirement planning: Four studies with a national sample. Journal of Behavioral Decision Making, 25(4), 382-389. doi:10.1002/bdm.745

79. Patacchini, E., & Rainone, E. (2017). Social ties and the demand for financial services. Journal of Financial Services Research, 52(1-2), 35-88. doi:10.1007/s10693-017-0279-0

80. Pikulina, E., Renneboog, L., & Tobler, P. N. (2017). Overconfidence and investment: An experimental approach. Journal of Corporate Finance, 43, 175-192. doi:10.1016/j.jcorpfin.2017.01.002

81. Ramalho, T. B., & Forte, D. (2019). Financial literacy in brazil – do knowledge and self-confidence relate with behavior? RAUSP Management Journal, 54(1), 77-95. doi:10.1108/RAUSP-04-2018-0008

82. Ramlee, R., Syed Mohd Zain, S. R., & Wan Husain, W. R. (2019). Are muslims practising moderation in their financial decisions? Asian Academy of Management Journal, 24, 157-170. doi:10.21315/AAMJ2019.24.S1.11

83. Ramudzuli, P. M., & Muzindutsi, P. -. (2015). Financial knowledge and subjective financial risk tolerance among students at a south african university. Risk Governance and Control: Financial Markets and Institutions, 5(3CONT2), 180-185. doi:10.22495/rgcv5i3c2art3

84. Rasool, N., & Ullah, S. (2020). Financial literacy and behavioural biases of individual investors: Empirical evidence of pakistan stock exchange. Journal of Economics, Finance and Administrative Science, 25(50), 261-278. doi:10.1108/JEFAS-03-2019-0031

85. Ribaj, A., Meçe, M., Cinaj, V., & Kadrimi, I. (2020). Issues related to financial education of youth in a developing country (the case of albanian youth). WSEAS Transactions on Business and Economics, 17, 140-152. doi:10.37394/23207.2020.17.16

86. Ross, D. B., & Coambs, E. (2018). The impact of psychological trauma on finance: Narrative financial therapy considerations in exploring complex trauma and impaired financial decision making. Journal of Financial Therapy, 9(2), 37-53. doi:10.4148/1944-9771.1174

87. Salamanca, N., de Grip, A., Fouarge, D., & Montizaan, R. (2020). Locus of control and investment in risky assets. Journal of Economic Behavior and Organization, 177, 548-568. doi:10.1016/j.jebo.2020.06.032

88. Seshan, G., & Yang, D. (2014). Motivating migrants: A field experiment on financial decision-making in transnational households. Journal of Development Economics, 108, 119-127. doi:10.1016/j.jdeveco.2014.01.005

89. Sharma, M., & Kota, H. B. (2019). The role of working women in investment decision making in the family in india. Australasian Accounting, Business and Finance Journal, 13(3), 91-110. doi:10.14453/aabfj.v13i3.6

90. Sherraden, M. S., Johnson, L., Guo, B., & Elliott III, W. (2011). Financial capability in children: Effects of participation in a school-based financial education and savings program. Journal of Family and

Economic Issues, 32(3), 385-399. doi:10.1007/s10834-010-9220-5

91. Singh, K., Rani, P., & Kiran, C. (2020). Relationship between various determinants and dimensions of financial literacy among working class. International Journal of Financial Research, 11(5), 319-333. doi:10.5430/ijfr.v11n5p319

92. Skagerlund, K., Lind, T., Strömbäck, C., Tinghög, G., & Västfjäll, D. (2018). Financial literacy and the role of numeracy–How individuals' attitude and affinity with numbers influence financial literacy. Journal of Behavioral and Experimental Economics, 74, 18-25. doi:10.1016/j.socec.2018.03.004

93. Smith, C. E., Echelbarger, M., Gelman, S. A., & Rick, S. I. (2018). Spendthrifts and tightwads in childhood: Feelings about spending predict children's financial decision making. Journal of Behavioral Decision Making, 31(3), 446-460. doi:10.1002/bdm.2071

94. Stark, O., & Szczygielski, K. (2019). The likelihood of divorce and the riskiness of financial decisions. Journal of Demographic Economics, 85(3), 209-229. doi:10.1017/dem.2019.8

95. Strömbäck, C., Lind, T., Skagerlund, K., Västfjäll, D., & Tinghög, G. (2017). Does self-control predict financial behavior and financial well-being? Journal of Behavioral and Experimental Finance, 14, 30-38. doi:10.1016/j.jbef.2017.04.002

96. Świecka, B., Terefenko, P., & Paprotny, D. (2021). Transaction factors' influence on the choice of payment by polish consumers. Journal of Retailing and Consumer Services, 58 doi:10.1016/j.jretconser.2020.102264

97. Van Raaij, W. F. (2012). Consumer financial behavior. Foundations and Trends in Marketing, 7(4), 231-251. doi:10.1561/1700000039

98. van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. Journal of Financial Economics, 101(2), 449-472. doi:10.1016/j.jfineco.2011.03.006

99. Van Staveren, I. (2014). The lehman sisters hypothesis. Cambridge Journal of

Economics, 38(5), 995-1014. doi:10.1093/cje/beu010

100. Vinodkumar, N., & AlJasser, H. K. (2020). Financial evaluation of tadawul all share index (TASI) listed stocks using capital asset pricing model. Investment Management and Financial Innovations, 17(2), 69-75. doi:10.21511/imfi.17(2).2020.06

101. Vyvyan, V., Blue, L., & Brimble, M. (2014). Factors that influence financial capability and effectiveness: Exploring financial counsellors' perspectives. Australasian Accounting, Business and Finance Journal, 8(4), 3-22. doi:10.14453/aabfj.v8i4.2

102. Wahyono, & Hutahayan, B. (2021). The relationships between market orientation, learning orientation, financial literacy, on the knowledge competence, innovation, and performance of small and medium textile industries in java and bali. Asia Pacific Management Review, 26(1), 39-46. doi:10.1016/j.apmrv.2020.07.001

103. Walczak, D., & Pienkowska-Kamieniecka, S. (2018). Gender differences in financial behaviours. Engineering Economics, 29(1), 123-132. doi:10.5755/j01.ee.29.1.16400

104. Ward, A. F., & Lynch, J. G. (2019). On a need-to-know basis: How the distribution of responsibility between couples shapes financial literacy and financial outcomes. Journal of Consumer Research, 45(5), 1013-1036. doi:10.1093/jcr/ucy037

105. Weisbenner, S. (2002). Do pension plans with participant investment choice teach households to hold more equity? Journal of Pension Economics and Finance, 1(3), 223-248. doi:10.1017/S1474747202001129

106. West, J. (2012). Financial literacy education and behaviour unhinged: Combating bias and poor product design. International Journal of Consumer Studies, 36(5), 523-530. doi:10.1111/j.1470-6431.2012.01118.x

107. Windram, B., & Song, J. (2004). Non-executive directors and the changing nature of audit committees: Evidence from UK audit committee chairmen.

Corporate Ownership and Control, 1(3), 108-115. doi:10.22495/cocv1i3p10

108. Xiang, D., & Worthington, A. (2015). Finance-seeking behaviour and outcomes for small- and medium-sized enterprises. International Journal of Managerial Finance, 11(4), 513-530. doi:10.1108/IJMF-01-2013-0005

109. Zokaityte, A. (2018). The UK's money advice service: Edu-regulating consumer decision-making. Economic Notes, 47(2-3), 387-412. doi:10.1111/ecno.12109

110. Al□Tamimi, H. A. H. (2009). Financial literacy and investment decisions of UAE investors. The Journal of Risk Finance.

111. Yurttadur, M., & Ozcelik, H. (2019). Evaluation of the financial investment preferences of individual investors from behavioral finance: the case of Istanbul. Procedia Computer Science, 158, 761-765.

112. Potrich, A. C. G., Vieira, K. M., & Kirch, G. (2015). Determinants of financial literacy: Analysis of the influence of socioeconomic and demographic variables. Revista Contabilidade & Finanças, 26(69), 362-377.

113. Disney, R., & Gathergood, J. (2013). Financial literacy and consumer credit portfolios. Journal of Banking & Finance, 37(7), 2246-2254.

114. Al Azizah, U. S., & Mulyono, H. (2020). Dataset on determinants of intention and investment behaviour amongst young Indonesian millennials. Data in brief, 32, 106083.

115. Chen, H., & Volpe, R. P. (1998). An analysis of personal financial literacy among college students. Financial services review, 7(2), 107-128.

116. Abebe, G., Tekle, B., & Mano, Y. (2018). Changing saving and investment behaviour: The impact of financial literacy training and reminders on micro-businesses. Journal of African Economies, 27(5), 587-611.

117. Agarwal, S., Amromin, G., Ben-David, I., Chomsisengphet, S., & Evanoff, D. D. (2015). Financial literacy and financial planning: Evidence from India. Journal of Housing Economics, 27, 4-21.

118. Lima, T. S., Mail, R., Karim, M. R. A., Ulum, Z. K. A. B., Mifli, M., & Jaidi, J. (2020). An investigation of financial investment intention using covariance-based structural equation modelling. Global Business and Finance Review.

119. Baihaqqy, M. R. I. (2020). The Correlation between Education Level and Understanding of Financial Literacy and Its Effect on Investment Decisions in Capital Markets. Journal of Education and e-Learning Research, 7(3), 303-313.

120. Mouna, A., & Anis, J. (2017). Financial literacy in Tunisia: Its determinants and its implications on investment behavior. Research in International Business and Finance, 39, 568-577.

121. Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013). Financial literacy, financial education, and economic outcomes. Annu. Rev. Econ., 5(1), 347-373.

122. Hastings, J., & Mitchell, O. S. (2020). How financial literacy and impatience shape retirement wealth and investment behaviors. Journal of Pension Economics & Finance, 19(1), 1-20.

123. Xiong, G., Wang, L., & Wu, D. (2020). Influence of Investor Sentiment on The Return Rate of Transnational Investment Behaviour. Revista Argentina de Clínica Psicológica, 29(1), 483.

124. Tavor, T. (2013). Investors' short term decision making and review of the hindsight bias effect. Mediterranean Journal of Social Sciences, 4(11), 176.

125. Liao, W. C., Zhao, D., & Sing, T. F. (2014). Risk attitude and housing wealth effect. The Journal of Real Estate Finance and Economics, 48(3), 467-491.

126. Lim, T. S., Mail, R., Abd Karim, M. R., Ulum, Z. K. A. B., Jaidi, J., & Noordin, R. (2018). A serial mediation model of financial knowledge on the intention to invest: The central role of risk perception and attitude. Journal of Behavioral and Experimental Finance, 20, 74-79.

127. Lusardi, A., & Mitchell, O. S. (2011). Financial literacy around the world: an overview. National Bureau of Economic Research Working Paper Series, (w17107).

128. Raut, R. K. (2020). Past behaviour, financial literacy and investment decision-making process of individual investors. International Journal of Emerging Markets.

129. Akhtar, F., & Das, N. (2019). Predictors of investment intention in Indian stock markets. International Journal of Bank Marketing.

130. Bucciol, A., & Miniaci, R. (2011). Household portfolios and implicit risk preference. Review of Economics and Statistics, 93(4), 1235-1250.

131. Sivaramakrishnan, S., Srivastava, M., & Rastogi, A. (2017). Attitudinal factors, financial literacy, and stock market participation. International Journal of Bank Marketing.

132. HALA, Y., ABDULLAH, M. W., ANDAYANI, W., ILYAS, G. B., & AKOB, M. (2020). The Financial Behavior of Investment Decision Making Between Real and Financial Assets Sectors. The Journal of Asian Finance, Economics, and Business, 7(12), 635-645.

133. Van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. Journal of Financial Economics, 101(2), 449-472.

134. Aggarwal, N., & Singh, H. (2019). Women and wealth: Financial propinquity to business success. Australasian Accounting, Business and Finance Journal, 13(2), 69-87.

# DIGITALISATION OF EDUCATION IN COVID-19 PANDEMIC: AN INDIAN PERSPECTIVE GROWTH AND CHALLENGES

**R.K. Yadav**

SPDT College, Mumbai

_____

## ABSTRACT

*E-learning has become the mandatory component of all educational institutions like schools, colleges, and universities in and around the world due to the pandemic crisis of COVID-19.Children of today have been surrounded by digital technology and internet since their birth. However, children of today are not equally equipped for their technology rich future: various kinds of digital divides still prevail in the society and affect the young generation and their digital futures. Schools and education of children should undergo an extensive digital transformation to be able to meet the needs of the young generation and their digitalized future. The COVID-19 pandemic has suddenly and abruptly forced schools and education indeed to engage in such a transformation. In this study we examine the digital transformation initiated by the COVID-19 pandemic in the basic education of the young generation, the variety of digital divides emerging and reinforced, and the possible barriers reported along the way.In this study shows that E-learning has become quite popular among the students all over the world particularly, the lockdown period due to the COVID-19 pandemic.*

_____

## Introduction

E-learning is defined as using information technology to improve the quality of education. Currently, online teaching is commonly used in the training of undergraduates—not as a sole method, but combined with the traditional teacher-led approach. The success of e-learning depends on many factors, including accessibility, usage of appropriate methods, course content, and assessment criteria. E-learning, like any method of teaching, has its advantages and disadvantages for both students and teachers. Besides the epidemiological benefits of e-learning during the COVID–19 pandemic, other benefits worth mentioning include increased convenience, access to resources regardless of location and time, and reduction of costs and air pollution, e.g. carbon dioxide emission because of the reduction in traffic.

Online classes also have limitations, including problems with internet access, poor internet connection quality, and insufficient digital skills of the respondents. Some benefits such as time exeecibility can also be a limitation, especially for students who have difficulties with self-discipline. After eight weeks of only online learning with no face-to-face learning, we decided to analyze college students' perception of this teaching approach.

## Literature Review

According to f **Laurillard's (2006)** research "e-learning as the use of any of the new technologies or applications in the service of learning or learner support", and it has been considered as operational definition of e-learning. According to Marc Prensky's research different learning outcomes are best learning through particular types of learning activities. He says that we all learn -a) behaviors through limitation, feedback and practice. b) creatively through playing c) facts through association, drill, memory and questions d)language through imitation, practice and impression e) reasoning through puzzles, problems and examples. These studies focus on the changing era and the implications of E- learning in near future. Also supporting to say that E-earning is the wheel for new innovations

According to Arun Gaikwad and Vrishali Surndra Randhi "It is proved that the developing wave of adaptive learning will help higher education, women, and government. E-learning is increasing the percentage of literate population in the total population of India. E-learning plays a vital role in educational development as a wheel of growth in education sector. It is expected that if India and developing countries proceed as joint venture and work mutually on the issue of e-learning, it will be beneficial for the development of

educational sector. Through E- learning lot of opportunities can be captured and speedy development will possible. It is expected that if India and Malaysia act as joint venture together work out on this issue for development, it will be beneficial for educational sector".

### Significance of the Study

This study will help to find out the students' attitudes towards e-learning during COVID – 19 Pandemic. This study was done for the students who are studying in various colleges and even schools to gain additional information regarding the contribution of e-learning during this pandemic. It can be a learning paradigm in educational institutions to enhance the student's knowledge and skills through digital technologies. Government and Educational Department has to provide better infrastructure for e- learning for the betterment of students.

### Objectives of the Study

1. To know the global trend of using E-learning resources among college students.
2. To identify the interest and attitude of students towards using E-learning resources.
3. To suggest prospects in using E-learning resources by students in their study.

### Methodology

This study is based on primary data. The data have been collected from students, who are currently pursuing their undergraduate degrees in different colleges and universities. The online questionnaire through Google Forms has been prepared for collecting data. Among the students, only 150 samples are scrutinized based on the stratified sampling method. The period of study is the month of February 2021.

### Analysis

While the COVID-19 pandemic has created an unprecedented challenge for educational systems worldwide, it also brought much needed attention to the importance of connectivity and the use of digital technologies for teaching and learning in an open schooling context. Some 3.6 billion people still have no access to the Internet and 250 million children are still out of school.

### 1) Willingness Towards the E-Learning

The revolution of information and global based availability of technology has a major impact on contemporary education. It is playing a major role in all new pedagogical skills in education at all levels. There are many available sources online to learn from wherever you need it. Digital devices and gadgets do not only provide students to engage in entertainment, but also make more opportunities for them to engage in learning activities. In this context, student's willingness towards e-learning is presented in table-1.

### Table: 1

| Classification | Respondents | Percentage |
|---|---|---|
| Yes | 167 | 69.29 |
| No | 36 | 14.94 |
| May be | 38 | 15.77 |
| Total | 241 | 100.00 |

Source: Data collected through Primary source

Among 241 respondents, around 69.29 percent of students reported their willingness to learn from e-sources. Around 15.77 percent of them were opined in somewhat they are learning from e-sources because there are no other alternatives. Since the classes and education institutions are stand to closed due to Corona, they have only depended on e-learning, most majority of the institutions, where the students have participated in this survey are have encouraged to learn through e-sources. And only 14.77 percent of them were not willing to learn because of a lack of connectivity. It is evident from the Table-1; a maximum number of respondents are engaged to learn from e-based learning.

### 2) Improvement of Student's Self-Study Skill Through E-Learning

Students have wanted learning materials that are accessible through online mode in mobile phones and computers. The main reason for e-learning is that the students can learn at their comfort and requirement. In this context, the improvement of student's self-study skills through e-learning is presented in table-2.

| Classification | Respondents | Percentage |
|---|---|---|
| Yes | 106 | 43.98 |
| No | 51 | 21.16 |
| May be | 84 | 34.85 |
| Total | 241 | 100.00 |

Source: Data collected through Primary source

Among 241 respondents, around 43.98 percent of students have reported their self-study skills to improve because of e-learning. Around 34.85 percent of them were opined in somewhat they are learning from e-sources because there are no other alternatives. Since the classes and education institutions are stand to closed due to Corona, they have only depended on e-learning, most majority of the institutions, where the students have participated in this survey are have encouraged to learn through e-sources. And only 21.16 percent of them were not supposed that the e-source alone can improve their self-study skills. It is evident from the Table-2, a maximum number of respondents are viewed that, e-based learning improves their self-study skills.

### 3) The Usefulness of the E-Learning at Quarantine Time

During this time of medical emergency, many education institutions are some simple measures have taken to learn during the quarantine time. Students are motivated and provided a link to helpful material for their upcoming semester examination. Colleges are encouraged to be planned towards e-learning, in this context; the usefulness of the e-learning at quarantine time is presented in table-3.

| Classification | Respondents | Percentage |
|---|---|---|
| Yes | 170.00 | 70.54 |
| No | 23.00 | 09.54 |
| May be | 48.00 | 19.92 |
| Total | 241.00 | 100.00 |

Source: Data collected through Primary source

From above table it is observed that 241 respondents, around 70.54 percent of students are opinioned that e-learning is very useful during the quarantine time. Around 19.92 percent of them are the attitude that it may be useful since the students are pursuing online competitive examinations. And only 9.54 percent of them are not positive on e-learning during quarantine time. It is evident from the table-4, maximum numbers of respondents are expressed that e-learning is useful and more satisfactory.

### 4) Comparison Between E-Learning and Traditional Learning

E-learning allows educationalists to get a higher degree of coverage to communicate the message reliably for their target listeners. This ensures that all learners receive the same type of training with this learning mode. However, despite the popularity of online education, vast groups of people intentionally stay away from such methods, mostly due to a false impression. At the same time, despite the rising popularity of online courses, traditional classroom training is the majority of the student's choice. Unlike online learning, the classroom learning method is more real and students have an opportunity to debate, deliberate, and discuss with their class teachers and friends. In this context, a comparison between e-learning and traditional learning on students' knowledge improvement is presented in table -4

| Classification | Respondents | Percentage |
|---|---|---|
| Yes | 73.00 | 30.29 |
| No | 98.00 | 40.66 |
| May be | 70.00 | 29.05 |
| Total | 241.00 | 100.00 |

Source: Data collected through Primary source

Among 175 respondents, around 30.29 percent of students are highly preferred e-learning because they are learning more advanced technical courses only through online. Since soft skills are highly essential for present job market students are keen to learn from e-learning. But at the same time still, more than 40.66 percent of the students are considered that classroom learning is better than e-learning. From above respondent it is cleared that classroom tradition teaching is more effective and popular.

### 5) Face – to- Face Teaching is Important for Practical Learning

In e-learning pedagogy, theoretical concepts are carried over through various application tools which make the student more convenient but it lacks in practical teaching.

| Classification | Respondents | Percentage |
|---|---|---|
| Yes | 203.00 | 84.23 |
| No | 15.00 | 06.22 |
| May be | 23.00 | 09.54 |
| Total | 241.00 | 100.00 |

Source: Data collected through Primary source

Among 241 respondents, 84.23 percent of students are supportive of conventional teaching for the practical session. Around 9.54 percent of them have opted as it may be conventional teaching is important for the practical session. And only 6.22 percent of them are not positive on e-learning for the practical session. It is evident from table – 5; a maximum number of respondents are towards conventional teaching for practical learning.

### 6) Technical Issues of E-Learning

E-learning is always depending on a strong internet connection with the high band. It is not succeeded always because of a lack of connectivity and an acute power shortage. E-learning is even worse in rural areas compared to urban due to lack of infrastructure that online courses require, and thus fail to attend with their virtual classes. In this context, technical issues of e-learning are presented in table-6

| Classification | Respondents | Percentage |
|---|---|---|
| Yes | 118.00 | 48.96 |
| No | 90.00 | 37.34 |
| May be | 33.00 | 13.69 |
| Total | 241.00 | 100.00 |

Source: Data collected through Primary source

Among 241 respondents, around 37.34 percent of students are experienced that, no such technical issues while e-learning. Around 13.69 percent of them are experienced technical issues. Nearly 48.96 percent of them express that, sometimes it is very difficult to follow the classes due to poor internet connection. Especially video lectures from Zoom and other applications are containing a lot of technical configurations which is highly difficult to handle since the listener is new to this technology. It is evident from the table-6; maximum numbers of respondents are expressed that there are many technical issues in e-learning.

### 7) Contribution of E-Learning Bring a Social Change in India

In the contemporary education system is urging to adopt new technology for every field. All the developed and developing nations are more concentrated on research and development; as a result, technology is a part of every curriculum at all levels. A country like India is keen to introduce more new web-based courses for the students to fit them into the global job market. The present learners are highly motivated by international exposures. Technological innovations are highly influential in this society. Technology allows us to learn all and it is provides an opportunity to utilize the technology without any discrimination. In this context, it is important to understand e-learning brings a social change in India.

| Classification | Respondents | Percentage |
|---|---|---|
| Agree | 173.00 | 70.33 |
| Disagree | 35.00 | 14.52 |
| Neutral | 33.00 | 15.85 |
| Total | 241.00 | 100.00 |

Source: Data collected through Primary source

Among 241 respondents, around 70.33 percent of students have opined that e-learning is significantly playing a major role in social change in India. They are categorically explained that e-learning gives more inclusion based, it reaches all heterogeneity groups, freedom of knowledge sharing. It is evident from table-7, maximum numbers of respondents are optimistic about social change.

### 8) Types of Device Prefer to use for e-Learning

| Classification | Respondents | Percentage |
|---|---|---|
| Desktop (Computer) | 7.00 | 2.90 |
| Laptop | 36.00 | 14.94 |
| Mobile | 198.00 | 82.16 |
| Total | 241.00 | 100.00 |

Source: Data collected through Primary source

Among 241 respondents, around 82.16 percent of students are preferred mobile phones for e-learning, followed by Laptop 14.94 percent, and remaining students prefer Desktop 2.90 percent.

**9) Types of Application Tools Prefer to use for e-Learning**

| Classification | Respondents | Percentage |
|---|---|---|
| Zoom | 63.00 | 26.14 |
| Meet | 163.00 | 67.63 |
| Webex | 3.00 | 1.24 |
| Youtube | 12.00 | 4.98 |
| Total | 241.00 | 100.00 |

Source: Data collected through Primary source

Among 241 respondents, around 26.14 percent of students are learning classes through Zoom. Nearly 68 percent of students are accessing learning materials through Meet and 4.98 percent are learning through YouTube. Remaining students prefer Webex 1.24 percent respectively.

### Findings & Conclusion

This study showed that e-learning is a valuable method of teaching medical students. In the opinion of the respondents in our survey, e-learning is effective in increasing knowledge and is highly accepted. However, it is important not to focus only on increasing knowledge, but also on practical and exercise. E-learning should not only be based on the delivery of content, but students should be able to work with the materials and receive feedback. Successfully implementing online learning into the curriculum requires a well thought-out strategy and a more active approach.

In general, the use of the e-learning system, as an important approach in managing knowledge and educational needs of higher education institutions, creates some challenges. Discussion on ways to improve these challenges requires rules in relation to both teachers and learners. These rules include the transition from traditional teacher and student relationship to cyberspace communications that help to overcome challenges and support the success of students. Teachers and learners must accept the shift from traditional classroom activities to e-learning approaches. Creating a safe online space that facilitates cooperation and creates an opportunity for learns to use different technologies can cover the gap of the digital divide and by creating a common culture. Furthermore, it can reduce the educational deference, which leads to effective e-learning experience. Simultaneous, contact access of learners and teachers to access contact information, confirming the technological competence of students as well as taking into account the different levels of their abilities in teacher and student interaction in e-learning environment are essential. Furthermore, developing appropriate, purposive and defined courses that contain educational, social, and cultural aspects support teachers and students in e-learning environments. These targeted online courses can enhance students' learning experience and support continuous and self-cantered learning.

In general, success in the implementation of e-learning system in managing knowledge and educational needs of higher education organizations cannot be achieved without identifying the technical, cultural and skills challenges of e-learning. To overcome these challenges, it is necessary to create technological infrastructure and standards and use the experiences of the developed countries in relation to e-learning. Furthermore, it is necessary to create a suitable culture, and familiarize teachers and learners by developing and using the e-learning system.

### References

1. Arun Gaikwad, Vrishali Surndra Randhir, (2016). E-Learning in India: Wheel of Change, International Journal of e-Education, e-Business, e-Management and e-Learning, Volume 6, Number 1, March, pp 40-45

2. Bates, A. W. & Poole, G. (2003). "Effective Teaching with Technology in higher education: Foundations for success", Indianapolis, IN: Jossey-Bass.

3. Bonk, C. J. & Graham, C. R. (2005). "Handbook of blended learning: Global Perspectives", local designs. San Francisco, CA: Pfeiffer Publishing.

4. Conceicao, S. C. O., & Lehman, R. M. (2011). "Managing online instructor workload: Strategies for finding balance

and success", San Francisco, CA: Jossey-Bass.

5. Dargahi H, Ghazisaeedi M, Ghasemi M. (2007) Electronic teaching position at the University of Medical Sciences. Journal of Payavard Salamat.;1:20–29. [Google Scholar]

6. Duffy, T. M. & Kirkley, J. (2004). "Learner-centered theory and practice in distance education: Cases for higher education". Mahwah, NJ: Lawrence Erblaum Associates.

7. Dziuban, C., Hartman, J., Cavanagh, T. Moskal, P., (2011). "Blended Courses as Drivers of Institutional Transformation". A. Kitchenham, Ed. Blended Learning Across Disciplines: Models for Implementation, pp. 17-37.

8. Garrison, D. R., & Vaughan, N. D. (2008). "Blended Learning in Higher Education, Framework, Principles, and Guidelines", San Francisco: Jossey-Bass.

9. Kamalian A, Fazel A.( 2010) Review prerequisites and feasibility of the implementation of e-learning system. Journal of Technology of Education.;4:13–27. [Google Scholar]

10. Laurillard, D. (2006). E-learning in higher education. Changing Higher Education: The Development of Learning and Teaching, 71-84.

11. Sing, P. P., & Sharma, S. (2005). E-Learning New Trends and Innovations (pp. 39). New Delhi: Deep and Deep Publications Pvt. Ltd.

12. Zare M. (2021) Challenges related to the development of e-learning at the University of Medical Sciences in Iran. The Journal of Medical Education and Development. 2014;10(4):500–503. [Google Scholar]

13. https://en.unesco.org/news/new-publication-digital-transformation-education-and-school-connectivity dated 20March timing 15:42

14. https://journals.lww.com/md-journal/Fulltext/2021/02190/Students__perception_of_online_learning_during_the.87.aspx dated 20March 2021 timing 15:45

15. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6149121/

# ANALYSIS OF DISPERSION COMPENSATION WITH FIBER BRAGG GRATING BASED TECHNIQUES IN OPTICAL FIBER LINK USING DIFFERENT MODULATIONS AND INPUT SEQUENCES

## G. Sharma[1], A. Agrawal[1] and A. Paliwal[2]

[1]Department of ECE, Sangam University, Bhilwara, Rajasthan, India
[2]Department of ECE, Geetanjali Institute of Technical Studies, Udaipur, India
gauravbhl.sharma@gmail.com

_____

## ABSTRACT

*For long-distance communication, optical fiber is used to fulfill the primary requirement of high bit rate, large bandwidth, and low-security risk. Dispersion is the major limiting factor that degrades the quality of optical communication. Dispersion needs to be compensated for the desired outcomes. In this paper, Fiber Bragg Grating (FBG) based dispersion-compensating technique is investigated. Three configurations (pre, post, and symmetrical) of dispersion compensation with Ideal Dispersion Compensation FBG (IDCFBG) using different modulation format like Non-Return to Zero (NRZ), Return to Zero (RZ), Carrier Suppressed Return to Zero (CSRZ), and Duo Binary (DB) along with PN, FCC and Walsh code input sequences at input laser power ranging from 1 mW to 10 mW are implemented and analyzed at 10 Gbps data rate and transmission distance of 200 km in Optisystem 17.0 software in terms of Q factor, Bit Error Rate (BER), and Eye diagram and comparison between three configurations used with input CW laser power for different modulations and input sequences was done. The analysis concludes that when IDCFBG is used in the symmetrical configuration using NRZ modulation with Walsh code, it gives the highest value of Q factor=66.2186 and BER=0 at 10 mW among all configurations. From the result, it is also concluded that when Walsh code is used for the entire configuration it gives the highest value of Q factor and BER as compared to other input codes.*

_____

*Keywords: IDCFBG, NRZ, RZ, CSRZ, DB, BER, Q factor.*

## 1. Introduction

The optical fiber industry is growing very fast day by day due to the technical and research progress in the field of optical communication. Optical fibers have major applications in the area of telecommunication, fiber optic sensors, fiber optic devices, and components and integrated optics . It has many merits like low loss, high bandwidth, low weight, and immunity to electromagnetic interference over conventional transmission lines (J. Seeds, K.J. Willims , 2006). Optical fiber has the capacity to transmit information at a larger distance with a high transmission rate. But the performance of the optical fiber is reduced by the Chromatic Dispersion (CD). The variation of the wavelength causes the variation in the group index of refraction and can generate CD. The dispersion reduces the data capacity at high transmission speeds and effective bandwidth. It is important to develop an efficient dispersion compensation technique in optical communication systems (M.A. Othman et. al. 2012). The optical amplifiers (EDFA, SOA) have reduced optical fiber losses and are used for long-distance transmission without electronic regenerators. There are several techniques to reduce the problem of dispersion; two widely used techniques are DCF and FBG (Pei, L, 2009; Landolsi et. al, 2008; Hu, B.-N, 2010). The CD can be reduced by Dispersion Compensating Fibers (DCF) and dispersion compensators (M. Vengsarkar & Reed , 1993; Nielsen & Knudsen, 2000). A DCF is often used to compensate for the dispersion effects of the fiber. But a DCF may increase the optical loss, nonlinear effects, and cost of the optical transmission system (Agrawal G.P. 1997). The FBG is proposed to reduce the CD instead of DCF. The FBG can reduce the nonlinear effects and have a low cost. The dispersion compensation using FBG is proposed by Qulette (1987), and Williams et al.(1994). An FBG consists of an optical fiber with a variation in the core refractive index along the propagation direction. Different portions of the grating reflect different wavelengths. The delays generated by wavelengths are at different time constraints. This will produce pulse narrowing and therefore the compensation of the chromatic dispersion of the fiber link. The FBGs are widely used in

optical communication systems (Mohammadi et. al. 2011) and optical sensors (scheerer et. al 1999).

In previous work, a DCF based compensation technique was proposed using different types of modulation like NRZ, RZ, CSRZ, and Duo binary modulation with different input sequences like PN Code, FCC sequence, and Walsh codes. Different modulation format and types of input sequence codes was also discussed in (Gaurav S 2021).

Now in this paper, DCF is replaced by the FBG based dispersion compensation technique. An IDCFBG is used in three configurations pre, post, and symmetrical along with the optical fiber that reflects a specific wavelength of light and passes all others. The whole analysis is based on comparing the value of the Q factor and BER using different types of modulation techniques and types of input sequence code at the transmitter side with the change in transmitted power from 1 mW to 10 mW.

### 1.1 FBG Based Dispersion Compensation Techniques

Fiber Brag Grating is one of the most flexible and evolved dispersion compensation techniques. An FBG is a distributed Bragg reflector developed in a short fragment of optical fiber that reflects specific wavelengths of light and transmits all others as shown in Fig. 1. It is either used as an inline optical filter to prevent certain wavelengths or as a wavelength-specific reflector. This is accomplished by making an intermittent variety within the refractive profile of the fiber core, which creates reflection for a particular wavelength (Hill & Meltz 1997).
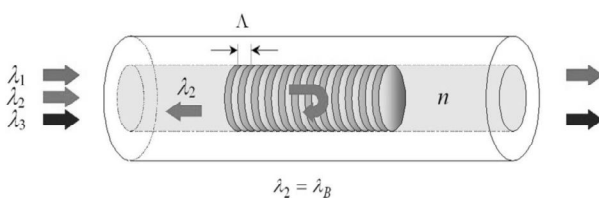


Fig. 1 FBG Principle

The light which enters into the grating depends upon the wavelength of light got reflecting by the grating. More distance will be traveled by the signal having a larger wavelength in grating before getting reflected; on the other hand, less distance will be traveled by the signal having a

small wavelength in the grating before getting reflected. Hence the pulse which is spread by CD in a single-mode fiber got reduced by traveling in FBG (T. Xie et al 2014; Singh & Rajveer 2015).

For the most part, FBG can perform as a single and multichannel DCM and give extra characteristics of dynamic compensation of dispersion, which are impractical with DCF and turned out to be an essential parameter for WDM and OTDM systems (Sumetsky & Eggleton 2005). Fresnel reflection is the fundamental principle behind the operation of FBG, where light traveling between media having different refractive indices may reflect or refract at the interface. The refractive index will alternate over a particular length. During refraction, a small amount of light is reflected. These reflected light signals combine to one large reflection at a particular wavelength in which the grating period is approximately half the input light wavelength. This is Bragg condition on the wavelength at which reflection occurs is called Bragg wavelength. The Bragg wavelength λ(b) is given by the relationship shown in Eq. (1)

$$\lambda(b) = 2n \, \Lambda \qquad (1)$$

where, n is effective refractive index of the grating in the core and $\Lambda$ is grating period.

The grating period of FBG can be defined as the distance between two nearby most extremes estimations of refractive index. The grating period of FBG is not a fixed value but alters linearly with the change in the length of the grating by keeping the shorter grating period at the starting of the grating. At the starting point, the grating period of chirped FBG is shorter but with the increase in the length of the grating, these periods also increase linearly. In this way, the wavelengths of shorter signals reflected sooner as compared to signals with longer wavelengths because these wavelengths propagate more into the fiber grating before their reflections (Spolitis & Ivanovs 2011). FBG can be used as a dispersion compensator by limiting the bandwidth that occurs due to the large oscillations present in grating dispersion. The main cause of these oscillations is Fresnel-type reflections. These Fresnel reflections are

accountable for the leftover bands, which are unenviable (Eggleton et. al 1996). Fiber grating incorporates a kind of merits over other dispersion compensations technologies used today. These include variations in physical parameters of grating at the time of inscription of the grating. Changing these parameters allows us to make grating of required features like either narrow or wide bandwidth or other special characteristics (Brennan 2005). Different authors have worked on different parameters to compensate the CD and achieved different results depending upon different parameters. By changing the refractive index profile and grating period, fiber Bragg grating can be divided into uniform FBG and ideal dispersion compensation FBG. In uniform fiber Bragg grating, unvarying grating periods are used (Pastor et. al 1996). Uniform means the grating period and refractive index is constant throughout the length of the grating. Ideal dispersion compensation (IDCFBG) is also known as chirped grating. In this type of FBG, there is additive fluctuation in the grating period. It has the advantage of large chip parameters which causes a decrease in reflection power. Due to the higher optical characteristics of chirped FBG, it's more convenient for WDM systems (Swati et. al 2018).

In this paper, for Ideal dispersion compensation FBG, a dispersion of -1700 ps/nm-km is considered for simulation.

## 1. Experimental Setup

This section shows the implementation of IDCFBG based dispersion compensation using Optisystem 17.0 software for a single channel. At the transmitter side, the simulation setup for all the three configurations pre, post, and symmetrical, CW laser is used as a source of light at the single frequency of 193.1 THz having power level ranging from 1 mW to 10 mW. Both pseudo random and user defined bit sequence generators are used to generate the bit sequences at the transmission rate of 10 Gbps. Different modulation formats like Non Return to Zero (NRZ), Return to Zero (RZ), Carrier Suppressed Return to Zero (CSRZ), Duo-Binary (DB) and Mach-Zehnder (MZ) modulator used for the modulation of the optical signals. The medium includes optical

fibers, IDCFBG and optical amplifiers. The position of IDCFBG is relocated at the time of simulations to analyse that how the position of IDCFBG affects the value of Q factor and BER of the communication link. This can be achieved in pre, post, and symmetrical compensation configuration.

- Pre-compensation: In the pre compensation scheme, IDCFBG is placed before the SMF and an optical amplifier.
- Post-compensation: In the post compensation scheme, IDCFBG is placed after SMF and an optical amplifier.
- Symmetrical-compensation: In Symmetrical compensation scheme, IDCFBG is placed after the SMF and before the optical amplifier.

At the receiver, a PIN detector is used along with a low pass Bessel filter to detect the optical pulses and convert them to electrical signals. To analyze the different fiber parameters, these electrical signals are applied to the BER analyzer through 3R generator. Different simulation parameters of single-channel optical system, fiber and IDCFBG are tabulated in Table 1, 2 and 3 respectively.

### Table-1 Single Channel Optical System Parameters

| PARAMETERS | VALUE |
|---|---|
| Bit Rate( Gb/s) | 10 |
| Sequence Length | 1024 |
| Samples/bit | 32 |
| Sample Rate (Hz) | 3.2e+011 |
| Number of Samples | 32768 |
| CW Laser frequency (THz) | 193.1 |
| CW Laser Power (mW) | 1 to 10 |
| Reference Wavelength (nm) | 1550 |

### Table-2 Fiber parameters

| PARAMETERS | SMF |
|---|---|
| Length(KM) | 100 |
| Dispersion(ps/nm/km) | 17 |
| Dispersion Slope | 0.075 |
| Attenuation | 0.2 |
| Differential Group Delay(ps/nm) | 0.5 |

**Table-3 IDCFBG parameters**

| PARAMETERS | VALUE |
|---|---|
| Frequency (THz) | 193.1 |
| Bandwidth (GHz) | 125 |
| Dispersion(ps/nm) | -1700 |

In this paper, three IDCFBG based dispersion compensation techniques using three different types of input sequences and four different modulation formats with different CW laser power are implemented. Fig. 2, 3, and 4 show the experimental setup for the Pre, Post, and Symmetrical IDCFBG techniques for NRZ, RZ, CSRZ, and Duo-Binary modulations using PN code generated by PRBS generator.
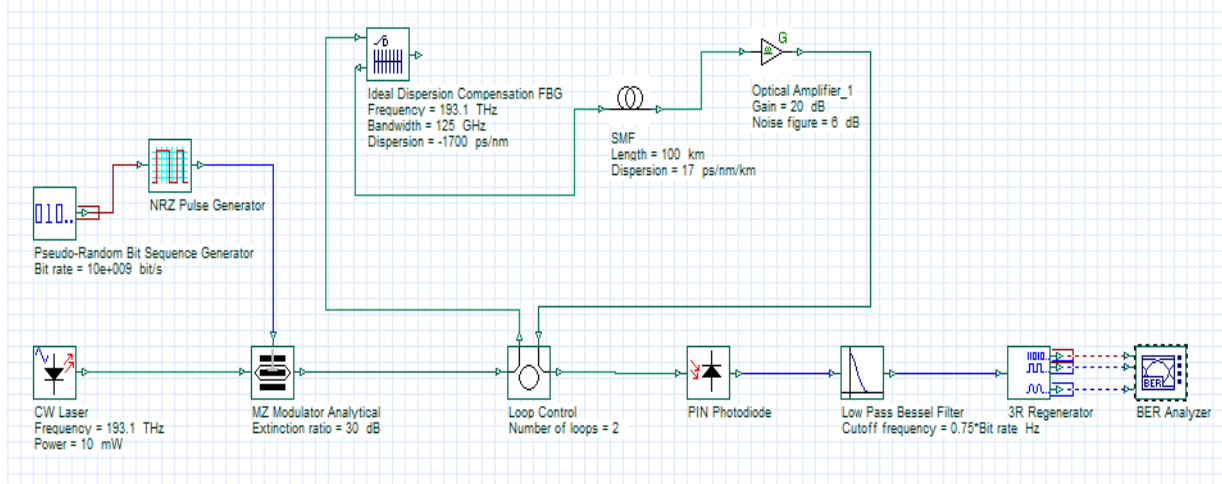


(a) Using NRZ modulation
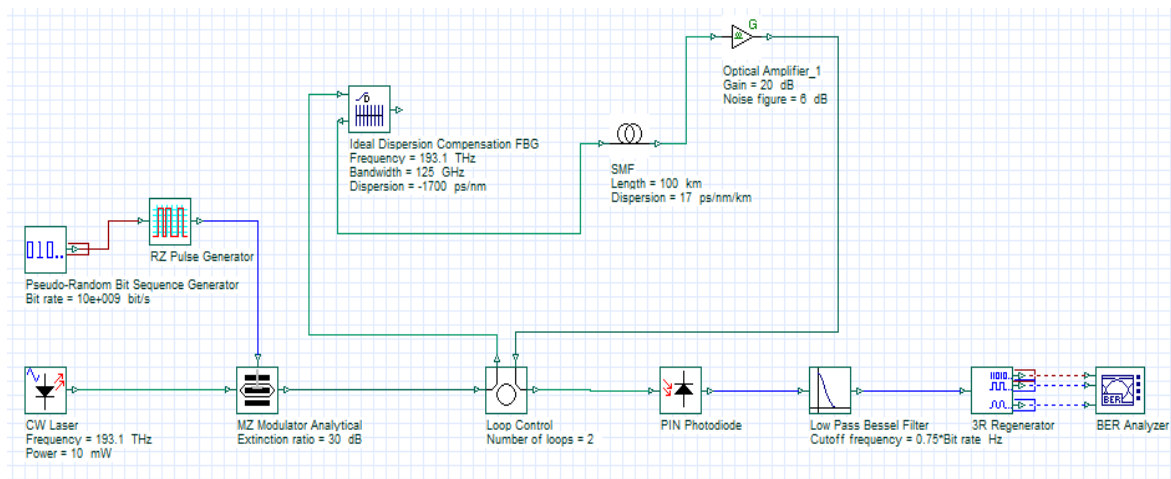


(b) Using RZ modulation
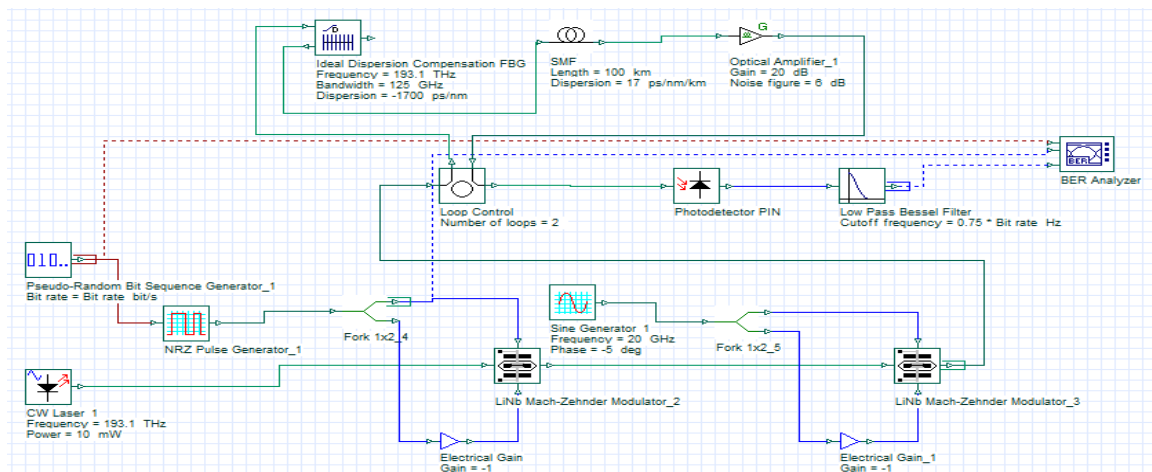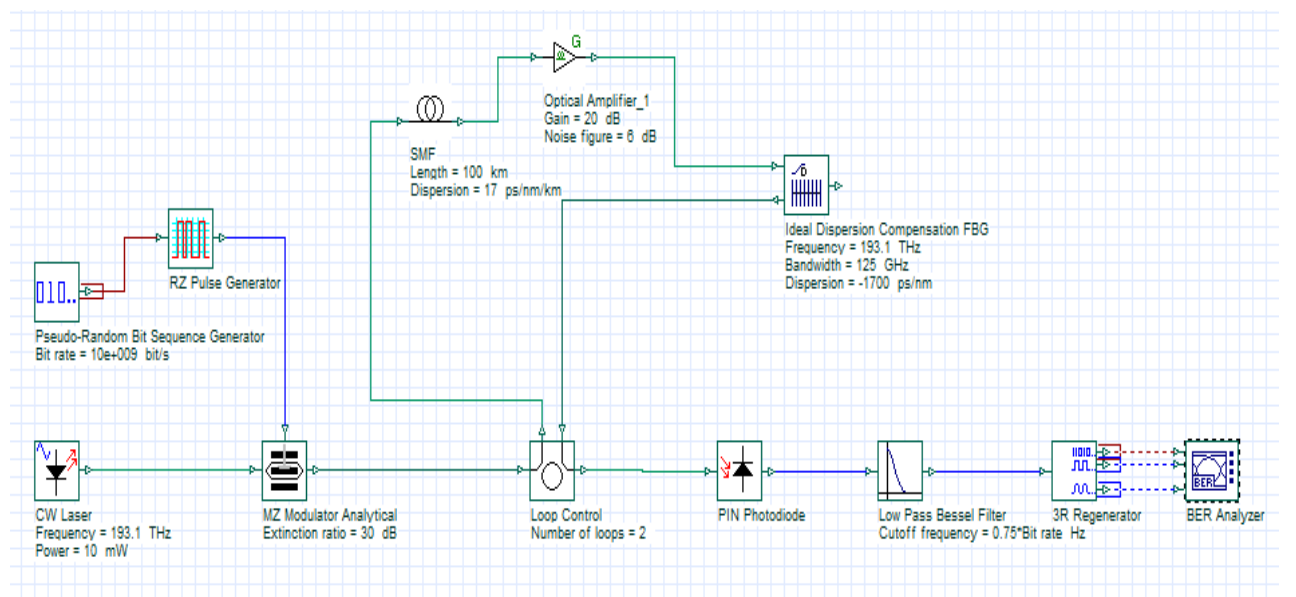


(c) Using CSRZ modulation
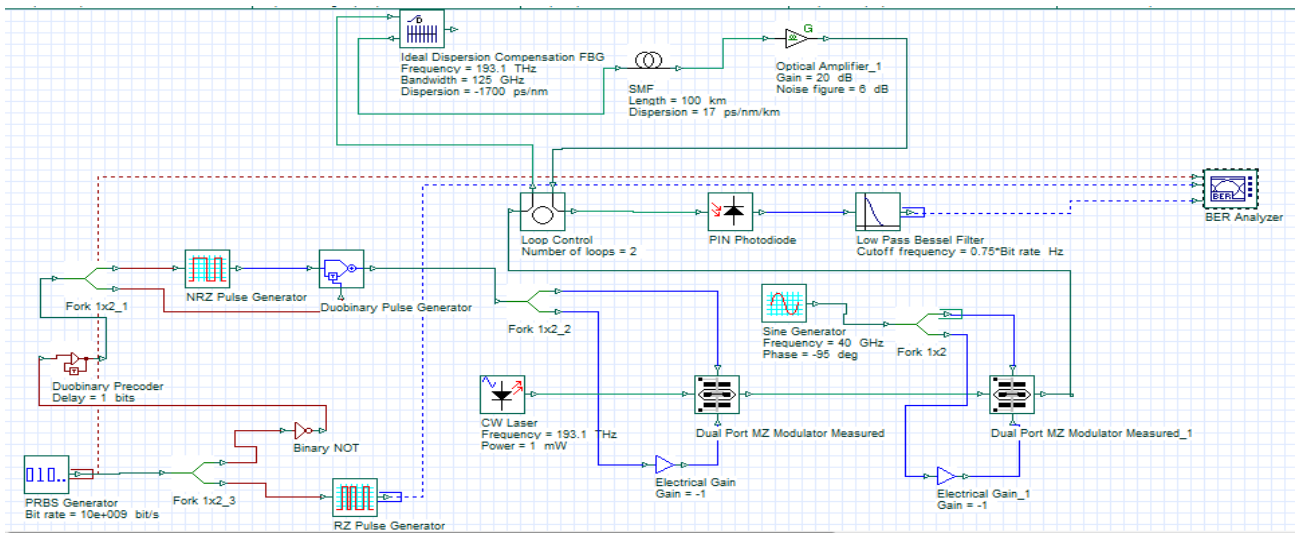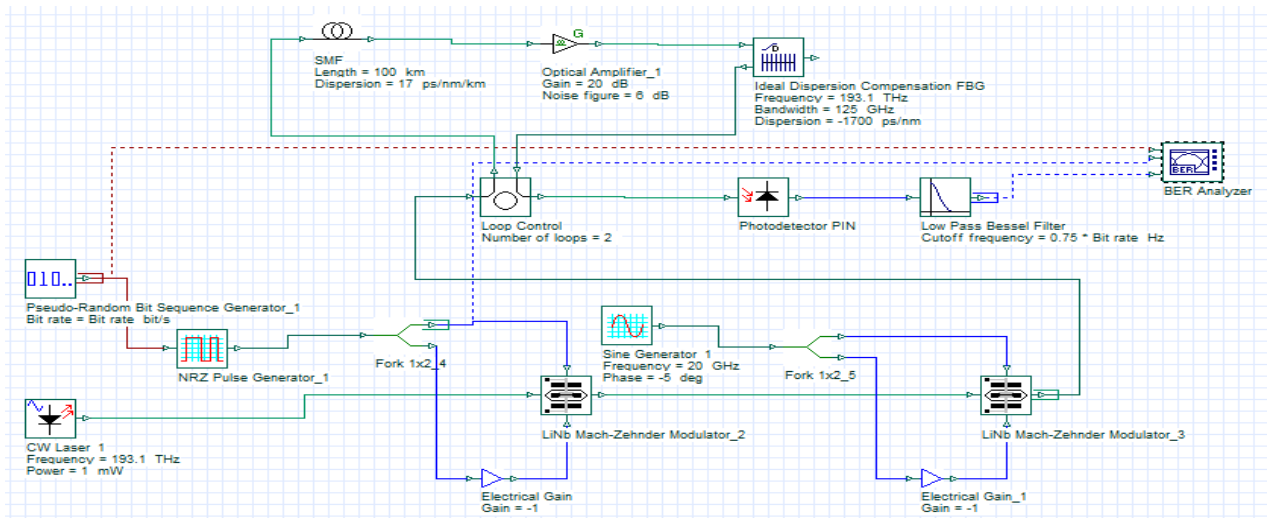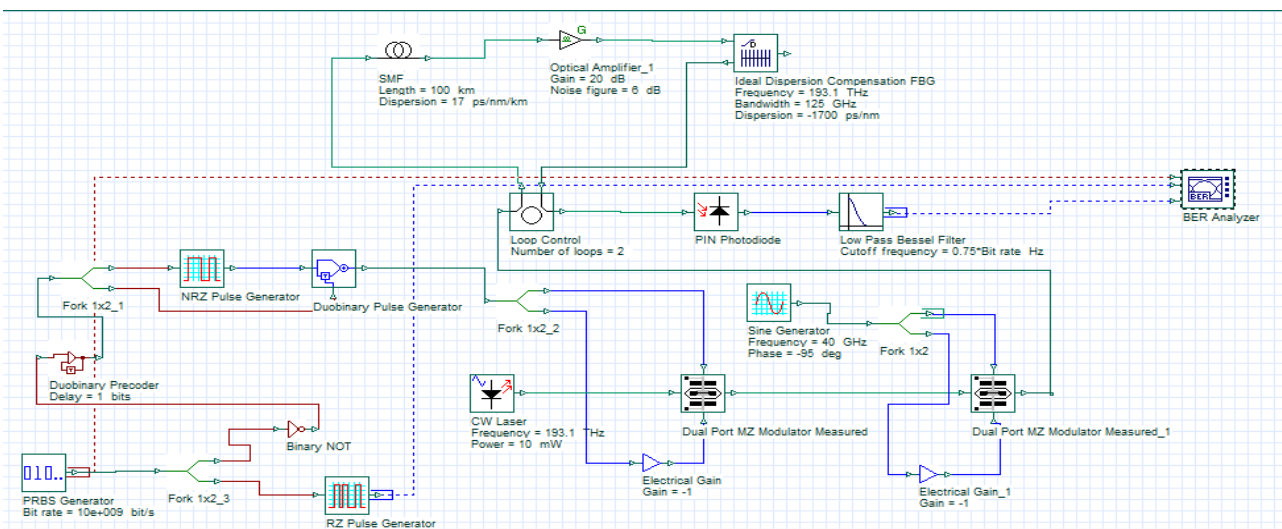
(d) Using Duo-Binary modulation

Fig. 2 Experimental setup for Pre IDCFBG compensation using (a) NRZ (b) RZ (c) CSRZ and (d) Duo-Binary modulation.
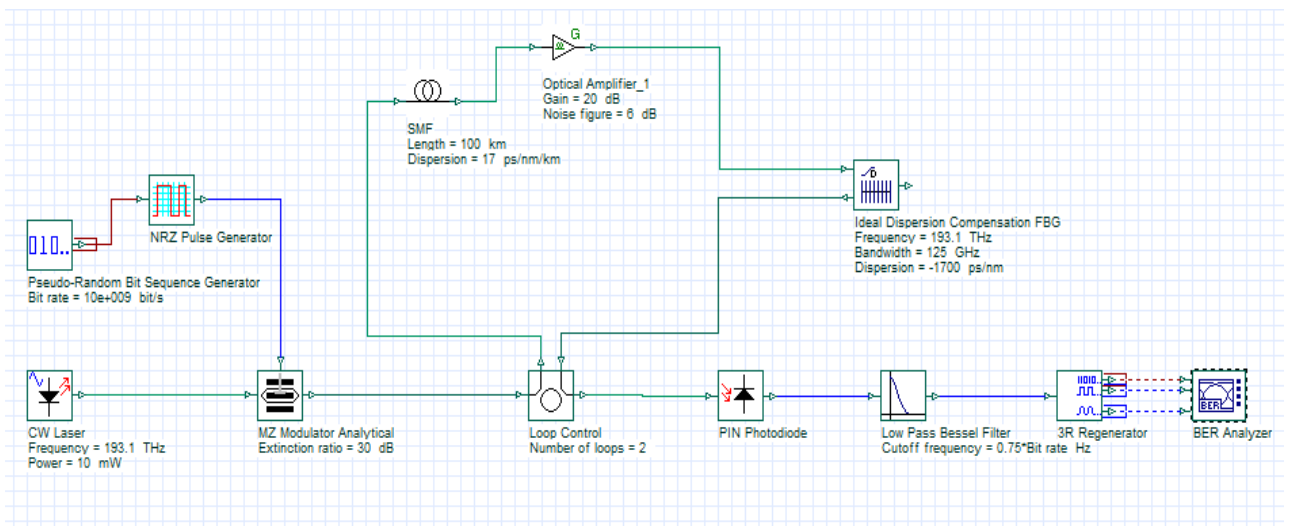


(a) Using NRZ modulation
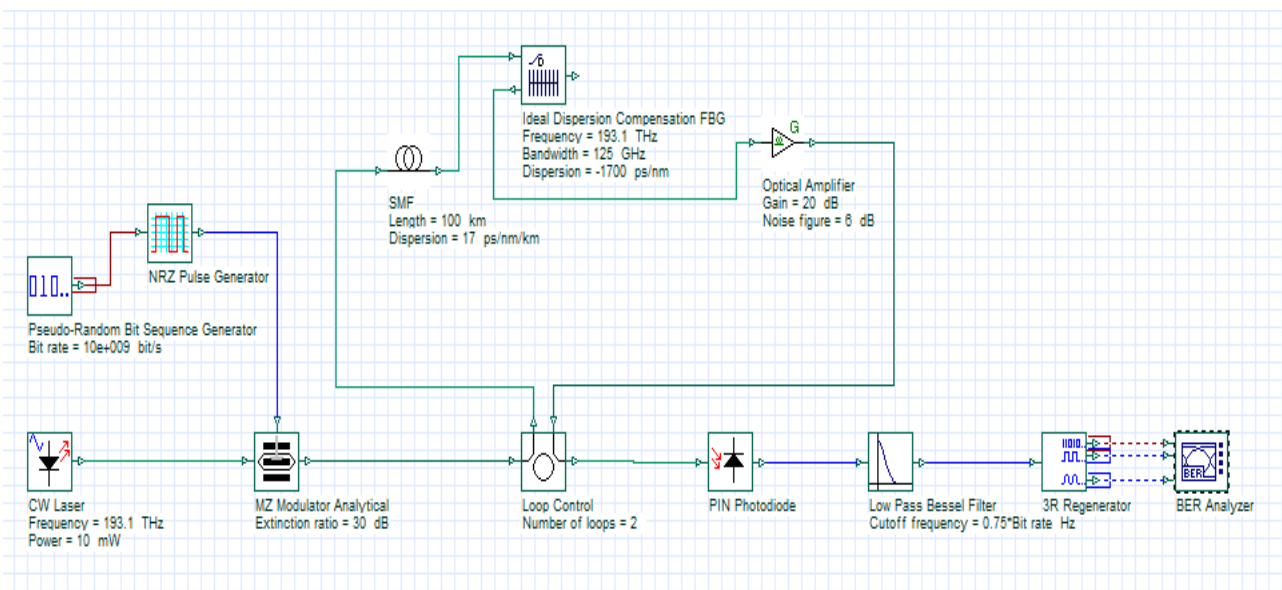


(b) Using RZ modulation
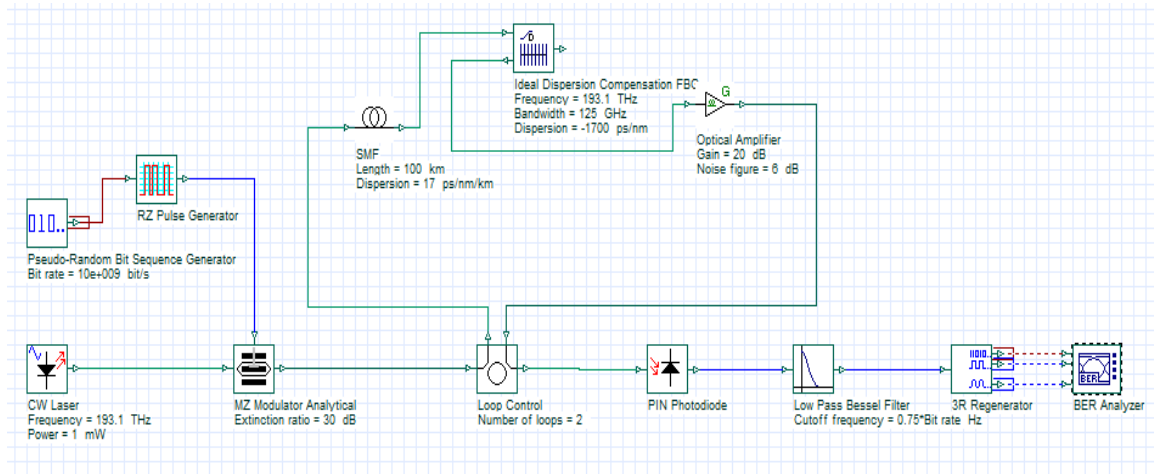
(c) Using CSRZ modulation
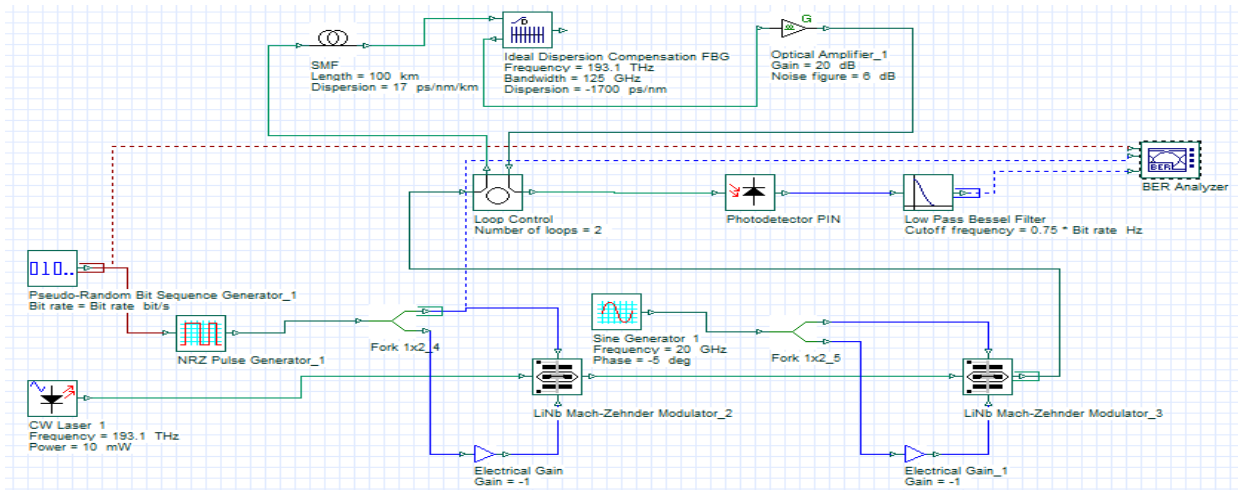


(d) Using Duo-Binary modulation

Fig. 3 Experimental setup for Post IDCFBG compensation using (a) NRZ (b) RZ (c) CSRZ and (d) Duo-Binary modulation.
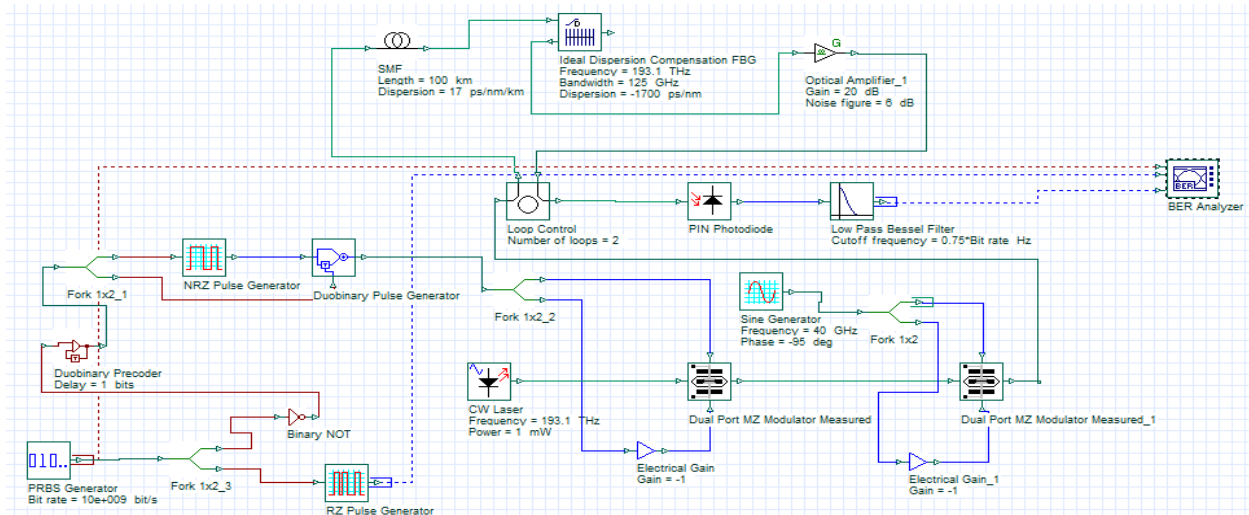


(a)      Using NRZ modulation

(b)      Using RZ modulation



(c) Using CSRZ modulation



(d) Using Duo-Binary modulation

Fig. 4 Experimental setup for Symmetrical IDCFBG compensation using (a) NRZ (b) RZ (c) CSRZ and (d) Duo-Binary modulation.

For the next simulation setup to apply FCC and Walsh code, PRBS generator is replaced by the user defined bit sequence generator in the entire Fig, where 16 bits of FCC Codes (0110111001010001) and Walsh codes (0110011001100110) are used for the simulation.

## 2.      Experimental Results

This section contains the analysis of the results obtained by using IDCFBG in pre, post and symmetrical configurations in terms of Q factor and BER. Comparison between them was done on the basis of input sequences like PN, FCC and Walsh code, modulation formats (NRZ, RZ, CSRZ and Duo Binary) with CW laser power level from 1mW to 10 mW.

### 3.1 Q Factor Versus Transmitted Power

Fig. 5 shows the comparative graph between Q factor and CW laser power ranges from 1 mW to 10 mW for the Pre, Post and Symmetrical IDCFBG compensation technique using NRZ modulation. It provides the high value of Q

factor = 44.691 at 6 mW for Pre IDCFBG, Q factor=64.3009 at 10 mW for Post IDCFBG and Q factor=66.2186 for Symmetrical IDCFBG technique using Walsh code at 10 mW.

Fig. 6 show the comparison graph for the Pre, Post and Symmetrical IDCFBG compensation technique using RZ modulation. It provides the high value of Q factor = 57.948 for Pre IDCFBG, Q factor=61.0088 for Post IDCFBG and Q factor=61.8333 for Symmetrical IDCFBG technique using Walsh code at 10 mW CW laser power.
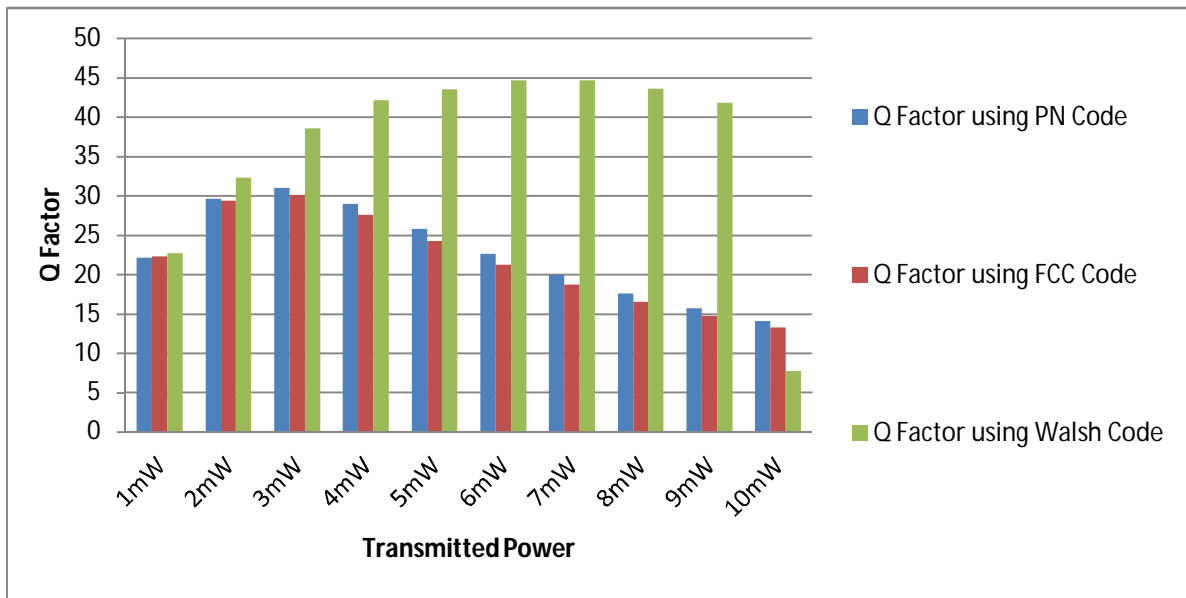


(a) Pre IDCFBG Compensation
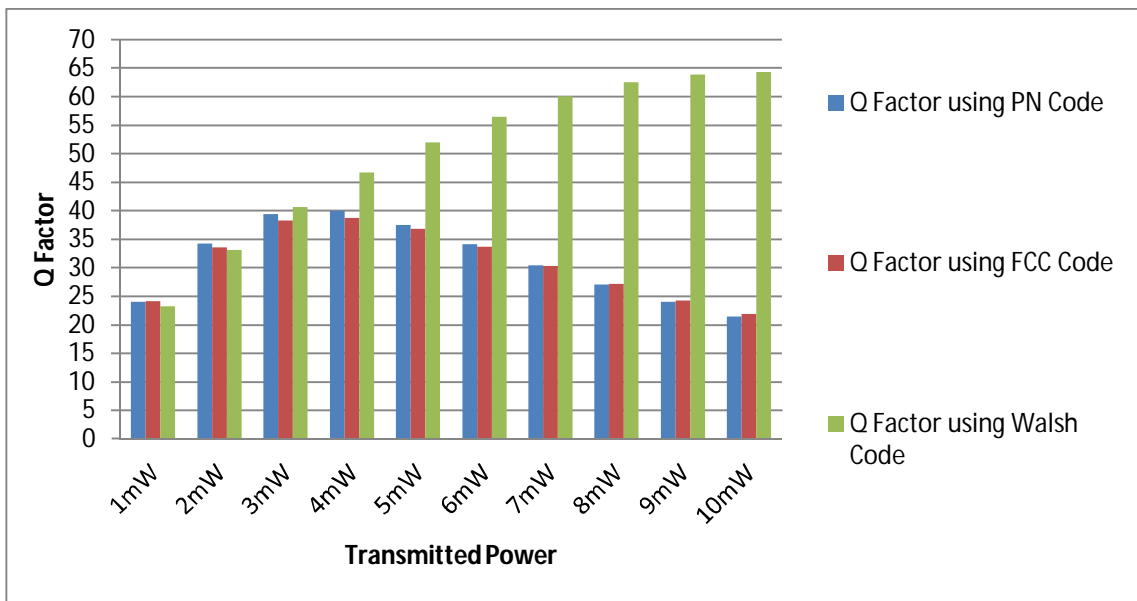
(b) Post IDCFBG Compensation



(c) Symmetrical IDCFBG Compensation

Fig. 5 Q factor versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using NRZ modulation



(a) Pre IDCFBG Compensation

(b)Post IDCFBG Compensation



(c) Symmetrical IDCFBG Compensation

Fig. 6 Q factor versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using RZ modulation

Fig. 7 show the comparative graph for the Pre, Post and Symmetrical IDCFBG compensation technique using CSRZ modulation. It provides the high value of Q factor = 53.5936 for Pre IDCFBG, Q factor=58.9648 for Post IDCFBG and Q factor=58.9554 for Symmetrical IDCFBG technique using Walsh code at 10 mW CW laser power.
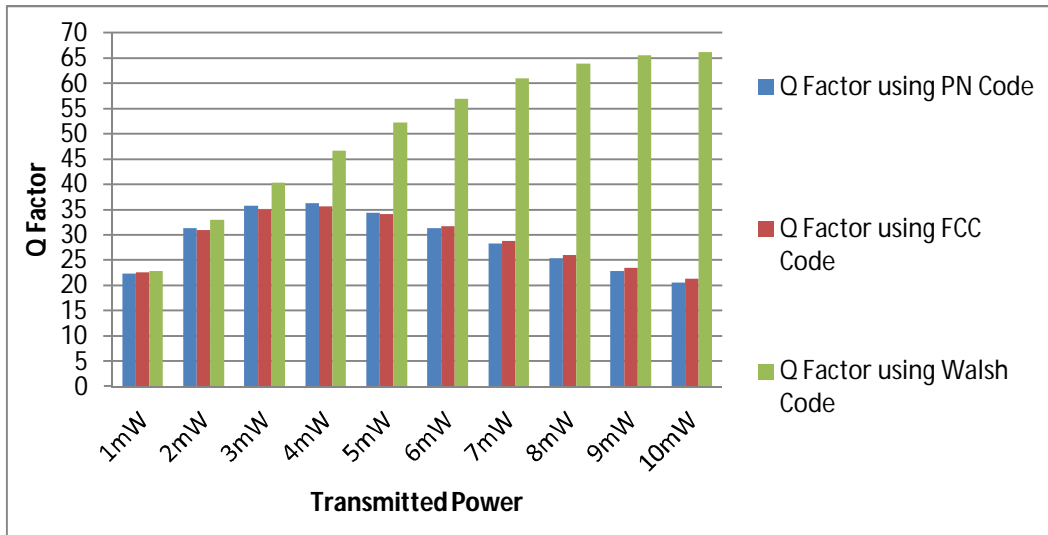
Fig. 8 show the comparison graph for the Pre, Post and Symmetrical IDCFBG compensation technique using CSRZ modulation. It provides the high value of Q factor = 48.1281 for Pre IDCFBG, Q factor=51.7116 for Post IDCFBG and Q factor=52.8802 for Symmetrical IDCFBG technique using Walsh code at 10 mW CW laser power.
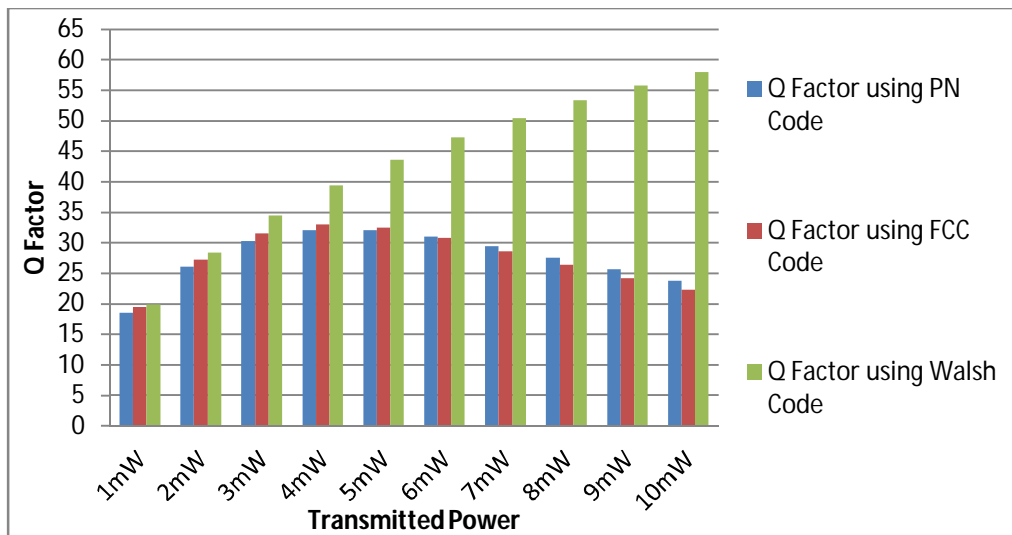


(a) Pre IDCFBG Compensation

(b) Post IDCFBG Compensation
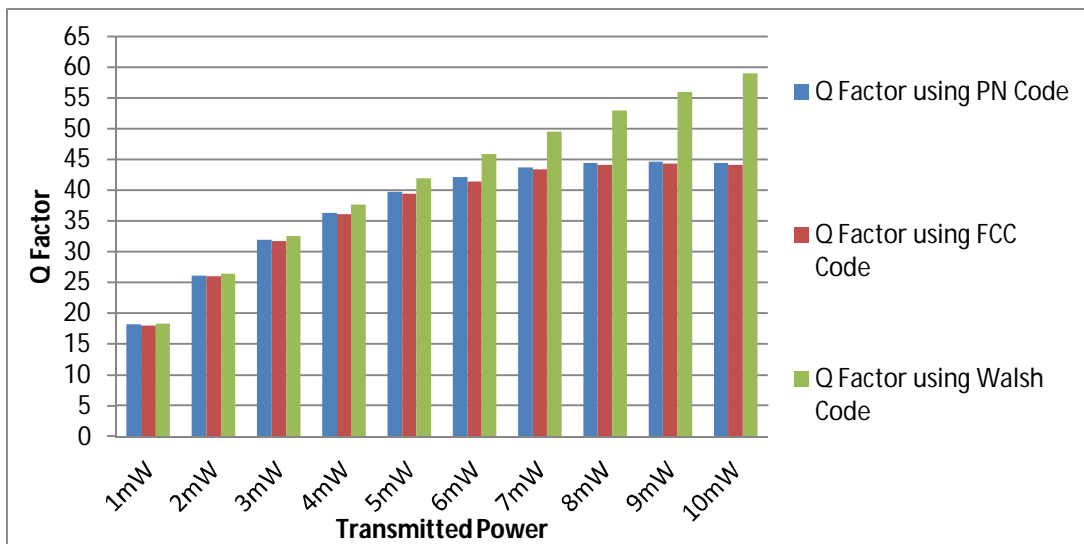


(c) Symmetrical IDCFBG Compensation

Fig. 7 Q factor versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using CSRZ modulation
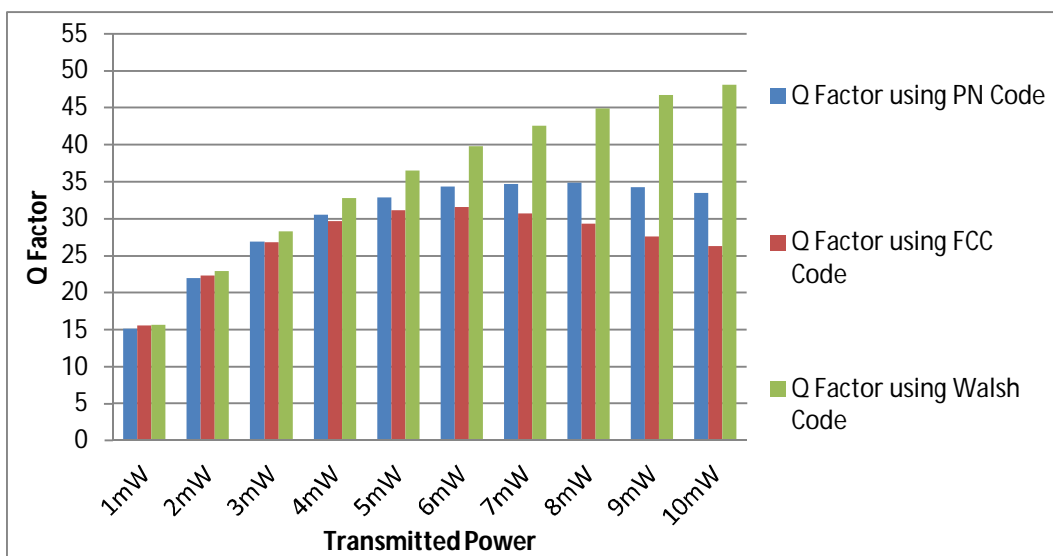


(a) Pre IDCFBG Compensation
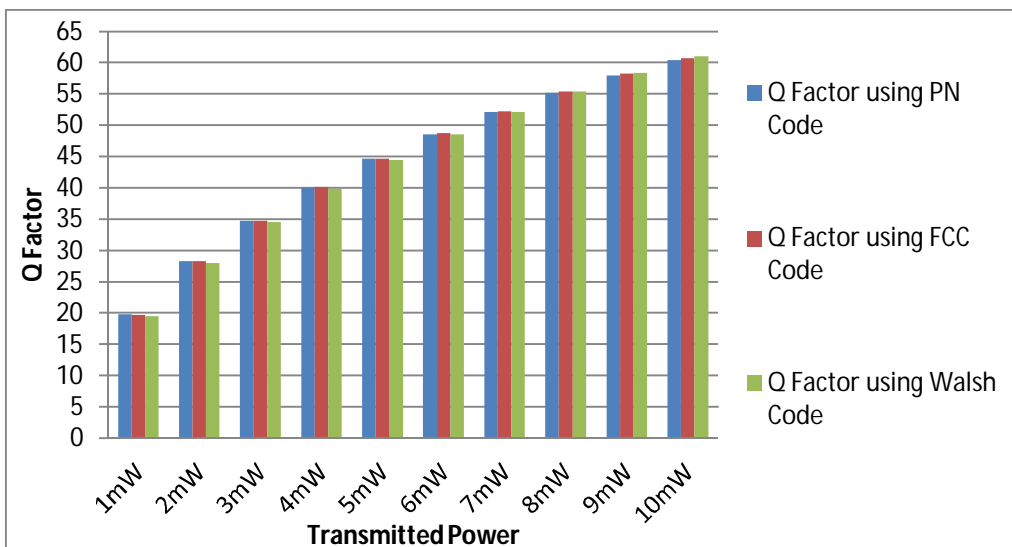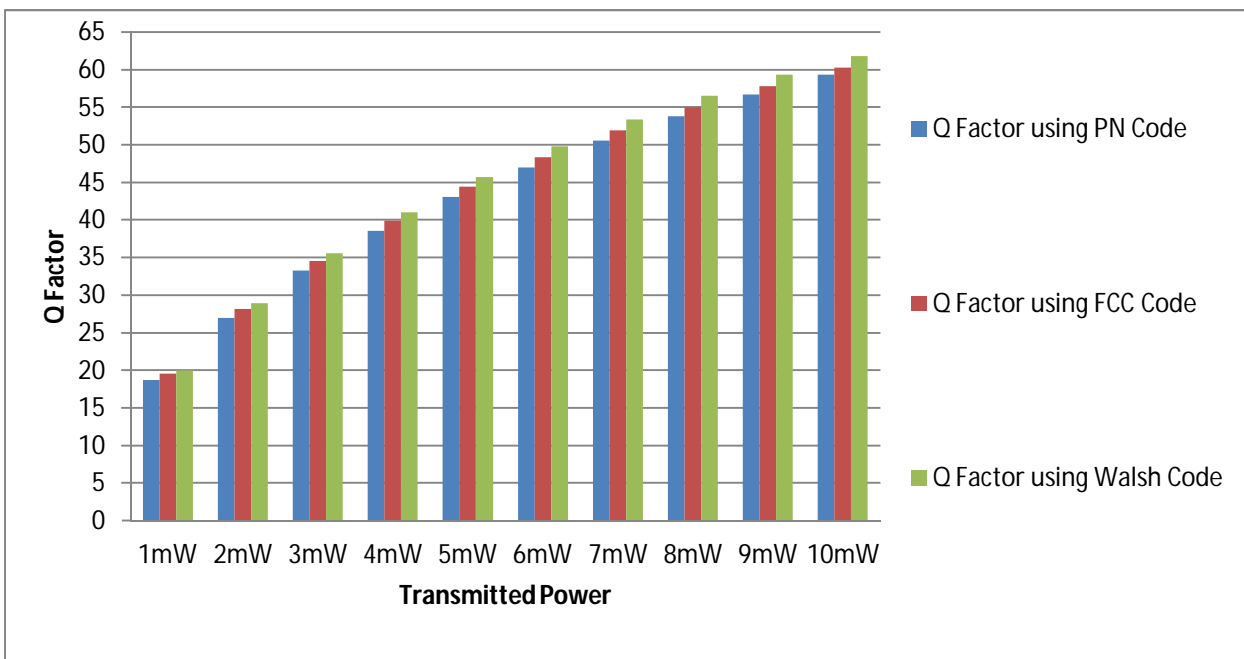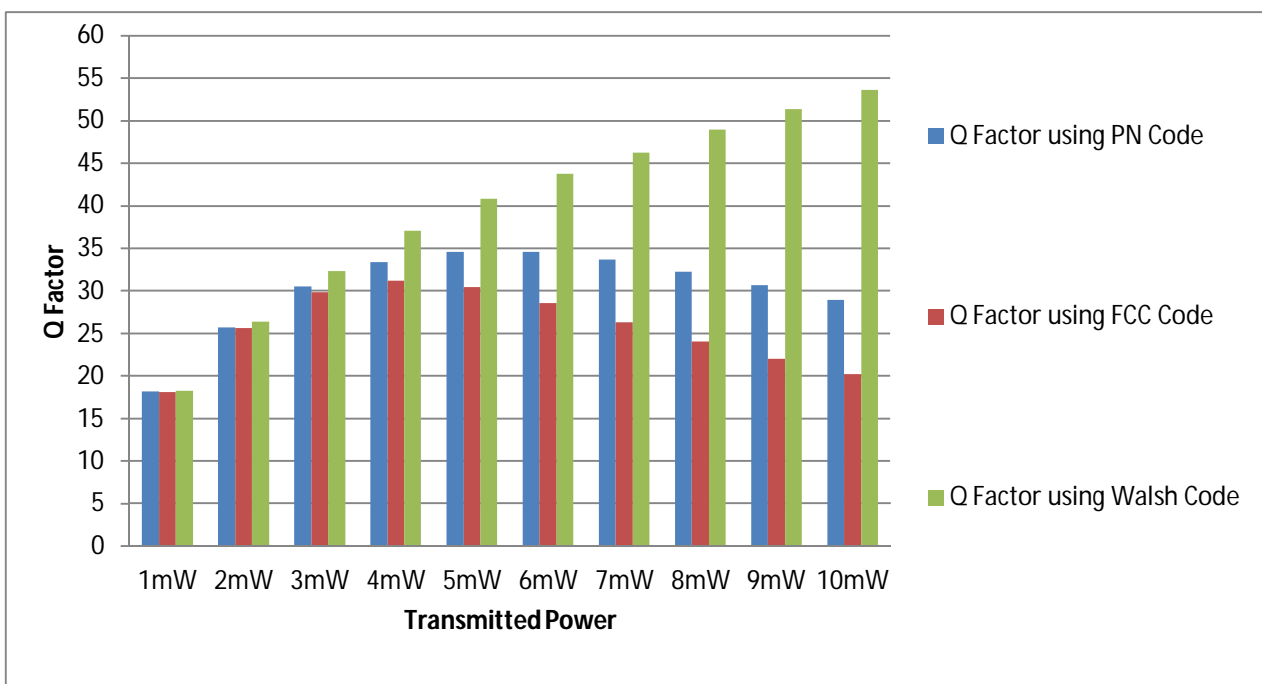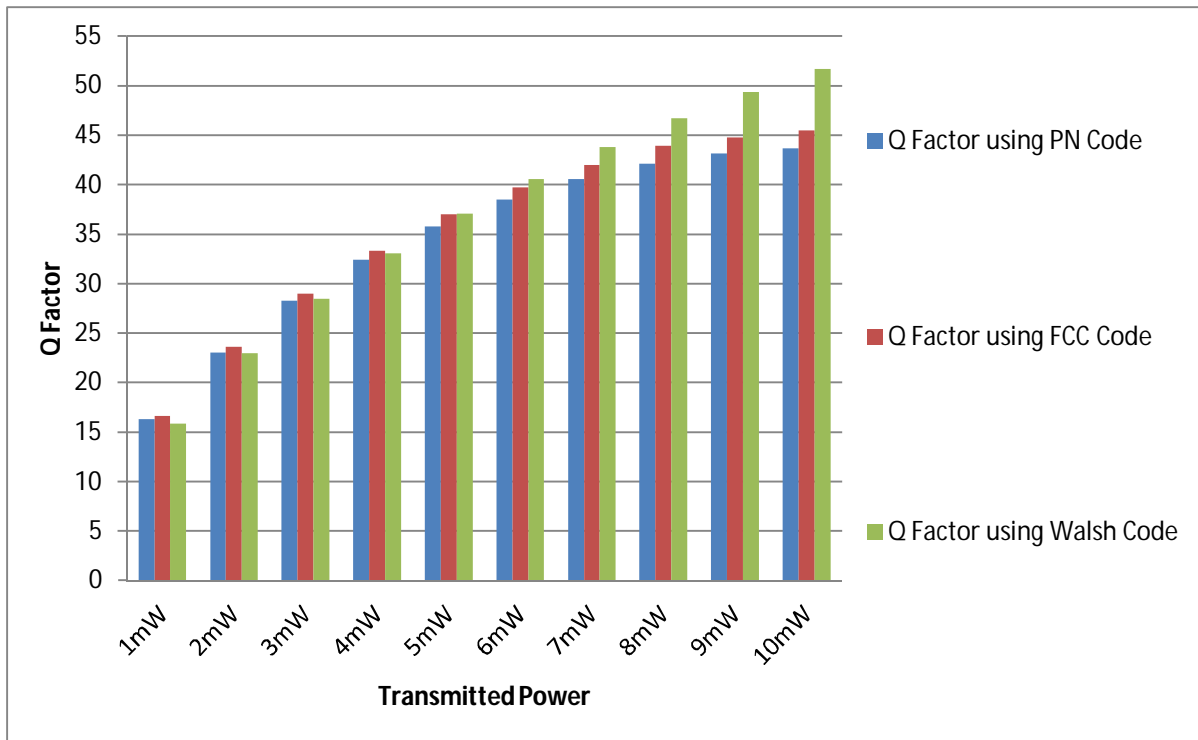
(b) Post IDCFBG Compensation
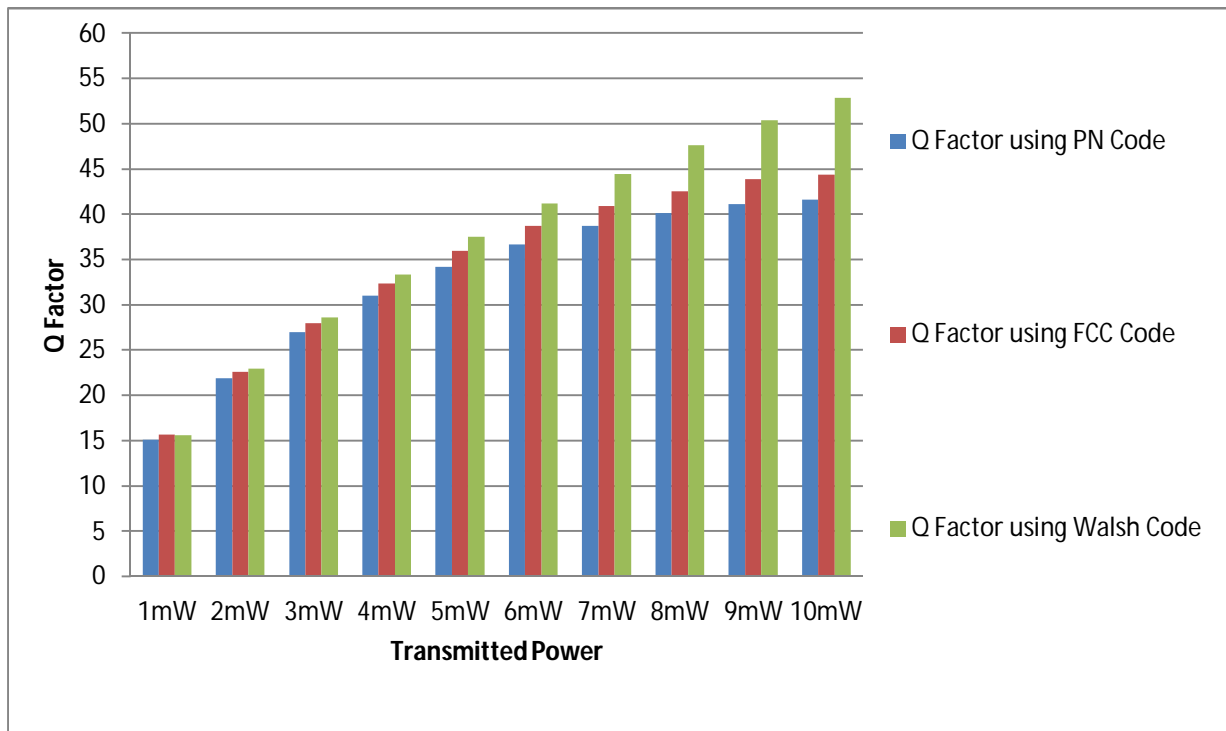


(c) Symmetrical IDCFBG Compensation

Fig. 8 Q factor versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using Duo-Binary modulation

## 3.2 Ber Versus Transmitted Power

Fig. 9,10,11 and 12 shows the comparative graph between Bit Error Rate (BER) and transmitted CW laser power for the Pre, Post and Symmetrical IDCFBG techniques using NRZ, RZ, CSRZ and Duo-Binary Modulation using PN, FCC and Walsh codes. From the graphs it is concluded that we get BER=0 using Walsh code for all the implemented techniques at 10 mW CW laser power.
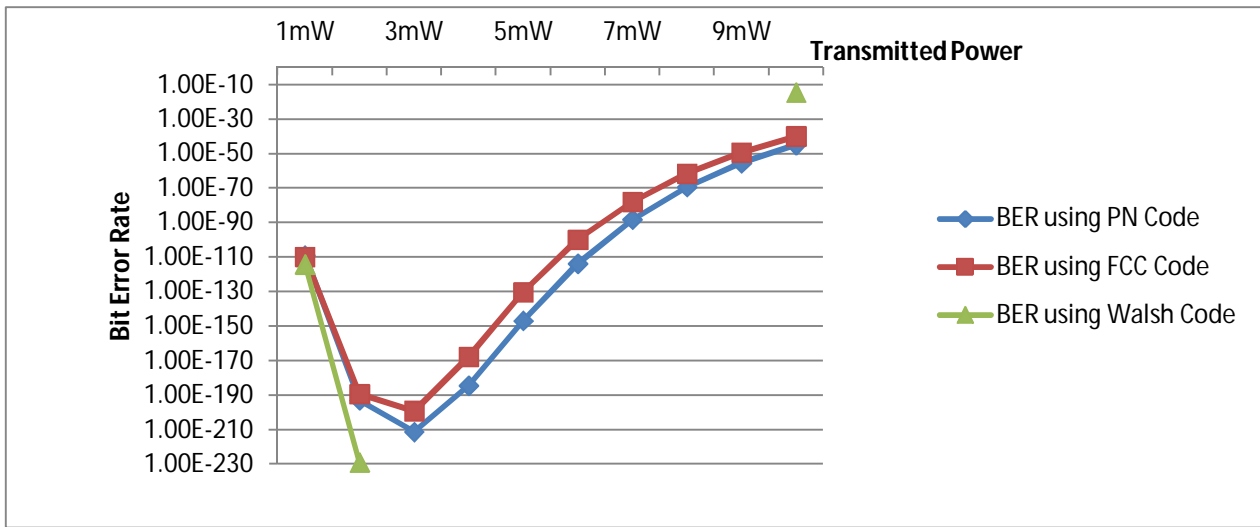
(a) Pre IDCFBG Compensation
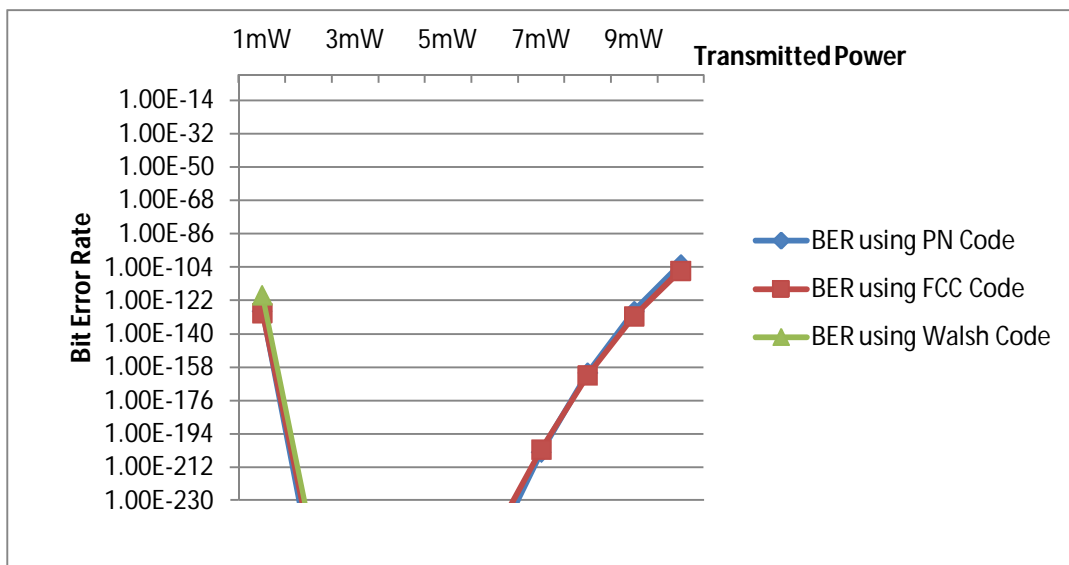


(b) Post IDCFBG Compensation
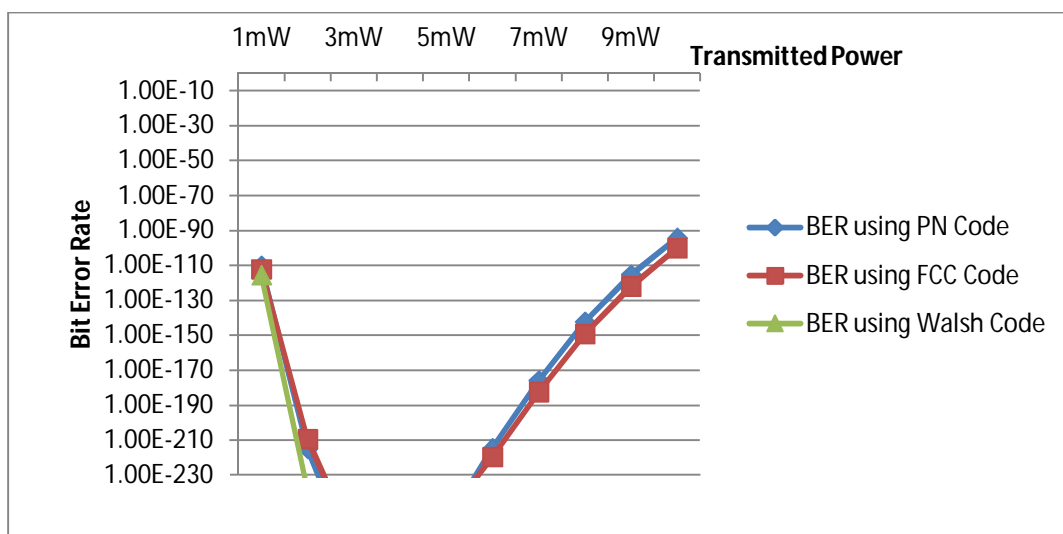


(c) Symmetrical IDCFBG Compensation

Fig. 9 BER versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using NRZ modulation

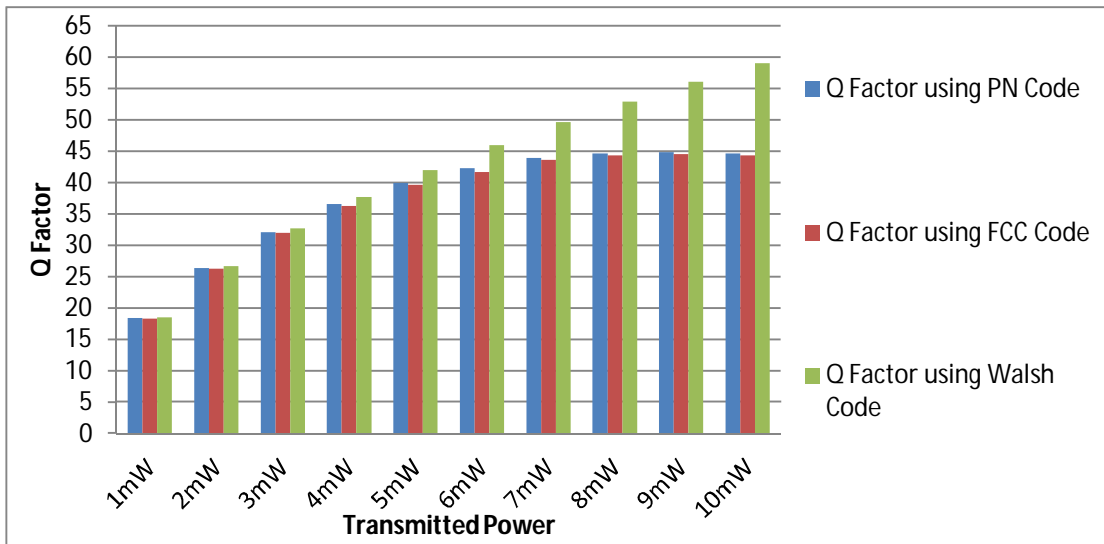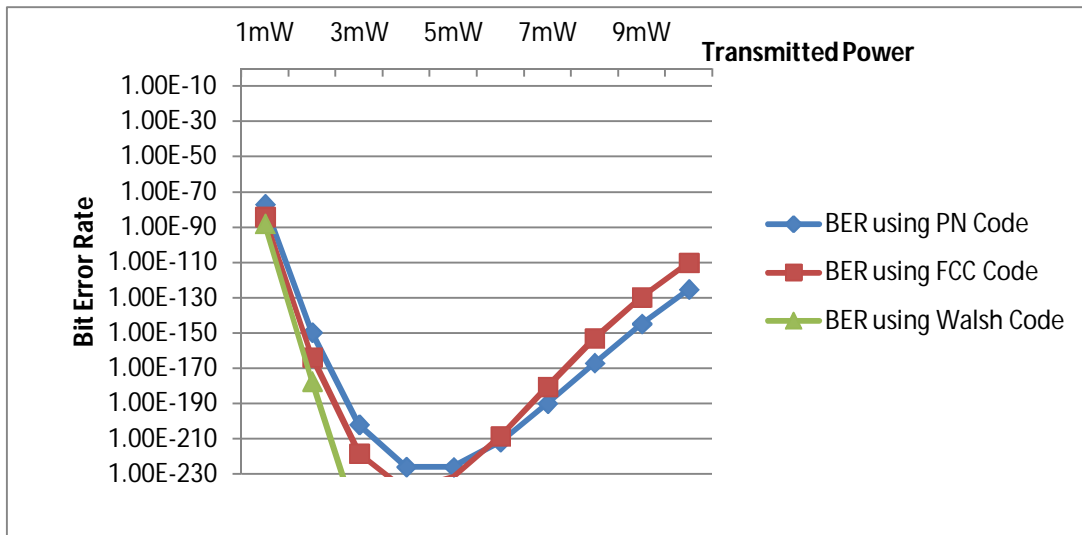(a) Pre IDCFBG Compensation
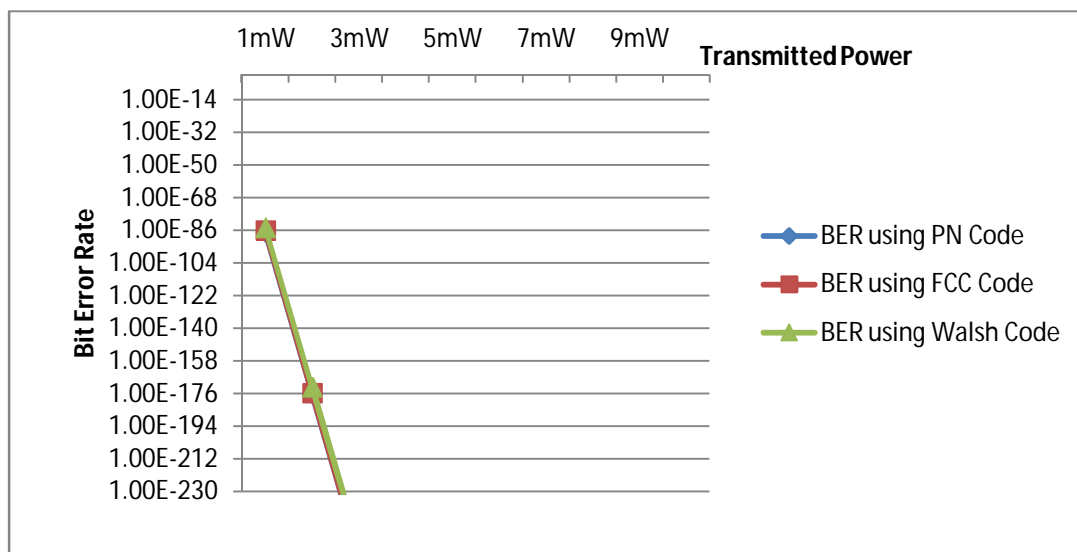


(b) Post IDCFBG Compensation
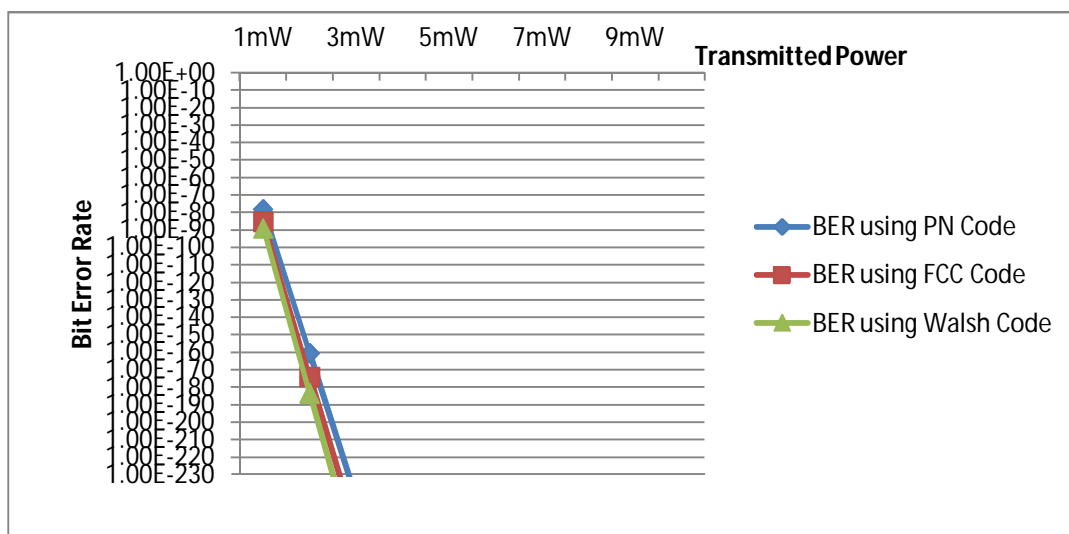


(c) Symmetrical IDCFBG Compensation

Fig. 10 BER versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG
compensation technique using RZ modulation
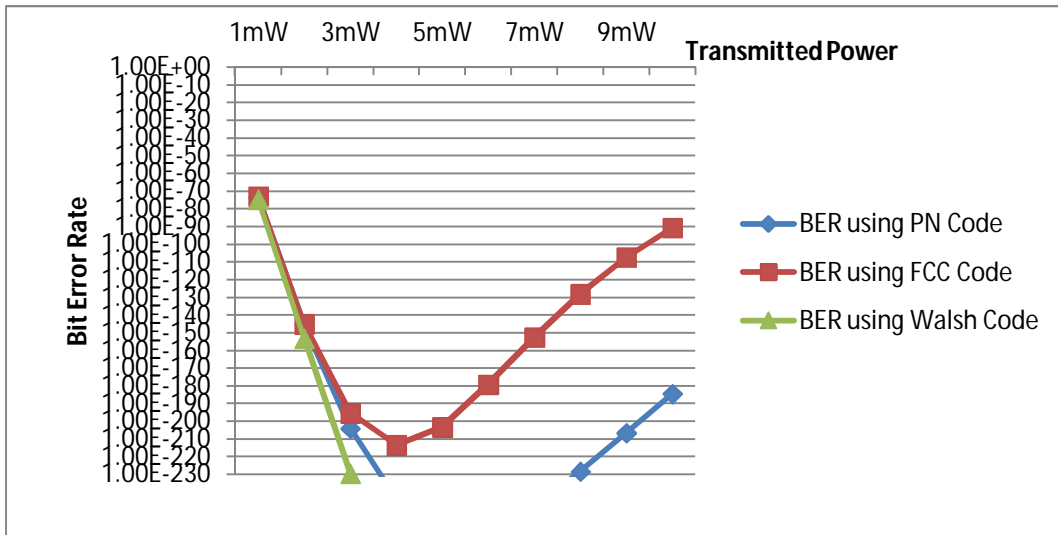
(a) Pre IDCFBG Compensation
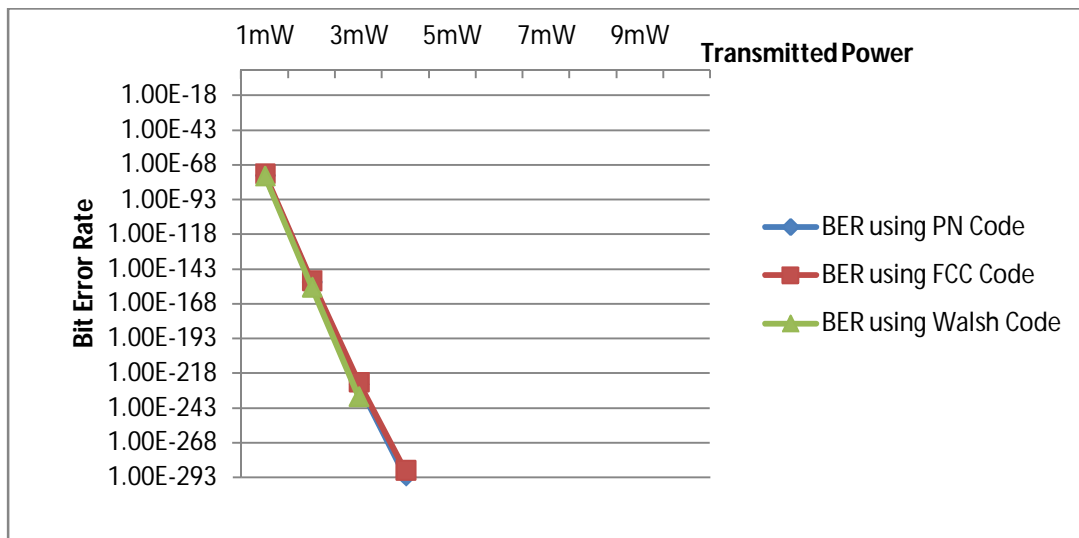


(b) Post IDCFBG Compensation
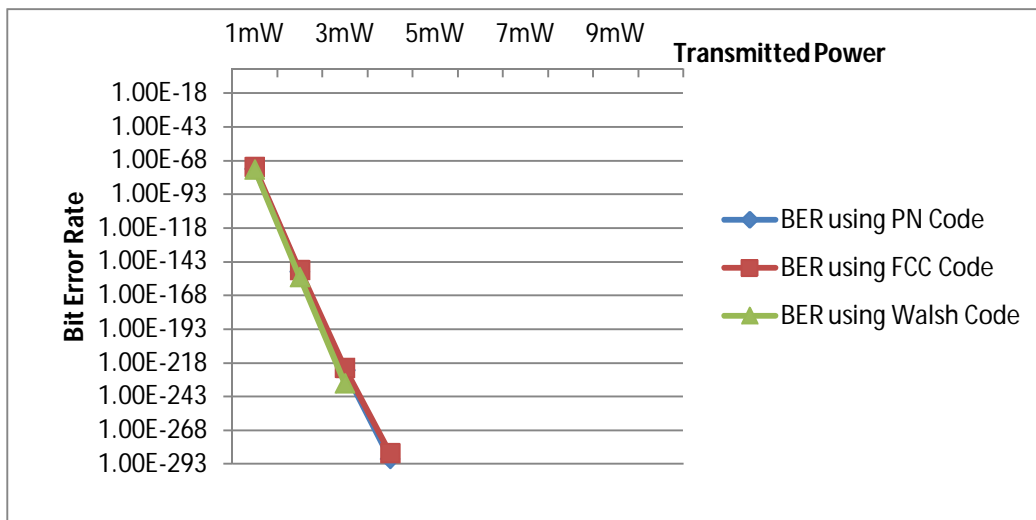


(c) Symmetrical IDCFBG Compensation

Fig. 11 BER versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using CSRZ modulation
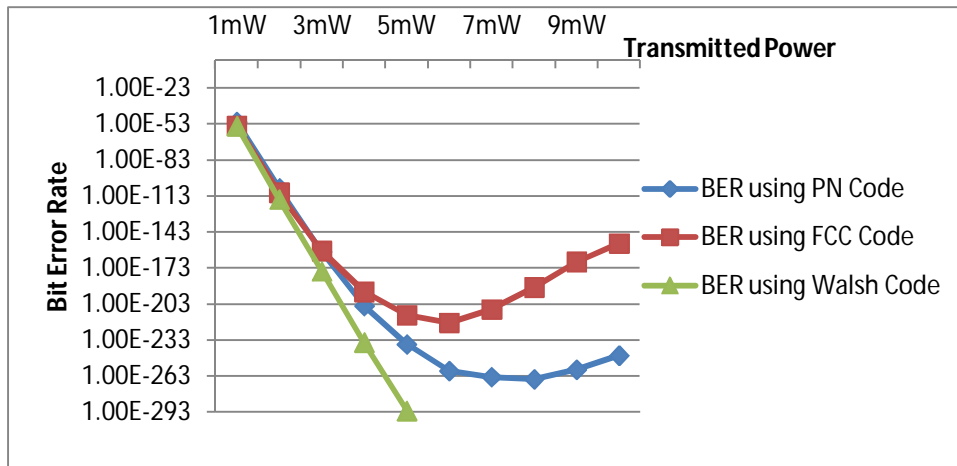
(a) Pre IDCFBG Compensation
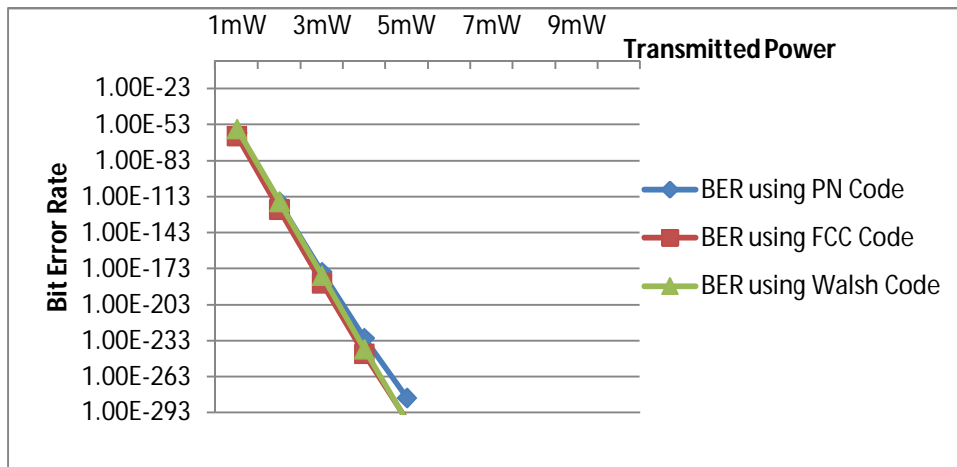


(b) Post IDCFBG Compensation
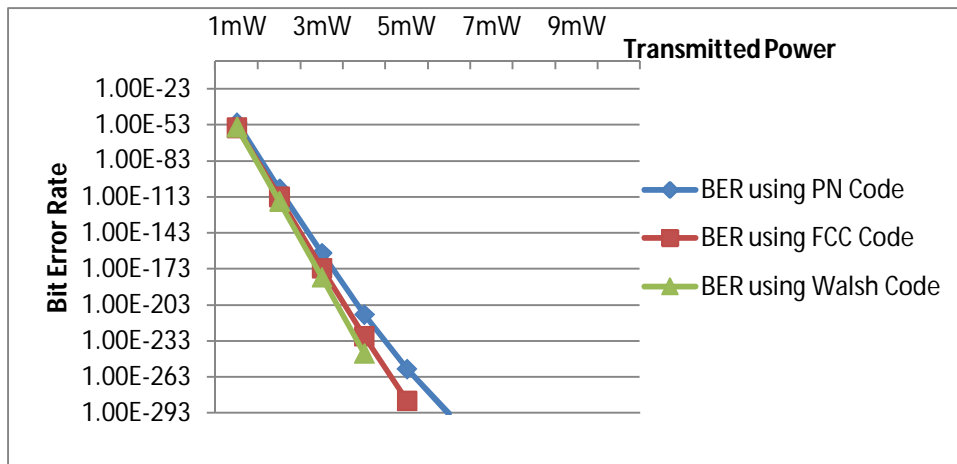


(c) Symmetrical IDCFBG Compensation

Fig. 12 BER versus Transmitted Power for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using Duo-Binary modulation

**3.2 Ber Diagram**

Fig.13,14,15,and 16 shows the Eye diagram or BER diagram for Pre, Post and Symmetrical IDCFBG techniques using NRZ, RZ, CSRZ and Duo- Binary Modulation for only those value of CW laser power and input sequence code in which we are getting the higher value of Q factor and minimum value of BER. Higher Q factor and Minimum value of BER shows that dispersion is compensated efficiently.
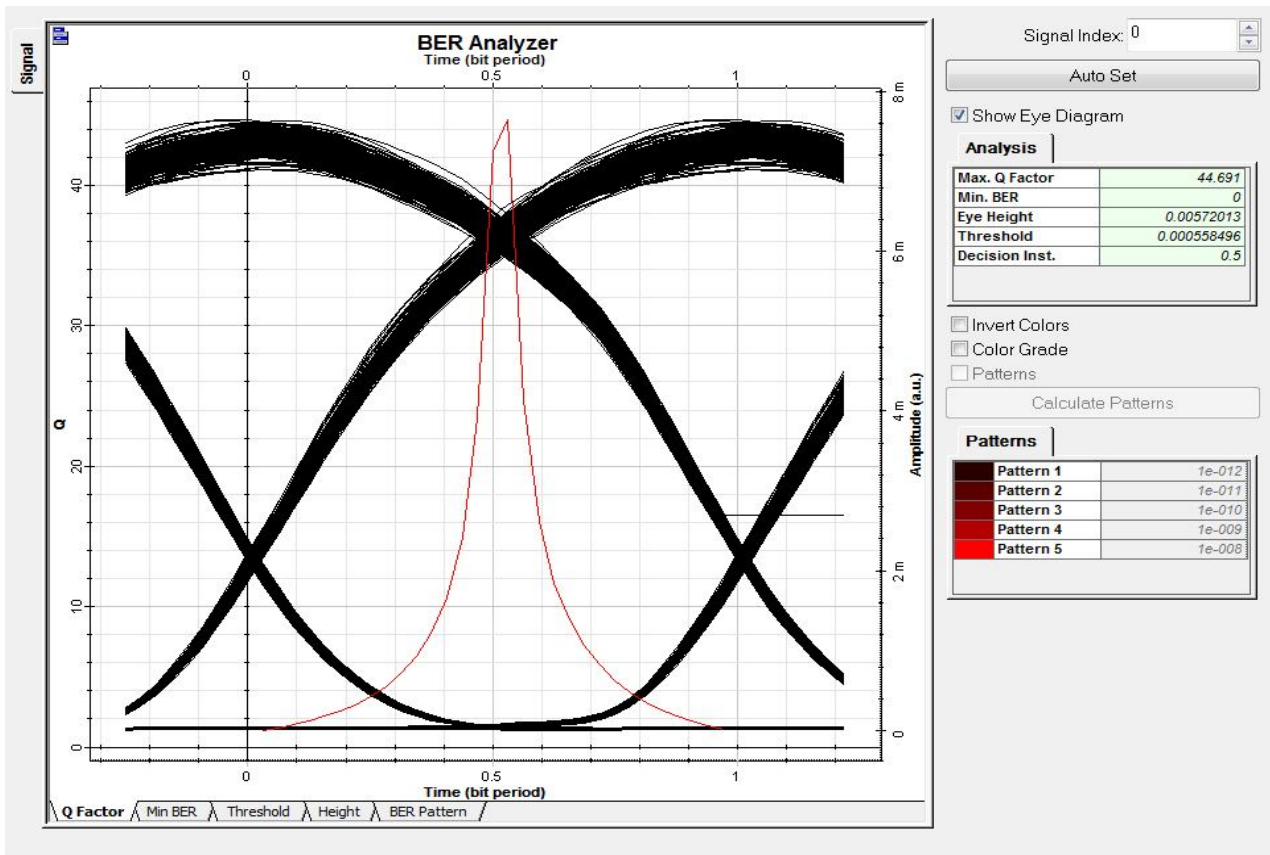
(a)  Qfactor= 44.691 and BER= 0 at 6 mw
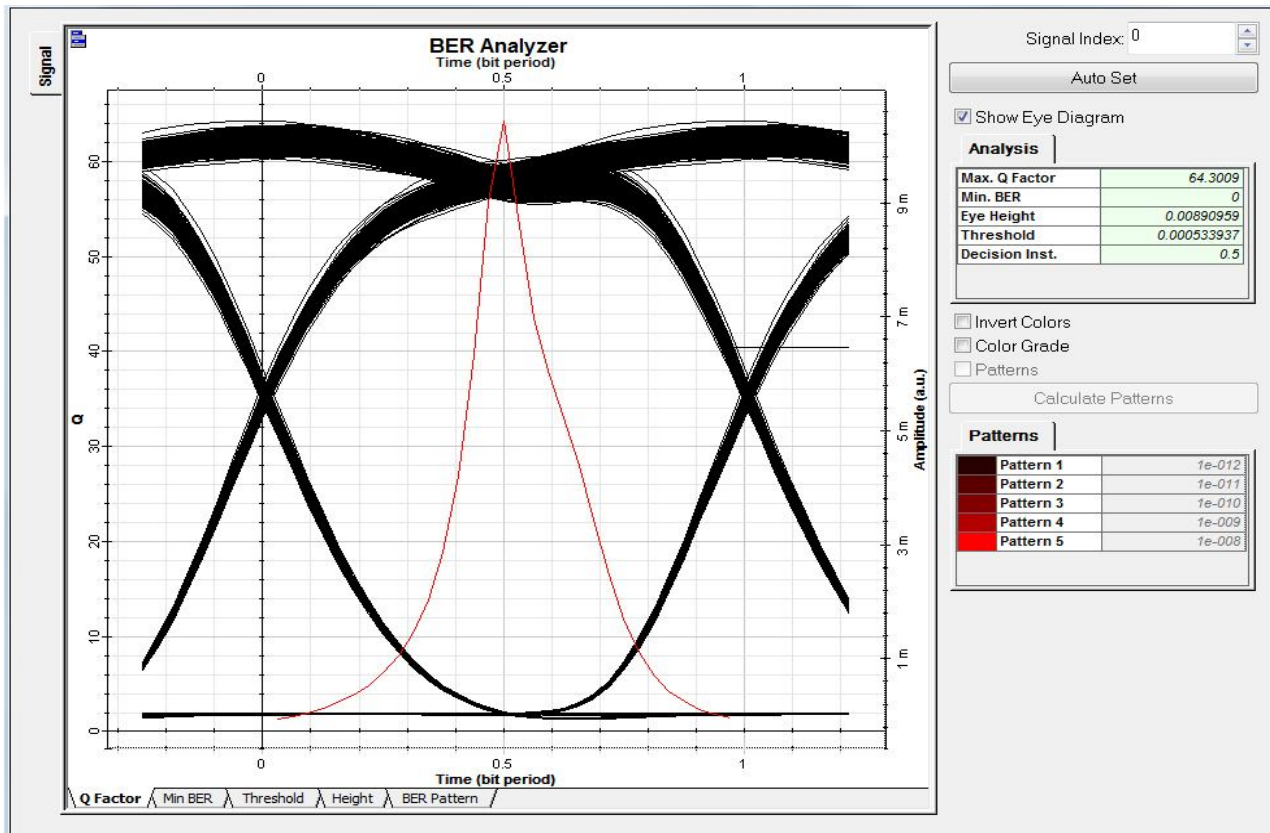


(b)  Qfactor= 64.3009 and BER= 0 at 10 mw
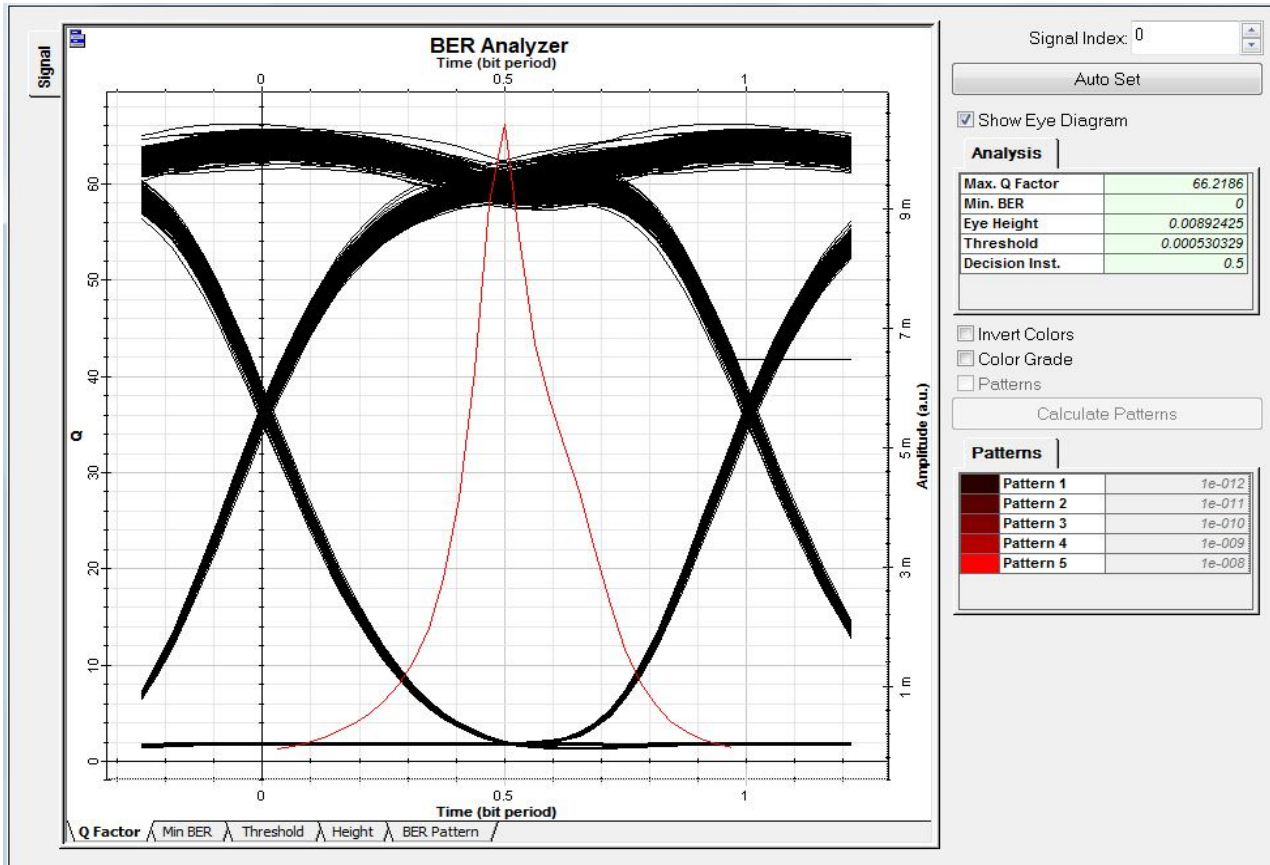
(c)  Qfactor= 66.2186 and BER= 0 at 10 mw

Fig. 13 BER analyzer diagram for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using NRZ modulation for Walsh code
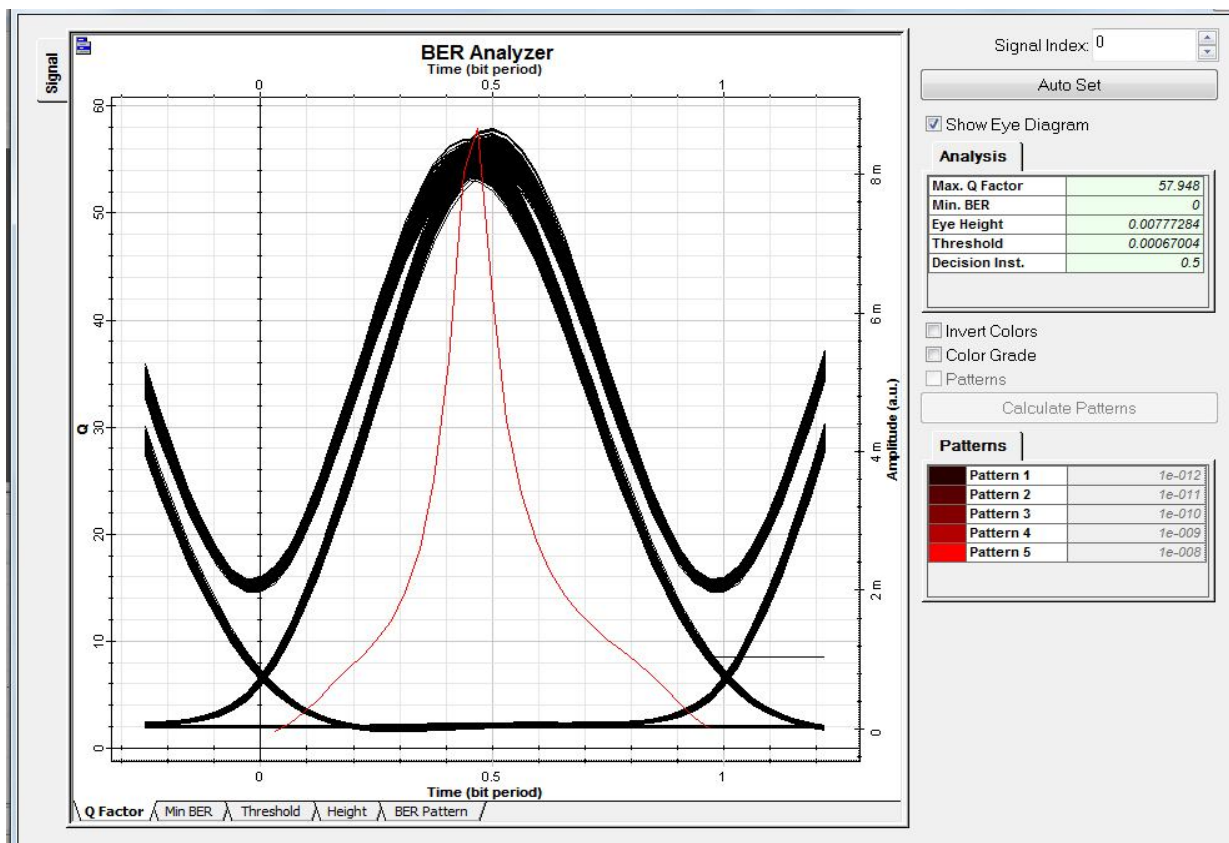


(a) Q factor= 57.948 and BER= 0 at 10 mW
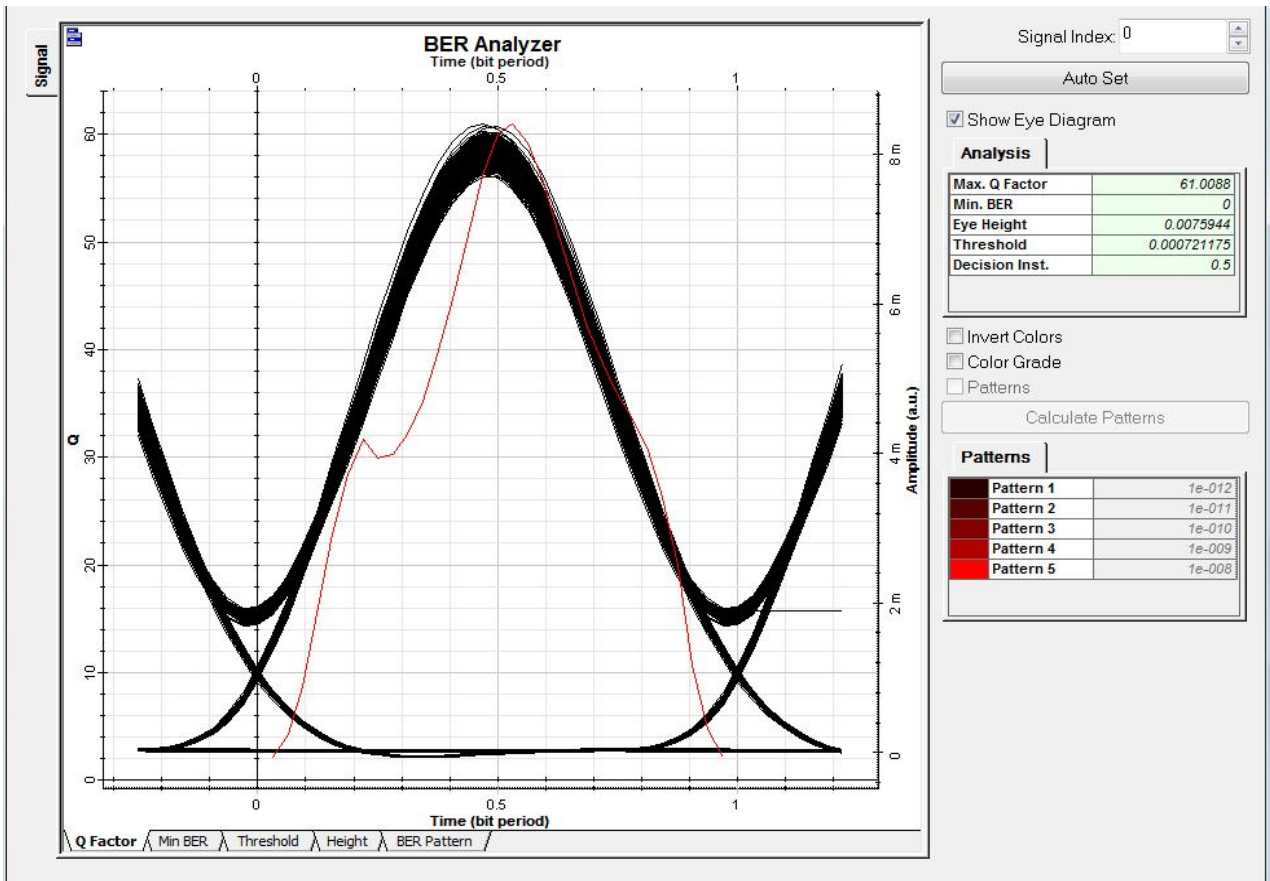
(b) Q factor= 61.0088 and BER= 0 at 10 mW
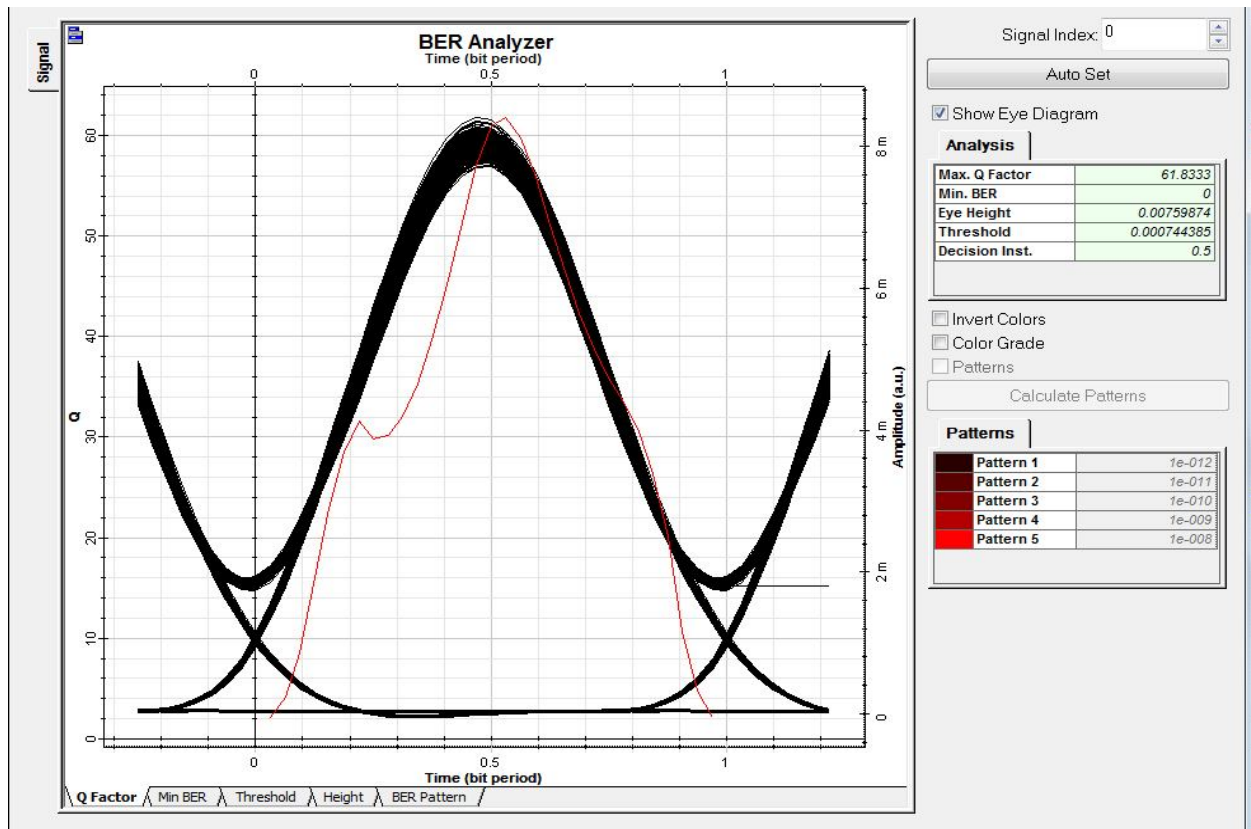


(c) Q factor= 61.8333 and BER= 0 at 10 mW

Fig. 14 BER analyzer diagram for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using RZ modulation for Walsh code
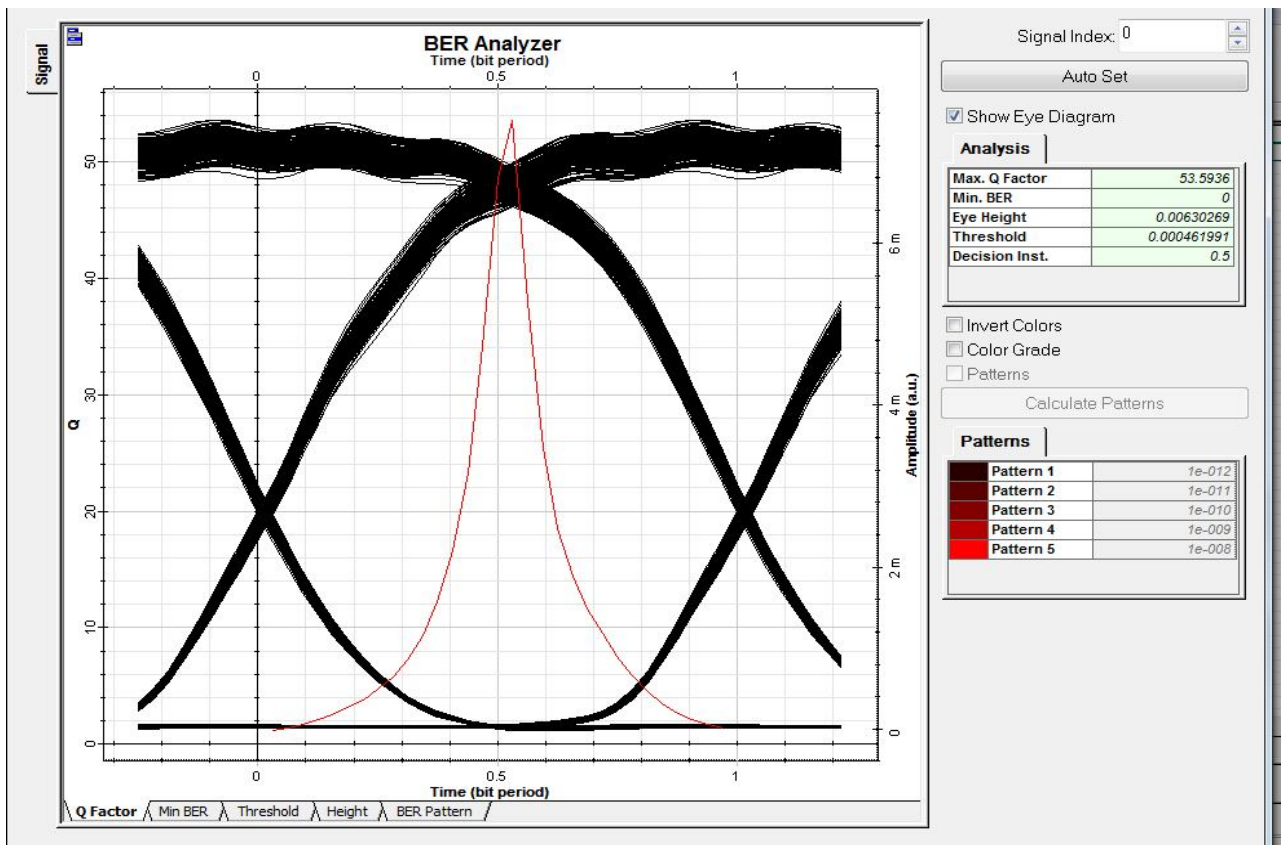
(a) Q factor= 53.5936 and BER= 0 at 10 mW
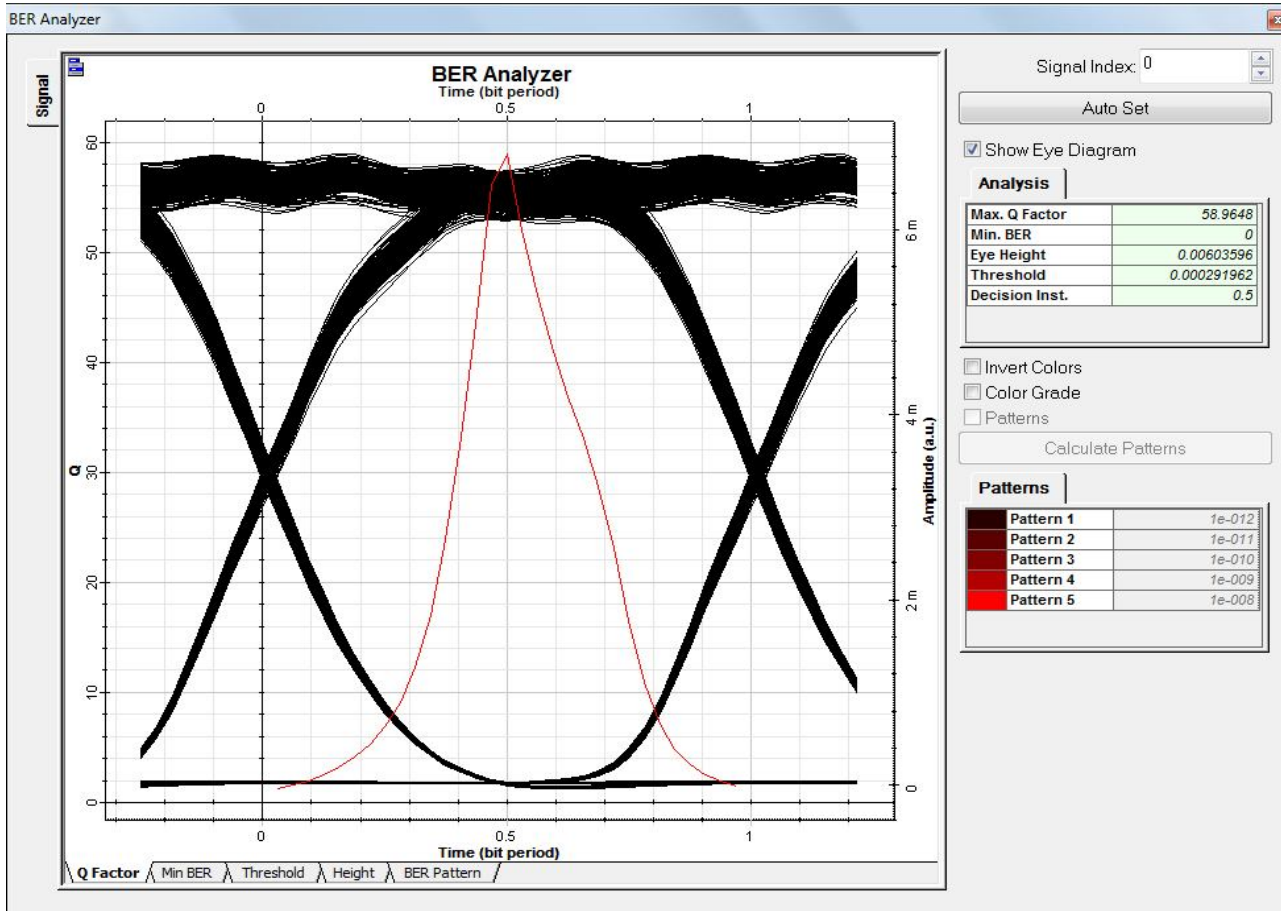


(b) Q factor= 58.9648 and BER= 0 at 10 mW
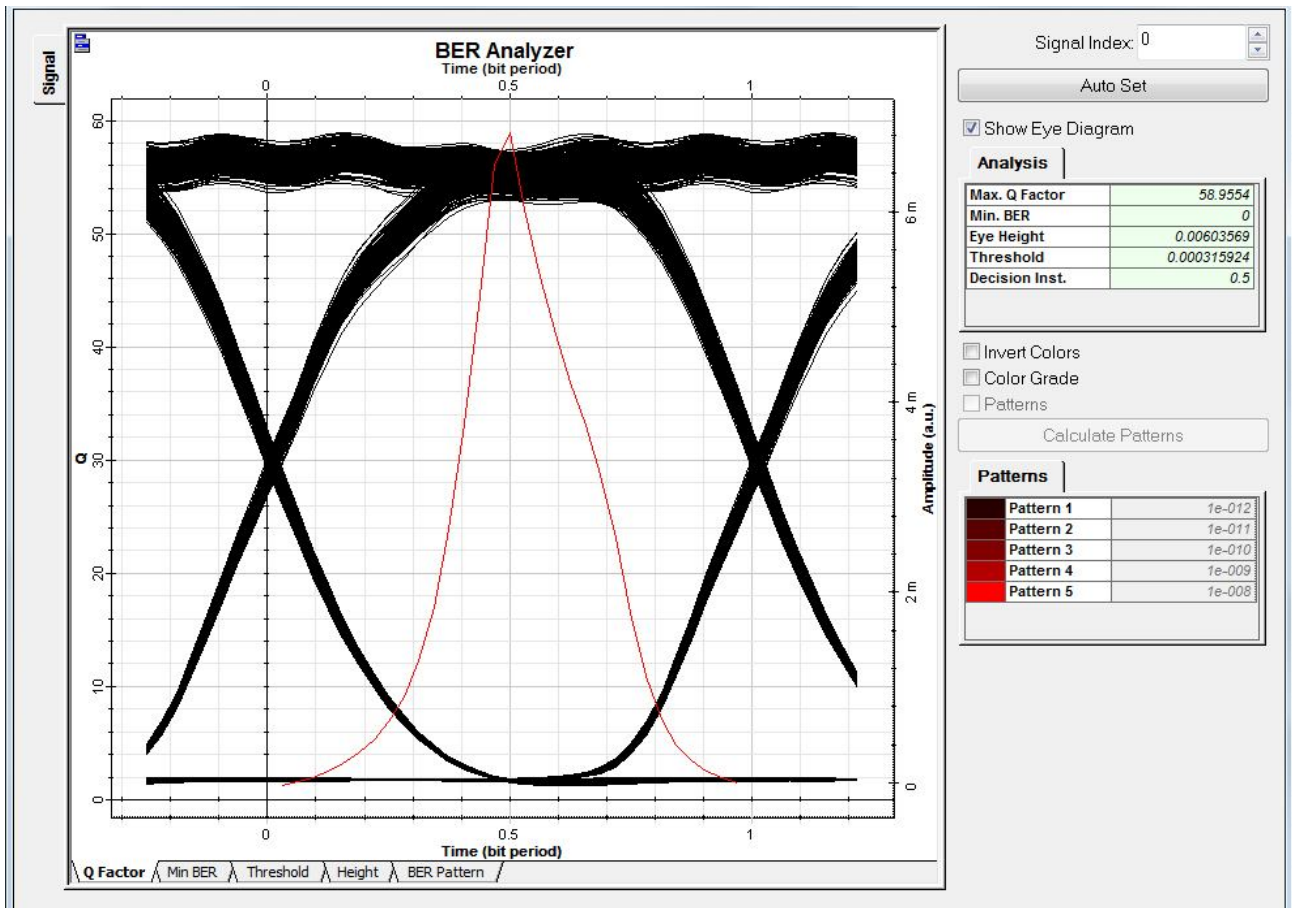
(c) Q factor= 58.9554 and BER= 0 at 10 mW

Fig. 15 BER analyzer diagram for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using CSRZ modulation for Walsh code
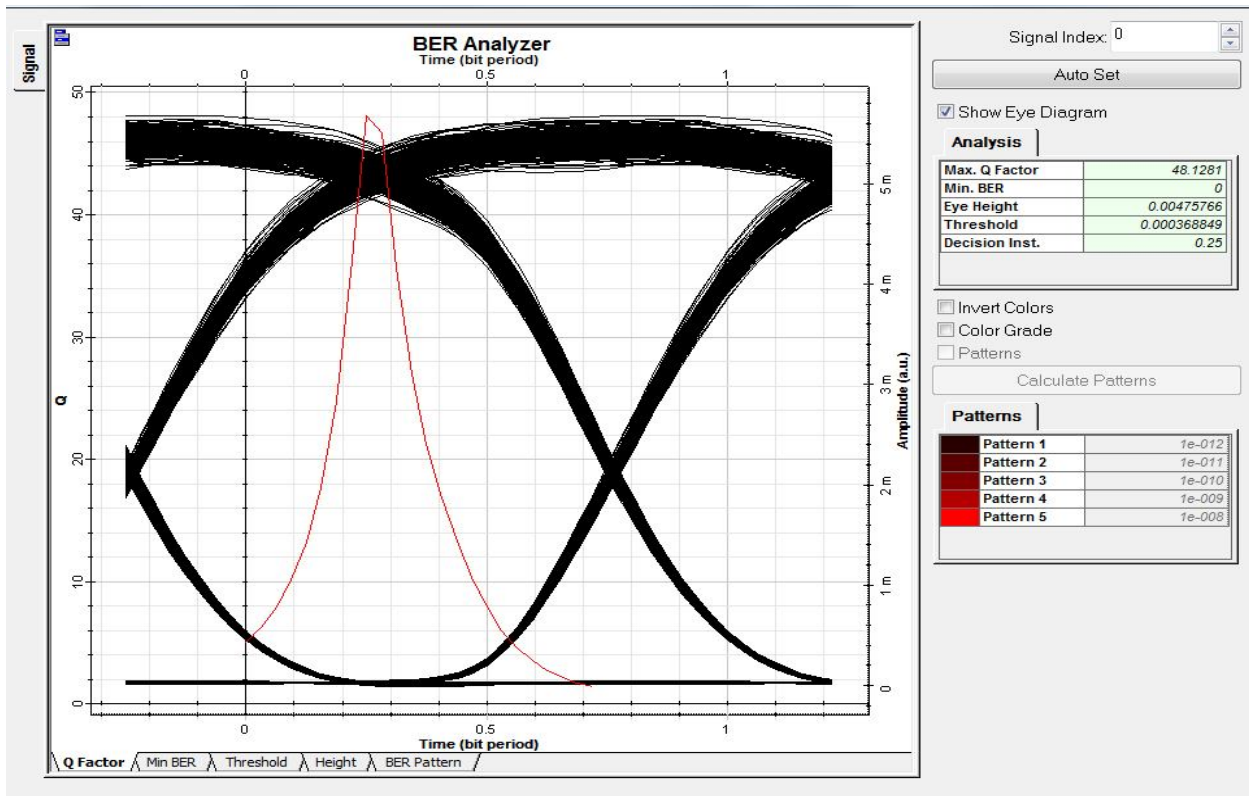


(a) Q factor= 48.1281 and BER= 0 at 10 mW
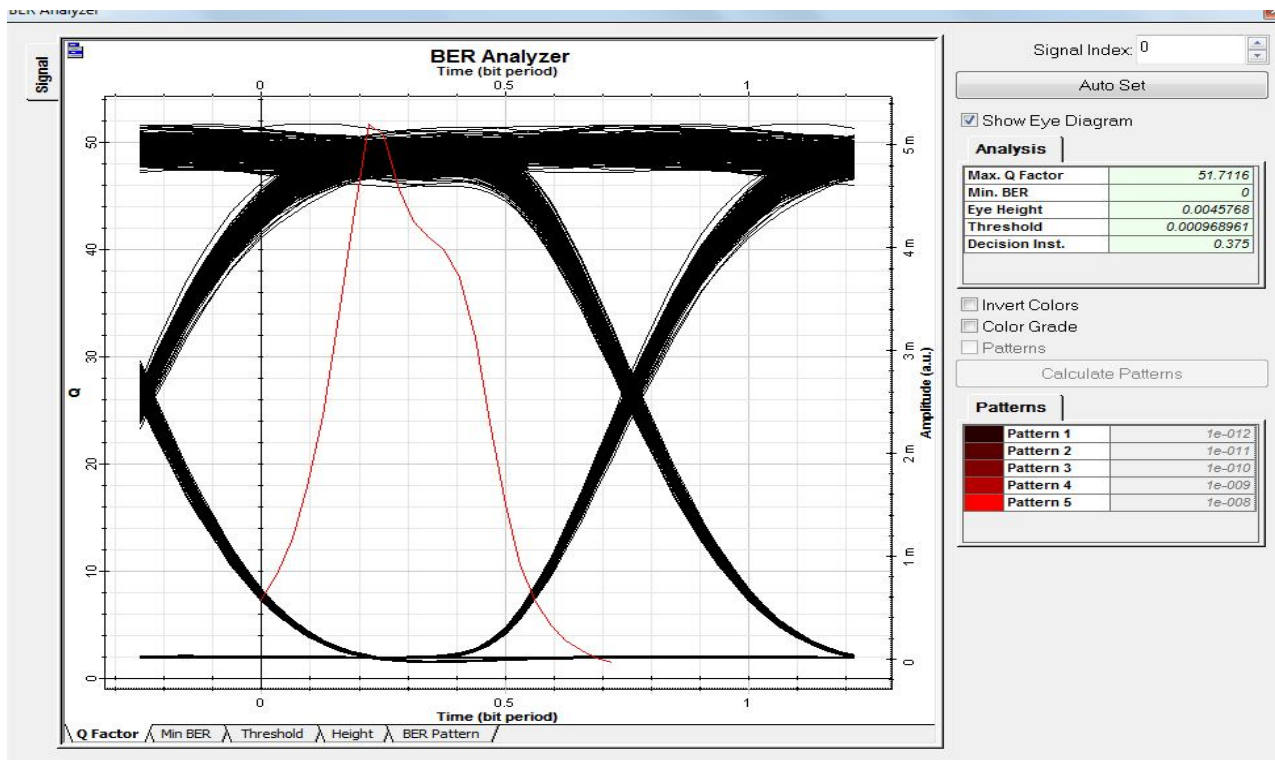
(b) Q factor= 51.7116 and BER= 0 at 10 mW
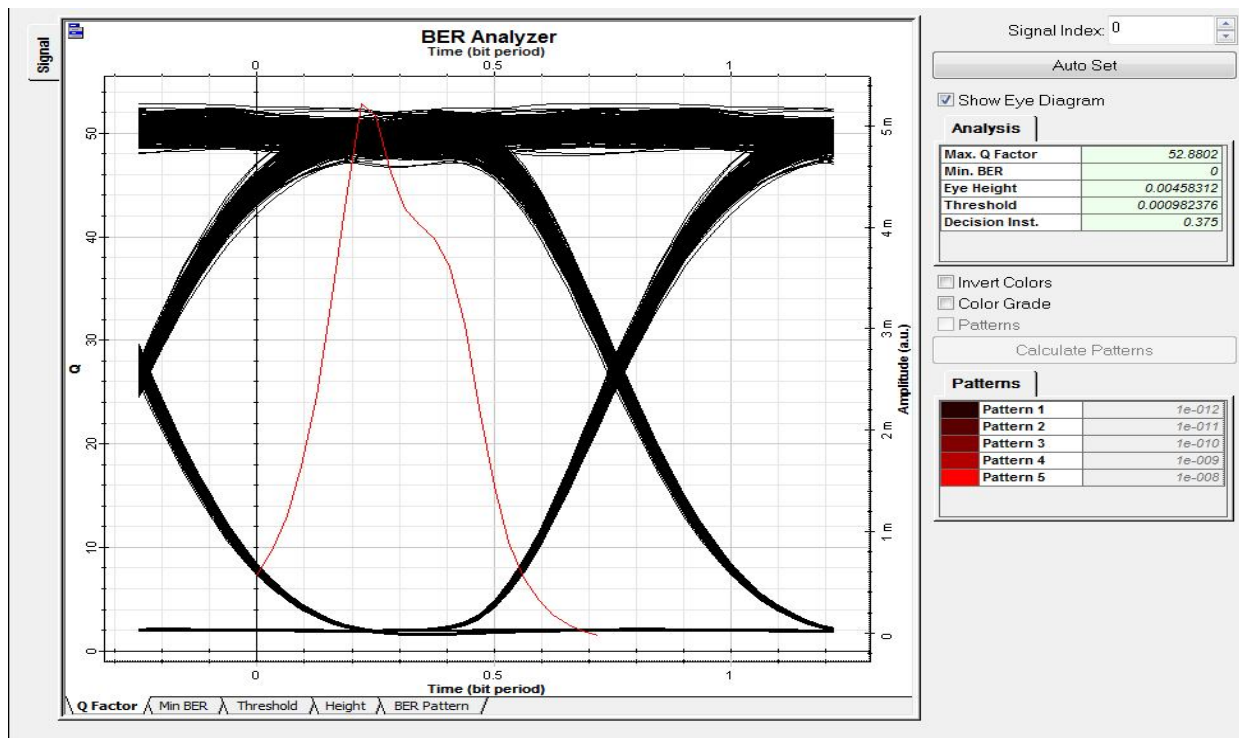


(c) Q factor= 52.8802 and BER= 0 at 10 mW

Fig. 16 BER analyzer diagram for (a) Pre (b) Post and (c) Symmetrical IDCFBG compensation technique using Duo-Binary modulation for Walsh code

### 3.     Conclusion And Future Scope

In this paper, the work is completely focused on implementing dispersion compensation techniques using IDCFBG to compensate the dispersion during transmission of signals over a distance of 200 KM at 10 Gbps. Results from the different configurations are analyzed and compared in terms of Q factor and BER with different modulation formats, input code sequences, and input CW laser power. From

the analysis, it is concluded that when Walsh codes are used as user-defined input data sequence it gives the highest value of Q factor=66.2186 and BER=0 at 10 mW when IDCFBG is used in symmetrical configuration with NRZ modulation at 10 mW. It is concluded that when Walsh codes are used for all the configuration setup it gives the highest value of Q factor and BER as compared to PN and FCC codes. This paper also concludes that when IDCFBG is used in symmetrical configuration using NRZ modulation it compensate the dispersion efficiently. In future work, we will use the hybrid configuration of both DCF and FBG based dispersion compensation techniques can used to find out the efficient dispersion compensation techniques.

## References

1. Agrawal G.P. (1997), "Optical Fiber Communications Systems" Wiley, New York, 1997.

2. Brennan III JF (2005), "Broadband fiber Bragg gratings for dispersion management". Springer, Heidelberg, pp 397–433, 2005.

3. Eggleton BJ, Stephens T, Krug PA, Dhosi G, Brodzeli Z, Ouellette F (1996), "Dispersion compensation using a fiber grating in transmission". Electron Lett 32(17):1610–1611, 1996.

4. Gaurav Sharma et al (2021)., "Comparative Analysis of DCF based Dispersion Compensation Techniques in Optical Fiber Communication Link using Different Input Transmitter Conditions at 10 Gbps", in press,2021.

5. Hill K. O. and G. Meltz (1997), "Fiber Bragg Grating technology fundamentals and overview" Journal of Lightwave Technoogy., vol. 15, pp. 1263-1276, 1997.

6. Hu, B.-N., Jing, W., Wei, W., Zhao, R.-M.(2010), "Analysis on dispersion compensation with DCF based on optisystem". In: IEEE 2nd International Conference on Industrial and Information Systems, pp. 40–43,2010.

7. J. Seeds, K.J. Willims (2006), "Microwave photonics". J. Lightwave Technol. 24(12), 4628–4641,2006.

8. Landolsi, T., El-Tarhuni, M. (2008): "Optimization of DCF location for WDM systems using RZ, chirped RZ and carrier-suppressed RZ Modulations". In: IEEE 4th International Conference on Innovations in Information Technology, pp, 646–649,2008.

9. M.A. Othman, M.M. Ismail, H.A. Sulaiman, M.H. Misran, M.A. Meor Said, Y.A. Rahim, A.N. Che Pee, M.R. Motsidi (2012), "An Analysis of 10 Gbits/s optical transmission system using fiber bragg grating (FBG)", IOSR. J. Eng. 2(7), 55–61,2012.

10. M. Vengsarkar, W.A. Reed (1993), "Dispersion compensating single mode fibers: efficient designs for first and second-order compensation". Opt. Lett. 18, 924–926 ,1993.

11. Mohammadi S.O., S. Mozaffari, M.M. Shahidi (2011), "Simulation of a transmission system to compensate dispersion in an optical fiber by chirp gratings". Int. J. Phys. Sci. 6(32), 7354–7360,2011.

12. Nielsen L.G., S.N. Knudsen (2000), "Dispersion compensating fibers". Opt. Fiber Technol. 6, 164–180,2000.

13. Pastor D, Capmany J, Ortega D, Tatay V, Marti J (1996). "Design of apodized linearly chirped fiber gratings for dispersion compensation". Journal of Lightwave Technology.;14(11):2581-2588,1996.

14. Pei, L., Ning, T., Yan, F., Dong, X., Tan, Z., Liu, Y., Jian, S. (2009) "Dispersion compensation of fiber Bragg gratings in 3100 km high speed optical fiber transmission system". Front. Optoelectron. China 2(2), 163–169,2009.

15. Qullette F (1987), "Dispersion cancellation using linearly chirped Bragg grating filters in optical waveguides". Opt. Lett. 12, 847–849.

16. Scheerer C. et al (1999), "Influence of filter group delay ripples on system performance", in ECOC (1999), pp. I-4101

17. Singh M. and Rajveer B (2015), "Analysis of Dispersion Compensation using Fiber Bragg Grating in Optical Fiber Communication System," International Journal of Computer Applications , vol. 126, pp. 1-5, Sep, 2015.

18. Spolitis S, Ivanovs G (2011), "Extending the reach of DWDM-PON access network using chromatic dispersion compensation". IEEE, pp 29–33, 2011.

19. Sumetsky M, Eggleton BJ (2005), "Fiber Bragg gratings for dispersion compensation in optical communication systems". Springer, Heidelberg, pp 256–278, 2005.

20. Swati Thakur, Ashwani Sharma, Shalini Sharma (2018). "Analysis of dispersion compensation using different modulation formats with fiber Bragg grating in different configurations". International Journal of Mechanical Engineering and Technology.;9(4):1070–1079, 2018.

21. T. Xie, M. Asif, et al.(2014), "Reparation of chromatic Dispersion Using Dispersion Compensation Bank and BER analysis at various power level in 40 Gbps Fiber Optics system," IEEE, pp. 1058-1062, 2014.

22. Williams J.A.R., I. Bennion, K. Sugden, N.J. Doran (1994), "Fiber dispersion compensation using a chirped in fiber Bragg grating}. Electron. Lett. 30, 985–987,1994.

# LOW FEE PRIVATE SCHOOLS – IS IT A SOLUTION FOR INDIAN SCHOOLING SYSTEM?

## V. Prabhu[1] and R.K. Jain[2]

[1]N L Dalmia Institute of Management Studies and Research, Mumbai, Maharashtra, India
[2]Symbiosis Institute of Business Management Hyderabad campus, Telangana, A constituents of Symbiosis International University, Pune
director@sibmhyd.edu.in

_____

## ABSTRACT

*This study mainly focused on understanding the concept of Low Fee Private School (LFPS) and corroborate its usefulness in the Indian schooling system. As a part of Education for All (EFA) movement, Low Fee Private School supposed to be better mean for reach. The eminence of education of Private School is the topic of debate. The public school is an integral part of Indian schooling system. The growth of private school is hampering the existence of public school. English as medium of teaching, distance from home, teaching quality and cost-effectiveness are the attributes which are contributing towards worthiness of Low-cost private schools. It was observed that, Low fee schools are using teaching tools effectively and efficiently. The parents view about Low-cost private school is also one of the important aspects. The low fee schooling provided opportunity for poor to send their children in English medium school. The learning experience is also good as per opinion of the parents. Parents are found to be satisfied with the activities conducted by Low Fee schools.*
*One of the major drawbacks of the private schools are lacking in abiding legal compliances. It was expected that, the government must create awareness about legal aspects among the school authorities and periodic review to be carried out for the same.*

_____

*Keyword: Quality of Education, Public and Private School, English Medium, Cost-effectiveness, Teaching Facility.*

## Introduction

With the increase in urbanisation in India, there is growth of low-income groups residential areas. These areas found to be surrounded by network of low-cost private schools. Not only in metro cities like Delhi, Bangalore, Mumbai and Kolkata, but also around all big cities in the proximity of Industrial sectors, where urban slums are developed or near rural areas closed to the industrial sectors, many low-cost private schools are present. In all these areas government/ public schools are available where students get free education, nevertheless the parents are interested in sending their children to the low-cost private schools. This study mainly focused on understanding the concept of Low Fee Private School (LFPS) and corroborate its usefulness in the schooling system.

## Objectives

- Understanding the concept Low fee Private Schools (LFPS) or Low-cost Private School (LCPS).
- To know the parent opinion about Low fee Private Schools (LFPS).
- To identify the similarities and dissimilarities between the Public and Private School.

## Low Fee School – The Concept

The growth of Low Fee Schools has increased many folds in last two decade. With the quality education, affordable and accessible schooling, the Low Fee Private Schools (LFPs) or Low-cost Private Schools (LCPS) have become solution for poor or rural peoples. The LCPs are not governed by state but mainly owned by community members or commercial business houses. These types of school also run as a philanthropic activity. In general, the concept LCPs and LFPs used interchangeably. The Low-Cost Private Schools are operating at pre-primary, primary and secondary school level. The lack of accessibility to public school in rural area or newly settled urban area is one of reason for the increase of numbers of Low Fee schools. Currently there are 40,000 LCPS with enrolment of around 7.9 crore students (Central Square Foundation). Low student to teacher ratio, flexible approach, better learning style and teaching pedagogy are the main attraction

for the parents who are expecting for better education for their children. Still the perceived quality of education and affordability are the questionable aspects in the case of LCPS. But decreasing trust on public/government school, English as a teaching medium, parents' economics and attraction for extra activities like computer learning differing the choice of parents for the selection of school.

## Quality of Education

The report by FICCI report published in 2014, mainly focused on private school education. It was pointed out that though private school (K-12) facing operational challenges and financial issues the contribution is significant. The quality of education is better than public / government driven school.  The points which were considered for the preparation of report were - Education System in India (Ownership, Board of Affiliation and level of Education), Challenges (Quality and Access), Challenges (Regulatory, RTE Impact and Financial). It was observed that only 25% school are private and these schools account for 40% enrolment of the students. The dropout rate is higher as ward goes in higher standard especially in the case of female students and no. of schools also less for higher standards. Public Schools found to be lack of quality resources and facilities as well as poor infrastructure contributing towards low quality education. The excellence in deliverables is not as predictable due to lack of training, higher student-teacher ratio and more vacancies at higher level. Private school enrolment amount to 55% in top 20 states in India. Quality education is better in private school as there is high passing percentage and good education practices. The authors pointed out that there is requirement of 130000 more private school by 2022.  It was pointed out that stringent/ strict RTE norms, late reimbursement and inapt compensation are the major challenges faced by private schools. The next important factors are - High Capital and operational cost making less feasible to open new private schools in India. The concept of low-cost private school, collaboration of public and private sectors, flexibility in norms are the few majors suggested in the report. The research paper authored by Nupur Garg (2011), "Low-Cost Private Education in India:

Challenges and Way Forward", is a study based on critical understanding of literature, google research, telephonic discussions and in person consultations. Author found, though teachers are less learned than those in government schools, management ensures better education to students and give better learning outcomes, parents also feel they have edge over getting good education. The second important point according to parents is teachers are approachable and they can know about the progress of their ward from teachers, even they can complain to management about teachers if not satisfied.

## Quality, Teaching and English Medium

The report, "The role and impact of private schools in developing countries", prepared by Day Ashley L, et al. (2014). These researchers are from various streams, advisor whose expertise lies in economics, education, international economics and international development in collaboration with Education for All (EFA) Global Monitoring report. The experts/adviser are from Overseas Development Institute, Institute of Education and University of Birmingham. The reports discuses about whether private school are contributing to improvement in education of the children from developing countries. In all 17 assumptions were made to test the 8 hypotheses. 137 relevant studies were chosen for the research work. The conceptual framework was prepared. It consists of three main aspects - 1. Demand - Related to User Choice, Affordability and Accountability of the school. 2. Supply - Related to Quality, Cost-Effectiveness, Financial Sustainability and Equity and Accessibility, 3. Institutional Environment - Related to Market and Financing and Partnership. It was observed that, Teaching is better as compared to state school in the private schools. (Strongly supported), Learning outcomes of private schools are better than state or public schools, Education delivery cost is lower in private school as compared to state schools, the enrolment of boys is more than girl in private school, Private school provides better quality education than state school (all the statements are moderately supported). A very weak evidences found regarding geographical reach,

education for poor and expansiveness of private schools. It was also pointed out about financial sustainability and working condition of Low Fee private school. The research focuses on review of school-aged children in developing countries towards indication of the role and influence of private schools on the education system. The focus was on low fee private schools. Teaching is found better in private schools than in state schools due to teachers' attendance and activities, also private school children achieve more learning outcomes than state schools, the delivery cost of education is lower in private schools than state or public schools, (The reason lies in lower salaries of staff in private schools), English as a medium of instruction, upcoming occupation opportunities and advancement rates to secondary schools are some other features found playing role. The promotion of private schools happens through parents' informal groups. States found lacking in capability, legality and facts about the sector to implement effective policy agendas. The enrolments of percentage of boys and girls in private schools is not seen consistent. There is no sign or indication sighted whether the poor are able to pay fees of private school. A very few students of lower economic section get access to private schools. The subsidies are not seen evident in scope, size and context. It is found with obvious that private schools are bridging the gap where state schools are lacking in providing services. No proper evidence was seen that private school education is really competing with state schools or providing quality education. According to Nupur Garg (2011), Low-cost private schools are using teaching tools very effectively and efficiently, which is lacking in government schools. It is important to see and taken care that, the education provided by the low-cost private schools with poor infra set-up and comparatively less qualified but highly motivated and trained teachers, offering the "right" environment for the development of children and how teaching quality should be elevated. It is expected that both policy makers and low-cost private school providers must take this matter very seriously. Geetha Nambissan (2012), in her research paper," Low-Cost Private Schools for the Poor in India

Some Reflections" has reviewed various papers to understand the growing number of Low Fee Private Schools (LFPS). The author found that after year 2000, a huge growth is low-cost unregistered schools. The teaching learning process is seen unattended in these schools as teachers are appointed at very low cost, generally they are the easily replaceable individuals, just passed out graduates in search of good opportunity or the women who are performing this activity to time pass and not with enthusiasm, though there are some cases of devoted individuals also. The solution to improve teaching learning process at these schools is to impart teachers training, provide para skilling – merely helps in providing education through standardised, homogenised and mechanical way without the true understanding of why to work on these guidelines.

## Quality, Geographical reach and Cost-effectiveness

The study by James Tooley and David Longfield (2014), namely "The Role and Impact of Private Schools in Developing Countries: A Response to DFID's "Rigorous Literature Review", is aimed at pointing out controversies in DFID report titled, "The role and impact of private schools in developing countries". This was based on 8 hypotheses and 17 assumptions based on various aspects of private schools. In the report it was stated that, private schools are good at imparting Quality of Education and Cost- effectiveness. But there was ambiguity about Gender equity, Affordability and Financial Sustainability. The authors duo based on various evidences from developing countries proved that, Private Schools are really doing well as compared to public/government school. According to them these schools are better at geographical reach, better quality education, gender equity and affordable education to poor. It is cost-effective solution for poor and that increase accountability of the school. These schools are financially sustainable also. Even Nupur Garg (2011), pointed out that, how the family from low-income group who may able to fulfil their basic needs some times are keen to pay for primary education offered by private schools rather than free facilities and services offered

by government schools. It is applicable especially in the case of developing countries where growth of low-cost private school is greater in urban slums and rural areas. The article namely, "Low-Cost Private Schools as Part of the Solution for Education for all", by James Tooley (2009), discussed about policy matters for improvement in various aspects of private school. Two main aspects were considered in the case of Private School - 1. The Phenomenon of Low-Cost Fee Private School. 2. Further Development with respect to accepting challenges. Author argued that LCP widely getting accepted as alternatively to government school with respect to reach to poor- and high-quality education. Author also narrated that LCP may be useful with respect to scholarship, reach to poor and girls. The education market is huge, the entrepreneur able to play vital role in improvement of LCP. The commentary-based paper titled, "Low-Cost Private Schools: How Low Cost Really Are These?" by Tanuka Endow (2019), discussed low-cost private schools are not really low-cost schools with help of case study of one of the private schools situated at Sarita Vihar, Delhi. Author pointed out that, the enrolment of the students from Government School is declined form 8.37% in 2003 to 58.6% in 2016. Around 38% students are current share of student enrolment in primary private schools. The rise in private school reflected in rise in low-cost schools also. The author observed that, the students from selected school are mainly from low-income family still the preference is given to private school. The main reason of preference for low-cost private school is education in English medium, comparatively less fee and good teaching quality with respect to government school and siblings are already studying in the same school. The study considered two areas related to school (household from the area)- Delhi and Noida. The author studied the expenditure of parents for schooling in detail. According to him, monthly schooling cost in Delhi area is Rs. 250-500 per month and in the case of Noida - Rs. 400-600 per month plus Rs. 1000-1500/- spending is on Annual charges plus 200 and above for books and uniforms. Considering all the figures together it is 7-10% of the monthly income hence author questioned whether these

schools are really low-cost schools for low-income family? Again, state to state variations in education law hamper private education system. It was expected that, private school should follow RTE Act seriously for quality education.

## Quality, Parent preference and Perception

The article, "The price of studying at private schools" by Geeta Gandhi Kingdon (2017), rightly pointed out the reality about Private Schools. The author noted that not only English medium but also unorganized low-fee private schools also able to give good learning experience in comparison with public or government schools. In this regards, Annual Status Education Report (ASER) pointed out that rural private schools are doing well vis-a-vis government schools continuously from last 10 years. The above fact diverts parents for private schooling. It was observed that RTE Act 2009 is compelling private school to shut down which is not true. Author further referred NSS 2014 data, which reflects that, fee level of private school is lower enough than government school per student expense. About the fee, author notifies the fact that, as private schools situated in urban area, they cannot afford to have higher fees as they are into competitive market. According to her, in the case of 80% of the private schools the fees are lower than government schools. The NSS 2014 data pointed out that the fee at elementary level for private school is Rs. 292 per month in rural area and Rs. 542 per month in urban area. Also state legislation restrict fee hike which varies from state to state. The author concluded with the note that, since government schooling system is not up to the mark, parents are forced to opt private school and it is necessary that the reality of private school must be understood before framing and implementing education policy. Pedro Carneiro, Jishnu Das, Hugo Reis (2016) in their research work, "The Value of Private Schools: Evidence from Pakistan", estimated Demand Model which is inducible of School Fees and characteristics of students. Model suggested that the low-cost private schools are in greater demand. The research paper used data from Learning and Education Achievement in Punjab School (LEAPS) Project. The project covered 112 villages in

Punjab. The attribute considered for estimation of model are - price, distance and measures of peer students' quality. Finding suggested that, the critical factor is distance to school for the student. The price doesn't matter for the parents who are having boy as compared to the parents who are having girl. But price variation is more important for low-income family. The study explores estimation of parent willingness to pay and How willingness changes with the various attributes of the school with respect to house hold characteristics. It may vary by family background.

## Faith-Based Quality Education

"Low-Fee Private Schools: Case Studies from Ghana", by Corinne Brion (2020) discoursed how Christian school charging less fees are playing vital role in providing education. This qualitative study tried to gather information about the type of students attending schools, their parents, why these school preferred by the parents and challenges faced by the school. The convenience sampling and purposive sampling used to collect data with the help of in-depth interview, focus group and observation of 4 Schools, 8 School management leaders, 22 teaching staff members, 42 parent representatives and 20 small business personalities around the schools. The finding showed that, the reason for existence of these school is quality faith-based education serving economically backward families. The fee system is such that, for the first child if full fees were paid, the fees for second child is less. It was observed that there are more girl's enrolment and more lady teachers. Parent choose these school because these schools are with academic excellence, the lesser distance from home, quality food provided by the school and extra-curricular activities conducted by the school. The Finance is most challenging factor to run the school. The reasons include late payment of fees, loan taken for infrastructure and its interest rate, lack of space for facilities like library, labs and teaching resources. The author suggested to provide money to parents or subsidized cost for low fee school.

## Public Vs Private School

The research paper penned by María Balarin, Clara Fontdevila, Paola Marius, María Fernanda Rodríguez (2019) on "Educating on a Budget: The Subsistence Model of Low-fee Private Schooling in Peru", tried to find out lacunas in low fee private schools in Peru. The study is carried out by doing documentary analysis, interviews of principal, school owners, decision-maker in order to understand organizational practices of LFP schools with respect to institutions, social norms in context with their area of operations. The study stated that LFP is doing by serving the education need of the society - for which author name as 'subsistence model' of LFP. This is consolidated with regulatory environment, socio-economic structure and culture of Peru. It was noted that, this model is based on interpersonal trust, lack of possibility of generating economies of scale which reduced the burden of regulatory environment and intervention of bureaucrats. The reasons identified for increase in LFP schools are - Low investment observed during the period 1980 and 1990 which resulted into lack of growth of private schools. It again led to perception that; the quality of public education is not good as compared to private schools. The analysis of collected data pointed out that, the performance in terms of academic achievement and learning outcome is very poor in the case of LFP in Peru, coupled with lack of organizational practices which includes development of curriculum, training of teachers, teaching pedagogy and planning deteriorate the LFP. The students of the LFP are from pre-urban areas and mostly from migrant population, hence lack of socio-culture environment. Subsistence model hampering education quality in terms of academic performance along with lack of knowledge of regulatory framework.

The report by Claire Mcloughlin (2013), titled, Low-Cost Private Schools: Evidence, approaches and emerging issues ", - as the name suggests talked about the analysis of evidences, issues and challenges of Low-cost private schools (LCPS). The rise in number of LCPS directed few things like equity (rural/urban), quality (teaching/learning

achievement of results), choices and affordability for poor and cost-effectiveness and financial sustainability. The report state that, upcoming approaches put emphasis on political influence on LCPS market and whether both type of schools i.e., private and government school will be able to provide better education for bottom of pyramid. It was clear that, the growth of LCP/ LFP is observed on large scale. The growth drivers are related to excess of demand i.e., these schools chose as a better alternative for government schools and differentiated demand which is related to differential aspect about education. The contribution of LCPS in attainment for education for all (EFA) is there but the point for debate is quality education, support for equality, financial sustainability and affordable education to poor and reach of such schools. This report pointed out that the research in the arena discussed about - Absenteeism of teacher, teaching activity and efforts, PTRs i.e., student-teacher contact time, qualification of teachers and teaching and learning environment. The basis for parent preference to private school is English as teaching medium, discipline and teaching quality. It was pointed out that, in order to become private aided school, there is need that LCPS must be at par with Government School. It was highlighted that there is lack of enthusiasm in enforcement of regulatory environment. It is expected that, there should be - sound policy framework, government capability and streamlined objective and clear registration criteria. The effect of public-private partnership is also discussed in the report. It was related to voucher system, subsidies, private finance initiative, private management and operations. The report stated that, The LCPS's dynamics affected by unreliable policies and legal instability. Market system may be developed with the help of analysis of economies of market with the clear objective of serving poor students. The challenges identified as follows - Migration of students and limitation on Fees, Exploitation of less qualified and less experienced teaching faculties, positive or negative act of government in the case LCPS which hampers effectiveness, and bottleneck of secondary school due to more support to primary education. The report supported with

case study of Gyan Shala and case studied related to LCPS from Lagos and Punjab.

## Legal Compliances

The working paper titled, "Low-Fee Private Schools in India: The Emerging Fault Lines" by Tamo Chattopadhay and Maya Roy (2017), focuses on concept of Low-Fee Private School (LFP) and the facts related to it. The LFP is supposed to target private education for poor. The motivation of the study is - Huge school age population in India (1.2 billion as per UNISEF, 2011), Large no. recognised school in India (1.4 million as per MHRD, 2011) and RTE act 2009 i.e., schooling right till 8th standard. The authors noted that as per ASER, 2014 report public school are providing education to more children than private schools. The RTE regulation helped schools for improving their infrastructure and learning support system (ASER, 2016). On this background authors identified three fault lines. 1. It is related to RTE policy constraint. i.e., in authors word, "Threat to affordability in contested Policy", 2. It is about untrustworthy teaching and quality of English teaching i.e., "Unreliable Teaching and Context Teaching in English", 3. Private Tuitions i.e., "The Disruptive shadow of Private Tuition". Thus, authors pointed out the discrepancy in formation of rules and their implementation. It is pointed out that, these three factors may lead to deterioration of LFP concept in Indian Education System.

## LFP for Poor and Regulation, Awareness about Government Regulation

The study namely, "Motivations to Set Up and Manage Low-fee Private Schools in India" by Hannah Mond, Poorvaja Prakash (2019), throws light on how private schools grown and reason behind it. The author used push-pull entrepreneurship theory to carry out this work. The research points out that, the private schools are providing education to the students who are not got chance to go to school because of lack of proximity of the school. It was observed that, the private school owner feels that the only private school providing quality education. As indicated by author, the literature review suggests that, LFP schools are violating the regulation norms and RTE Act 2009. It

may be possible that the increase in such typeover schools will be problematic from government accountability. Hence it is necessary that, the government must create awareness about the policies and act among the people who wish to run such schools. It was noted that globalised assessment and education model may be helpful for quality education. This paper highlighted the capability of global disclosure which may able to bring change in government schooling system. Nupur Garg, (2011) in his study emphasised that the low-cost private schools are not withstanding with very stringent government regulations. Considering the affordability to low-income parents, low-cost schools are playing big role to educate students. However, some restrictions to control quality education and not only to earn profit are mandatory.

Tanuka Endow (2019), wrote, in India, every state government has its own rules for private schools and therefore the low-cost private schools are run in very unhygienic condition with low payments to teachers and appointing less learned teachers. Teachers found conducting private tuitions after school and in many cases in the school premises. So, the school management is earning profits through different modes. Geetha Nambissan (2012), has discussed around 2008 Transnational Advocacy Networks (TAN) done efforts to regularise these low-cost private schools, considering potential profit earnings from the low-income group. Many school chains were developed in this sector, convincing parents for career advancement trainings, but the response towards career development was not seen good from the respondents. Corporate players tend to look for higher fee private schools for investment. Further, the powerful financial interests involved in private school sector in India, who are influencing policy makers to create more conducive regulatory environment. Laura Day (2014), wrote the promotion of private schools happens through parents' informal groups. According to author States are lacking in knowledge, legality and capacity of education sector to implement effective policy frameworks. The percentage of boys against girls is not seen consistent in private schools.

## Case Study

A report prepared by DFID, South Asia Research Hub, titled "Preliminary Study into Low Fee Private Schools and Education" pointed out that strengthening and improving the government school system is a solution for providing universal primary education, including increasing its budgetary allocation. Second opinion about the same says, that the better option is, schools should go for privatisation and government should pay vouchers to the poor. In India, there are large number of public and private school programmes. Private schools are either very costly and unapproachable by lower income individuals or affordable but not with good quality. The study focussed on finding innovative ways for public-private partnerships, this will make the less charging private schools to provide enlarged access to improved learning performance at lower cost and sustainable pattern. This will enable to address equity and system improvement. This study was considered 3 different aspects. The first aspect was to understand significance of private sector in providing education and the basic education sector.

In second part, the author has studied case study of Gyan Shala which is working in Gujarat and Bihar to provide quality education. GS has developed a very structured system which appoints trained and better qualified supervisors to define teaching schedules. Care is taken in selecting learning material and designing class room tasks. Teachers are selected from local areas to ensure higher attendance and monitoring of reach of education is systematised. Considering the finances, it largely depends on CSR and personal donations from public. The comparison of GS with other school performances shows that the GS is performing far better than other municipal schools. Further FGDs for management, teachers, parents and students were conducted at Gujrat and Bihar to understand their views towards GS. In part 3, author studied the future opportunities and risks for implementing GS. Then the author conducted surveys at both locations Gujrat and Bihar. At Gujrat, over-all the respondents were satisfied with infrastructure and other facilities,

teaching learning process and with management and leadership, even they said GS has achieved good reputation and parents are ready to pay little higher fees also to send their children to GS. At Bihar also the stake holders were satisfied with education, but GS is facing problems of acquiring infrastructure in the slum areas. Secondarily the influence of political interference or opposition might be an issue.

### Conclusion

It is to be noted that, the mushrooming of Low-cost private school phenomenon raised questions like whether LFPS is the replacement public or government school. According to Birhas Tiwari (n.d.), in the education sector public and private schools are serving interest of community by constructive contribution. Public schools are lacking in organization and negligence at government level at policy level downsizing the enrolment. The co-existence of public-private school may be a solution for

better education. "The Private Schooling Phenomenon in India: A Review" by Geeta Gandhi Kingdon (2017), clearly indicated that, parents mind set is shifting towards private schools mainly due to affordability of Low Fee Private schools, value for money. For those private schools which charge low fee per student, teacher salaries are based on market demand in the area where schools are situated. It is expected that, government must take decision wisely before making education policies or regulation act especially RTE 2009 which related to infrastructure norms and other recognition norms. Author further suggested that Public Private Model is perfect for running private schools wherein public sector player will fund private schooling for quality and cost-effective education.

Thus, it may be stated that, affordability, value for money, public-private partnership and evidence-based education policy frame work may be a solution to education for all (EFA).

### References

1. Balarin, M., Fontdevila, C., Marius, P., Rodríguez, M. F. (2019), "Educating on a Budget: The Subsistence Model of Low-fee Private Schooling in Peru", Education policy analysis archives,https://www.researchgate.net/publication/336700941_Educating_on_a_budget_The_subsistence_model_of_low-fee_private_schooling_in_Peru

2. Berry, J. and Mukherjee P. (2019), "Pricing Private Education in Urban India: Demand, Use and Impact", https://riseprogramme.org/sites/default/files/inline-files/Mukherjee.pdf

3. Brion, C. (2020), "Low-Fee Private Schools: Case Studies from Ghana", International Journal of Education Policy & Leadership, https://doi.org/10.22230/ijepl.2020v16n3a957

4. Chattopadhay, T. and Roy, M. (2017), "Low-Fee Private Schools in India: The Emerging Fault Lines", Working Paper 233, National Center for the Study of Privatization in Education,

https://ncspe.tc.columbia.edu/working-papers/WP233.pdf

5. Carneiro, P., Das, J. and Reis Hugo, R. (2016), "The Value of Private Schools: Evidence from Pakistan", Discussion Paper No. 9960, IZA, https://www.iza.org/publications/dp/9960/the-value-of-private-schools-evidence-frompakistan#:~:text=Using%20the%20estimates%20from%20the,for%20those%20choosing%20private%20schools

6. Day Ashley L., Mcloughlin, C., Aslam, M., Engel, J., Wales, J., Rawal S., Batley, R., Kingdon, G., Nicolai, S., Rose, P. (2014), "The role and impact of private schools in developing countries", Department for International Development. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/439702/private-schools-full-report.pdf

7. Endow, T. (2019), "Low-Cost Private Schools: How Low Cost Really Are These?" Indian Journal of Human

Development, https://doi.org/10.1177/0973703019838704

8. Garg, N. (2011) "Low-Cost Private Education in India: Challenges and Way Forward", https://dspace.mit.edu/handle/1721.1/65779

9. Kingdon, G. G. (2017), "The Private Schooling Phenomenon in India: A Review", Discussion Paper Series Iza DP No. 10612, https://doi.org/10.1080/00220388.2020.1715943

10. Kingdon, G. G. (2017), "The price of studying at private schools", India Today Aspire https://www.indiatoday.in/magazine/supplements/aspire/story/20170710-private-schools-price-studying-1022075-2017-07-03

11. Mcloughlin, C. (2013), "Low-Cost Private Schools: Evidence, approaches and emerging issues", EPS-PEAKS, https://www.educationinnovations.org/post/lowcost-private-schools-evidence-approaches-and-emerging-issues

12. Mond, H., and Prakash, P., (2019), "Motivations to Set Up and Manage Low-fee Private Schools in India", Education Policy Analysis Archives, https://epaa.asu.edu/ojs/article/view/4361

13. Nambissan , G. B.(2012), "Low-Cost Private Schools for the Poor in India Some Reflections",

https://www.semanticscholar.org/paper/Low-Cost-Private-Schools-for-the-Poor-in-India%3A-ReNambissan/f967479746e0466be5e44a41f018dbc6a360f469

14. "Private sector's contribution to K-12 education in India Current impact, challenges and way forward", FICCI Report (2014), FICCI-Ernst & Young Report, https://ficci.in/spdocument/20385/ey-ficci-report-education.pdf

15. Tiwari B. (n.d.), "Can Low-Fee Private Schools Be An Alternative To Government Schools?", Students' Journal of Education and Development, Issue 06, Azim Premji University

16. Tooley, J. (2009), "Low-Cost Private Schools as Part of the Solution for Education for all", ATDF Journal, https://www.researchgate.net/publication/228473471_Low_Cost_Private_Schools_as_Part_of_the_Solution_for_Education_for_all

17. Tooley, J. and Longfield, D. (2014), "The Role and Impact of Private Schools in Developing Countries: A Response to DFID's "Rigorous Literature Review", https://eprints.ncl.ac.uk/file_store/production/208667/DEA1EDE1-4499-49D6-A971-C0128AB3F19C.pdf

# MYTH AND HISTORY IN SHASHI THAROOR'S THE GREAT INDIAN NOVEL

**K. Kaman**

Dibrugarh University, Assam, India

kabitakaman974@gmail.com

_____

## ABSTRACT

*Shashi Tharoor's The Great Indian Novel is a very fascinating peace of literature that deals with the Indian myth of the Mahabharata and history of India's freedom struggle. Through the Epic story he presents the history of modern India. Mythological story of the epic is retold as a history of India by transforming the figures from Indian history into mythological characters. This research paper focuses on the new historical notion that reinterprets myth and history to study the past reality. It aims at building a new concept on rationality with changed political ideologies and political scenario.*

_____

**Keywords:** *Myth, History, Independence, Political Ideologies.*

## Introduction

The Great Indian Novel, Tharoor recast Indian history as mythical and democracy as image. The Novel challenges the modern myths of Indian independence and a narrative of democracy. He observes in different narratives multiple interpretations of reality. Tharoor's creativity lies in revealing how the methodology of the ancient epic can replay the political system of modern India. Tharoor combines the creativity of fiction and the scholarship of factual information to identify the historical figures like Gandhi, Nehru and Jinnah with their mythological counterparts. He corelates the two narratives to foreground history as highly transformative discourse ever open to reinterpretation. The real value and standards are derived from myth and history. *The Great Indian Novel* is a reconstructed text blending myth and history. The *Mahabharata* is an epic tale describing the successional struggle over the throne of Hastinapur between Pandava's and the Kaurava's, the two branches of the successors of the king Shantanu. In this novel, Tharoor redecorates the story of the developing Indian democracy as struggle between groups and individuals, closely associated by their personal and political histories. Thus Tharoor obtains two ambitious projects in one stroke, recreating the epic Indian tale as well as narrating the history of twentieth century India. Aijaz Ahmed says "colonialism becomes a trans-historical thing always present and always in a process of dissolution in one part of the world or another."

Tharoor writes in his "Afterword" issues in this novel are based on people and events described in the great epic, a work remains a perennial source of delight and inspiration to millions in India."(P.419 His first work, The Great Indian Novel (1989) may be the most genius reworking of an epic model. On the basis of brief analysis of the novel, an attempt is made to see the reinterpretation of history and myth to bring out the past reality.

## Methodology

This article relies on library study, textual discussion and analysis. It follows the descriptive and the analytical method. The Great Indian Novel is the primary source of this paper.

## Analysis

Shashi Tharoor, an eminent writer of both fiction and non-fiction has recreated the stories of the great epic as an account of the political history of the India, in his debut novel called *The Great Indian Novel*. The *Mahabharata is taken* as a primary source of inspiration. In Sanskrit Maha means great and Bharata means India and therefore Tharoor calls his novel *The Great Indian Novel*. The novel is an analysis of the influence of the *Mahabharata*, regarding the Indian freedom struggle, which leads to the partition of the India and correlating the two, Tharoor himself confesses, "Both are stories that at different levels are told and retold in Indian culture. In my intermixing the two, I was able to cast a perhaps cynical modern sensibility upon the great legends of the past,

but equally was able to casts some of the values of that passed on to the experiences of the more recent present." He not only juxtaposes the atmospherics of the *Mahabharata* with modern history, he organizes the chapters similar to the *Mahabharata.* The novel has eighteen "books," just as the *Mahabharata* has eighteen books, corresponding with the war between Pandava's and Kaurava's which lasted for eighteen days. In the opening chapter, entitled "The Twice-Born Tale" the narrator asserts his desire to have "The Song of Modern India" transcribed in his very own words. Ved Vyasa states the whole story to Ganapathi, similarly obliged by Vyasa to Ganesh in the opening part of the ancient epic. *The Great Indian Novel* depicts the narrative of the battle for independence of Hastinapur under the administration of Mahaguru Gangaji (Mahatma Gandhi), his acclaimed Mango March (Salt March) and the birth of Indian democracy with a blind nationalist (Jawaharlal Nehru) and a British Vicereine (Lady Mountbatten). Other notable characters are Karna (Md. Ali Jinnah), Pandu, the Pale (Subhas Chandra Bose) and Duryodhani (Indira Ghandhi). In *The Great Indian Novel*, Bhishma of the *Mahabharata* and Gandhi of the Indian freedom struggle become Ganga Datta or Gangaji. Tharoor allegorically draws a parallel between these two, implaned in the mythological past and with the recent history, by pointing that the two were equally serious in their principles and both intentionally surrendered their claim to power and administration of the nation.

In the *Mahabharata,* Dhritrashtra and Pandu had equal right to the throne of Hastinapur after Bhishma, in the Indian political history, Nehru and Subhas were the both eligible for eading the Indian polity after Gandhi. Thus Tharoor equals Dhritrashtra with Nehru, and Pandu with Subhas. Gangaji's bias against Pandu becomes evident with the progress of the novel, and so does his preference for Dhritrashtra. It was because of Gangaji's favors towards him that Dhritrashtra succeeds to create a place for himself in the country's political arena, while Pandu pays heavily for Gangaji's indifference towards him. The fact that Gangaji supported Dhritrashtra in the Great Indian Novel, in the same way Bhishma

supported Dhritrashtra and his Kaurava sons, despite being aware of their falsity. It suggest Gandhi's blender and biasness in favor of Nehru. Tharoor highlights how the greed for power baked the battle of Kurukshetre in the *Mahabharata*. The same instance is seen in the political scene of both pre and post partition of India. In the process of defining this point, he introduces the character of Karna, who stands for Jinnah. Despite belonging to the same clan, he is deprived of his rightful position because of the circumstances of his birth. However, Karna fights courageously for his rights and finally succeeds in setting up a new nation called Karnistan which stands for Pakistan. The division of India into Pakistan and Hindustan on the 14th of August 1947 is recorded as 'the partition' in the Indian history, an event that influence the future of two nations. The novel starts with Gangaji's (Gandhi's) appearance in the Indian political scene and ends with Priya Duryodhani's return to power after the fall of the Janta Government. Tharoor narrates Gandhiji's character as "while he was alive, he was impossible to ignore: once he had gone, he was impossible to imitate."(p.47)

He establishes Gangaji as the most pious leader of the freedom fighters, who worked hard to lay the foundation of independent India. He instilled with the spirit of truth, ahimsa and Satyagraha, on the other hand he was responsible for the partition of India.

Gangaji (Gandhiji) is not directly held responsible for the disaffection between the Hindus and the Muslims by Tharoor. He puts forward clear indication that Gangaji's ideas and principles were responsible for alienations of political leader like Karna from Kauravas party. He describe Karna's disapproval of Gandhiji in the following words:

"Karna was not much of Muslim but he found Gangaji too much of Hindu the Mahaguru's traditional attire, his spiritualism, his spouting of the ancient text, his ashram, his constant harking back to an idealized pre-British past that Karna did not believe in…. All this made the young man mistrustful of the Great Teacher…. And Gangaji's mass politics were, to Karna, based on an appeal to the wrong instincts: they embodied an atavism that in his view would never take the country forward". (142)

Tharoor's *The Great Indian Novel* illuminates the misfortune of India that could not produce another leader of Gangaji's stature. Dhritrashtra as the leader of Kauravas betray Gangaji's faith and trust as soon as liberated India is born. Thus Tharoor treats history as a raw material and transform the characters. He picks the moral attitudes of the characters. He mythologize the historical ideas to transform his art and do not hesitate in violating them if necessary. Shashi Tharoor talks about the various popular and critical incidents in Indian history. He depicts colonial incidents which focus on the grotesque brutality of the British. The Bibigarh massacre refer to the Jalianwala Bagh tragedy in the Indian history. The description of Jalianwala Bagh massacre by Tharoor shows his agreement with Samuel P. Huntingdon, who believe that "the West won the world not by the superiority of its ideas or values or religion but rather by superiority in applying organized violence." Similar incidents in the novel are 'Chaurasta' event, actually known as the Chauri Chaura incident, Nathu Ram Godse's killing of Mahatma Gandhi, illegitimate relationship with Viceroy's wife lady Mountbatten, emergency incident and most critical incident of Kashmir's king.

The Maharaja Vyabhichar Sing sign the contract of Kashmir agreement simply on the demand of the woman in his bed. Historians generally believe that instead of the Maharaja, as depicted by Tharoor in his fictionalized historical story, it is Nehru who caused delay in the signing of the contract. According to them, as soon as the Pakistani forces attack Kashmir, the Maharaja sent his wazir to Delhi, requesting the Indian government to give military support to Kashmir, against Pakistan, while in return Kashmir would join to India. Nehru, the prime minister of India, kept the wazir waiting in Delhi for three days, while Pakistan's forces moved into Kashmir. Nehru agree to help Kashmir only after the Maharaja appoint Sheikh Abdullah as the chief minister of Kashmir. Moreover when the Indian Army was steadily and successfully pushing back the enemy, the United Nations announce a cease fire. Nehru decide to go to the U. N. O., a decision that earn him the utter disdain of the people of India. In the narrative, Tharoor suggests that Nehru act in accordance with the suggestion of the Vicereine, and take an absurd decision for which India has to pay to the present day.

Tharoor's novel emerges as an outstanding exemplification of the perseverance of British colonialism, in liberated and free India. His fiction explicitly reveals that before independence the country was exploited by the British and after independence she suffers at the hands of her own leader. Tharoor's hero Gangaji, with non-violence shake the mighty British Empire but become week to use the same weapon to prevent partition of the subcontinent. Due to which Nathu Ram Godse kills him, presented as 'Shikhandi' in the novel. Shikhandi, who is actually Amba in the epic, but here the name and sex is changed, kills Gangaji for his faults to withdraw from political scene of partition. It shows that Nathu Ram kills Gandhiji because he feels that mahatma cheated him and the nation. Tharoor's Shikhandi not only express his personal reasons for killing Gangaji but also echoes those of Nathu Ram Godse's Gandhi's assassination. Nathu Ram perceive Gandhi to be unjust in forcing the Indian government to give fifty five crores of rupees to Pakistan at a time of partition which return with invading India in Kashmir. Pakistan purchased weapon with that money for fighting Indian forces. Perhaps Gandhi's fast is not accepted by Godse and many Hindus begin to doubt the wisdom of Gandhi's experiment of politics. Further, question of Hindu-Muslim became international in the period of Nehru and even today India is facing same everlasting problem. Thus Tharoor suggests that Gangaji, who stood for Hindu-Muslim unity throughout his life, ironically became responsible for the cause of communal tensions between Hindu and Muslims. Commenting on Tharoor's comprehension and depiction of Mahatma Gandhi's role in colonial India, Dr. Dhar observes, "It is somewhat ironical that a person who fought all his life for Hindu-Muslim unity has to be made responsible for encouraging Muslim separatism, but this is implicit in Tharoor's understanding of Gangaji and of several historians too."

Through reinterpretation, he tries to reduce the tensions based on earlier consumption of the history. He also tries to take the people from

their imaginative glorious past to the current bare realities of the modern life. Myths are the manifestations of man's basic instincts and conflicts, is also a useful means to link the past with the present. They prove that man in spite of all his progress in science is basically the same being he was thousands of years ago.

## Conclusion

Shashi Tharoor's The Great Indian Novel is a masterpiece of postmodernI ndian English Literature. Myth is used as narrative and interpretative technique in this novel. History both as context and as reality is the observed presence in postmodern Indian English novels. The novel weaves myth and history into the fictional narratives to reevaluate the importance of Indian myth and colonial history with new perspective. In The Great Indian Novel, the author utters through Ved Vyasa, who remains almost as a spectator or commentator. The Zigzag narrative, constantly shifting from the present to the past, from reality to illusion, discovers and defines, enlarges and evaluates the central theme of the novel. The novelist proves himself successful in merging the earlier themes of public issues like the achievement of political freedom. In this novel, the novelist explains the concept of 'Dharma' in terms of 'Duty' to be performed by different persons. He also shows how 'Dharma' varies with the persons and their occupations. But still it is the only yardstick with which the purposefulness of human life on earth is measured. Through weaving of the ancient and the modern times together, he highlights that the essential nature of man perpetually remains the same and history repeats itself.

## References

1. Dhar, T.N. (1999 )"History-Fiction Interface in English Novel." New Delhi: Prestige. 221.
2. Munshi, K.M. (1978) preface, Mahabharata by C. Rajagopalchari, (Bombay: Bharatiya Vidya Bhawan, 2.
3. Sharma, Diksha. (2013) "Shashi Tharoor's Novels: A Postcolonial and Postmodern perspective.) B.R. Publishing Corporation.
4. Stephen Slemon, (1988) "Post-Colonial Allegory and the Transformation of History," Journal of Common Wealth Literature, 23:1
5. Tharoor, Shashi.( 1989) The Great Indian Novel. New Delhi: Penguin Books India.Young, Robert. "Post-colonialism: A very Short Introduction (New York: Oxford University press 1999) 221.

# ADMINISTRATIVE PROCESSES FOR THE APPLICATION OF PRIOR CENSORSHIP ACCORDING TO THE ORGANIC LAW OF COMMUNICATION OF ECUADOR

**J.P.C. Vélez**[1], **M.A.L. Ledesma**[2], **S.D.F. Padilla**[3] **and A.R.R. Andrade**[4]

[1]State University of Bolívar, Faculty of Jurisprudence, Social and Political Sciences, Ecuador
[2]Independent Journalism, Ecuador
[3]Free Professional Practice, Ecuador
[4]National Council of the Judiciary, Ecuador
[1]jcabrerav@hotmail.com, [2]aby_16l@yahoo.es, [3]silvanafl12@hotmail.com, [4]alexisrivera-91@hotmail.com

_____

## ABSTRACT

*In June 2013, the new Organic Communication Law was issued, a regulation that arises in response to public communication policies in which it promotes, based on journalistic standards, regulatory regulations that cover control and sanction for the media; However, as a result of its application, different journalistic associations and the media have expressed their concern about why certain issues do not respond with the necessary guarantees for the exercise of communication and press freedoms. In this sense, the objective of this investigation is focused on carrying out an analysis of the administrative processes of applying prior censorship according to the Organic Law of Communication of Ecuador; for which, the methodology used is based on a mixed approach; that is, qualitative, where a case morphology was carried out describing the general parameters, implications, current status and general and quantitative analysis because an information collection instrument was applied that allowed obtaining the criteria of the Constitutional judges in order to scientifically validate the subject investigated. Based on this and as the main findings, it was possible to determine based on a case analysis that the Organic Law of Communication aims to create a legal figure of prior censorship, which in practice is perverse and contradicts its true definition, extending to the government the power to sanction the media that resist transmitting imposed information, said information was verified through the criteria of Judges from different Judicial Units of the country who generally agree that the Law was created in order that the government of turn edit the information that is transmitted in the different media directly affecting the right to free expression.*

_____

*Keyword: Access to information, prior censorship, freedom of expression, Organic Law of Communication*

## Introduction

Desde inicios del siglo XXI, en América Latina el poder mediático viene usando la libertad de prensa con la finalidad de defender ciertos intereses totalmente ajenos al periodismo; dado que, la información en primera instancia constituye un derecho humano por lo que es menester de los distintos medios informar de forma libre dicha información con imparcialidad, pluralidad e independencia, para contribuir al conocimiento, la educación y la cultura.

No obstante, la realidad es distinta a la mencionada en la idea anterior, pues los oligopolios de la comunicación se han encargado de transformar la información en mercancía. Dicho en otras palabras, en los regímenes neoliberales de la región, la denominada gran prensa se encarga de definir la agenda legislativa, asumir la voz y representación de la población, toma partido en las disputas electorales, realiza de forma abierta campaña política por aquellos candidatos de su preferencia, influye en los poderes del Estado, así como también coloca y derroca presidentes (Barrera, 2018, p. 3).

A partir de junio del año 2013, en Ecuador se encuentra vigente la Ley Orgánica de Comunicación, iniciativa desarrollada por el gobierno central cuyo gestor fue Rafael Correa Delgado, ex mandatario de la república. Esta Ley fue aprobada por la Asamblea Nacional con la finalidad de garantizar el acceso y el ejercicio de la comunicación en el país, sin embargo, la misma ha traído consigo un serie de cuestionamientos dado que ésta nueva Ley se ha convertido en una herramienta más que garantista del derecho a la libertad de expresión, pues puede ser catalogada como un instrumento de control, dado que resulta evidente que la limitación conceptual de este derecho reflejan el conflicto que se genera entre el Gobierno Central y la prensa, que bajo el discurso de intolerancia al abuso de los medios de comunicación se hace necesario restringir y controlar su funcionamiento

estableciendo de esta manera restricciones que se configuran en censura previa (Sabando, Cedeño y Vélez, 2018, p. 530).

En este contexto, a nivel internacional se registran reglamentos y leyes similares a las aprobadas en el país en relación a los medios de comunicación, por ejemplo, en Argentina se cuenta con la Ley de Servicios de Comunicación Audiovisual, en Bolivia existe la Ley General de Telecomunicaciones, en Brasil está la Ley de Medios de Comunicación Democráticos, en Colombia se encuentra el Código Colombiano de Autorregulación, y en Venezuela, la Ley de Responsabilidad Social de radio, televisión y medios electrónicos (Sánchez, Yánez y Martínez, 2017, p. 467).

La Ley Orgánica de Comunicación fue aprobada el 14 de junio de 2013 por la Asamblea Nacional y entró en vigencia con su aplicación en el Registro Oficial No. 22 del 25 de junio del 2013 (Suing y Quezada, 2017, p. 125), como respuesta de una consulta popular desarrollada el 7 de mayo de 2011 en la cual, en las urnas la población decidió que la Asamblea Nacional se encargue de la creación de una Ley de Comunicación que sustente un Consejo de Regulación donde se norme la difusión de contenidos de las publicaciones de prensa escrita, radio y televisión los cuales dentro de su contenido expresen mensajes de violencia, o que se encuentren mensajes explícitamente discriminatorios o sexuales y que establezca criterios de responsabilidad ulterior de los medios emisores o comunicadores (Sabando et al. , 2018, p. 525).

Con la finalidad de hacer cumplir lo acotado en el párrafo anterior, los artículos 49 y 56 establecen la creación y las funciones de dos instituciones encargados de la vigilancia y la reglamentación de los distintos medios: el Consejo de Regulación y Desarrollo de la Información y la Comunicación (Cordicom) y la Superintendencia de la Información y la Comunicación (Supercom), el primero se encarga, entre otras funciones de la reglamentación sobre cómo debe categorizarse la información y la asignación de los tiempos radiales y televisivos, mientras que, el segundo se encarga de velar y vigilar el cumplimiento de los preceptos acotados dentro de Ley Orgánica de Comunicación así como también de imponer castigos determinados por la misma y la Cordicom (Henao y Barredo, 2019, p. 2).

Bajo este contexto, la respuesta constitucional a dicha Ley se enmarca en cumplir con un lineamiento garantista y complementario a lo dispuesto en los artículos 18 de la Constitución ecuatoriana y en los instrumentos internacionales de protección a la libertad de expresión como es el artículo 13 de la Convención Americana de Derechos Humanos. En este sentido, la finalidad de la Ley Orgánica de Comunicación es desarrollar, proteger y regular en el procedimiento administrativo, el ejercicio de los derechos a la comunicación dictaminados dentro de la Constitución (Melo, 2015, p. 15).

A partir de lo expuesto, el procedimiento administrativo puede ser definido como:

El conjunto de actos preparatorios concatenados según un orden cronológico y funcional, para verificar la existencia de la necesidad pública a satisfacer y de los hechos que lo crean, así como para oír a los posibles afectados y voceros de intereses conexos, tanto públicos como privados, especialmente estos últimos, con el fin de conformar la decisión en la forma que mejor los armonice con el fin público a cumplir (Rojas, 2014, p. 180).

En este mismo orden de cosas y desde otra perspectiva el procedimiento administrativo puede ser descrito como «la parte del Derecho administrativo que estudia las reglas y principios que rigen la intervención de los interesados en la preparación e impugnación de la voluntad administrativa» (Editorial Cep S.L., 2017, p. 129). Esta última definición se introduce en la naturaleza y tipología de los procedimientos administrativos, que pueden distinguirse claramente entre aquellos de naturaleza constitutiva y los de impugnación.

En este sentido, el procedimiento administrativo de naturaleza constitutiva tiene como principal propósito el dictado de un acto administrativo final que resuelva la petición de la parte interesada, ya sea en un sentido favorable o en uno desfavorable. Mientras que, en relación al procedimiento administrativo de naturaleza impugnativa, este se refiere a la posibilidad de recursar o impugnar el acto final que fue dictado en el marco del procedimiento constitutivo. Para ello, el administrado tiene a su disposición una serie de recursos

establecidos dentro de la Ley (Salinas, 2017, p. 43-44).

La doctrina en repetidas oportunidades ha reconocido esta tipología o también las ha señalado como dos etapas constitutivas del procedimiento: una primera etapa conformada por la formación de la voluntad administrativa, y otra etapa de fiscalización, control e impugnación que comienza una vez que la primera haya concluido (Aberastury y Blanke, 2012). En este contexto, ambas definiciones sitúan al procedimiento administrativo como una actividad de carácter instrumental en la satisfacción adecuada del interés público. Asimismo, resulta interesante que los planteamientos apuntados señalan la intervención del administrado como parte integral del concepto del procedimiento administrativo (Ponce, 2017, p. 352).

Con base a estos antecedentes, esta investigación centró su atención en analizar los procesos administrativos de la aplicación de censura previa, según la Ley Orgánica de Comunicación de Ecuador (LOC-2013). Para una mejor comprensión del tema a investigar, fue necesario conocer la forma como la aplican y determinar el modo en que la censura previa, ha vulnerado la libertad de expresión en el ámbito de las sanciones impuestas a medios de comunicación acusados de cometer dicha falta, contrastando este análisis con el resultado de encuestas dirigidas a Jueces Constitucionales.

## 2. LA Libertad DE Expresión, Como Garantía DEL Acceso A LA INFORMACIÓN

Para el ejercicio pleno de la libertad de expresión resulta indispensable que el Estado adopte y respete las normas establecidas por el derecho internacional con la finalidad de garantizar un libre flujo de información y la posibilidad de que todos los ciudadanos puedan expresar sus opiniones, ideas y críticas. En este sentido, la libertad de expresión constituye un derecho humano fundamental, que incluye la libertad de buscar, recibir y difundir ideas e informaciones de cualquier índole y que la misma no puede estar sujeta a una previa censura sino a responsabilidades ulteriores (Torrealba, 2017, p. 3).

Dentro de una concepción bastante amplia, Mendoza (2007, p. 127) establece que «la libertad de expresión es el derecho de transmitir o recibir información e incluso opiniones públicamente». Consecuentemente, la finalidad del derecho de libertad de expresión se centra en proteger: 1) Las informaciones fácticas; y, 2) Los juicios de valor. Sin más restricciones que las impuestas en la ley, como es el caso de las informaciones fácticas, que su limitación sería evitar el contenido explícito en horario que afecte a la niñez y adolescencia. O en el caso de los juicios de valor, que su límite es la irrogación de injurias a un tercero.

Salvo los límites previstos en la ley, el derecho a la libertad de expresión debería ejercerse plenamente, facultando a las personas que intervienen en los medios de comunicación a transmitir libremente informaciones u opiniones, que servirán a la vez, a la población que recibe dichas informaciones u opiniones, para conocer el estado actual, lo que posee una mayor connotación cuando el contenido trata de la administración pública. Como lo explica Loreti y Lozano (2014, p. 26) «...es el derecho a tomar voz pública y dar a conocer la información que poseen».

El derecho de que la población reciba toda clase de información y opiniones, se denomina derecho de acceso a la información, lo cual opera en los ámbitos: público y privado; en tal virtud, la libertad de expresión crea paralelamente y garantiza este nuevo derecho. En este contexto, «... la población puede conocer sobre la actuación estatal y a su vez, fomenta la participación social» (Blasco Hedo, 2018, p. 167). Básicamente, el derecho de acceso a la información pública, es el que tiene cualquier persona para acceder a los acontecimientos de su entorno, más aún cuando estos forman parte de la administración estatal, lo que permite a la sociedad ejercer su participación en la toma de decisiones, dentro de la vida política, económica y social (Llamazares. 2007, p. 249).

Por esta razón, realmente es de destacar, el efecto jurídico que posee el derecho de libertad, que crea tantos otros derechos en su ejercicio, tal como el de acceso a la información, que a su vez permite a la sociedad debidamente informada a ejercer su voz de

protesta, en el caso de inconformidad con los actos de la administración pública. Asimismo, se puede determinar que para el caso de «...incumplimiento de los gobernantes, se reclame sus derechos, por tanto, fundamentan una eventual protesta social» (Bassa y Mondaca, 2019, p. 105). Por lo dicho, se confirma la trascendencia que posee el derecho de libertad de expresión, que siendo uno principal, crea en su ejercicio tantos otros derechos secundarios, que resultan fundamentales para la vida en sociedad.

### 3. LA Libertad DE Expresión DE UNA Sociedad Democrática

El derecho a la libertad de expresión se garantiza de acuerdo a la Constitución del Ecuador dentro del artículo 18. En este sentido, el derecho a la libre expresión representa un mecanismo para ser efectivo otros derechos. Por lo tanto, resulta importante recalcar que toda persona se constituye como titular de este derecho, es decir que no puede restringirse a un grupo determinado de personas o profesionales, razón por lo cual, su ámbito tanto de protección como de aplicación es extenso, comprendiendo actividades informativos y comunicacionales tanto públicas como privadas (Melo, 2015, p.5).

La libertad de expresión precautela el derecho que tienen los ciudadanos a conocer la información pública y de escudriñar a los funcionarios de la administración estatal, premiándolos o sancionándolos por medio del voto popular. Es así que, la libertad de expresión permite la constitución de una sociedad democrática. Es decir, la libertad de expresión deriva del acuerdo básico americano según el que los asuntos públicos deben ser decididos por el sufragio universal. Frente a este tema, existen importantes fallos como el emitido por la Corte Interamericana de Derechos Humanos (2004, p. 66) donde se establece que «la libertad de expresión es un derecho fundamental sobre el cual se basa la existencia de una sociedad democrática».

Bajo este contexto, se plantea en el fallo jurisprudencial, que la libertad de expresión permite que la sociedad esté informada, acerca de los actos de la administración pública, para de esta forma pueda ejercer con verdadera libertad su derecho al voto. Por su parte, en

otro fallo jurisprudencial, se cita el expresado por la Corte Interamericana de Derechos Humanos (1999, p.37) donde se recalca que «... la libertad de expresión y el derecho de acceso a la información, prevén el autogobierno de una sociedad democrática, que conocedora de la situación actual, se pronuncia conscientemente en las urnas para la elección de sus representantes...»

Como puede apreciarse de los fallos emitidos por la Corte Interamericana de Derechos Humanos, la libertad de expresión posee una importante connotación dentro del concepto de democracia, ya que únicamente si la sociedad se encuentra debidamente informada, puede considerarse consiente a la vez que libre, para ejercer el voto. El error, las mentiras y la negación implícita frente a la sociedad, conllevan a un engaño consensuado, que dista del concepto de democracia.

La libertad de expresión debe ejercitarse de forma libre y amplia, para proveer a la sociedad del conocimiento suficiente para dar un voto conscientemente. En las veces que el gobierno de turno pretenda editar dicha información, se incidirá negativamente en la libertad de expresión, volviéndola adversa para una verdadera democracia.

### 4. Concepciones Jurídicas Y Comunicacionales DE LA Censura Previa

La Corte Interamericana de Derechos Humanos ha determinado que cuando existe censura previa se genera una supresión radical de la libertad de expresión al impedirse la difusión libre de noticias, informaciones, opiniones e ideas. Constituyéndose esto una violación radical tanto del derecho de cada persona a expresarse como del derecho de todos a estar bien informados, afectando directamente a las condiciones básicas de una sociedad democrática (Cabezas, 2015, p. 11).

En este contexto, el principal objetivo histórico del derecho de libertad de expresión, ha sido eliminar la censura previa, entendida como una inspección precedente de un funcionario de gobierno, para determinar el contenido de la información. Es decir, «la publicación o no de un contenido» (Bianchi y Gullco, 2009, p. 38). Lo cuál ha sido un proceso histórico bastante complejo, en especial en sociedades

latinoamericanas con una herencia de dictaduras, tendencias al socialismo y sus variaciones, que en países como: Ecuador, Venezuela, Bolivia, Nicaragua y Argentina, se ha denominado socialismo del siglo XXI.

La interpretación de la declaración de principios de la Comisión Interamericana de Derechos Humanos, determina que la censura previa se define como «el control y veto de la información antes de que sea difundida, impidiendo tanto al individuo, cuya expresión ha sido censurada, como a la totalidad de la sociedad, a ejercer su derecho a la libertad de expresión e información» (Correa, Guanipa, Cisneros y Cañizález, 2007).

Por lo cual, la censura previa es un medio opresor, para silenciar a cualquier persona, que pretenda transmitir a la sociedad una información o juicio de valor a través de un medio de comunicación; esto con el claro objeto de mantener a un gobierno en el poder e impedir que la sociedad pueda acceder a la información pública, reaccionar en voz de protesta y castigar a dicho gobierno con el voto.

Asimismo, la censura previa constituye un medio propio de la tiranía, que pretende silenciar a los medios de comunicación restringiéndolos, herramienta que los gobiernos totalitarios utilizan como un medio para tratar de perennizarse en el poder. A esta concepción, Todorov (2008, p. 178) establece que «la censura previa representa la expresión del miedo y de la intolerancia» dado que, asedia bajo amenaza de sanción o cierre a los medios de comunicación no alineados con estos regímenes e incluso llega a los extremos de encarcelar a las personas que buscan expresarse.

No obstante, la doctrina y el derecho comparado determinan eventos en que la censura previa se justifica, como claros ejemplos de aquellas situaciones se pueden mencionar los siguientes: la seguridad nacional en situación de guerra o conmoción, en el que debe restringirse la información y de este modo limitar la libertad de expresión en función de proteger un bien mayor (Zárate, 2013). Asimismo, otro ejemplo de censurar justificadamente el contenido de un medio de comunicación, es la restricción de programas para adulto en horarios nocturnos, a fin de que

tanto niños y adolescentes no los puedan verlos, por lo que se justificaría plenamente el uso de esta figura, con la finalidad que esta clase de programas no dañe la integridad de los menores de edad.

En los casos aludidos a manera de ejemplo, se puede evidenciar que la práctica de la censura previa se produce para precautelar un bien mayor, como es la seguridad del Estado y la integridad de los niños y adolescentes, por lo tanto, el uso de esta figura queda justificado; dado que, se pondera el derecho a la libertad de expresión versus otros derechos constitucionales.

## 5. LA Censura Previa Según LA Ley Orgánica DE Comunicación DE Ecuador

A pesar que las concepciones acerca de la censura previa están bastante instituidas en el derecho comparado y la doctrina, Ecuador ha previsto su propio entendimiento. En este sentido, según la Ley Orgánica de Comunicación de Ecuador vigente, dentro del artículo 18, establece lo siguiente:

Prohibición de censura previa. - Queda prohibida la censura previa por parte de una autoridad, funcionario público, accionista, socio, anunciante o cualquier otra persona que en ejercicio de sus funciones o en su calidad reviste, apruebe o desapruebe los contenidos previos a su difusión a través de cualquier medio de comunicación, a fin de obtener de forma ilegítima un beneficio propio, favorecer a una tercera persona y/o perjudicar a un tercero. Los medios de comunicación tienen el deber de cubrir y difundir los hechos de interés público. La omisión deliberada y recurrente de la difusión de temas de interés público constituye un acto de censura previa.

Quienes censuren previamente o ejecuten actos conducentes a realizarla de manera indirecta, serán sancionados administrativamente por la Superintendencia de Información y Comunicación, con una multa de IO salarios básicos unificados, sin perjuicio de que el autor de los actos de censura responda judicialmente por la comisión de delitos y/o por los daños causados y por su reparación integral (Ley Orgánica de Comunicación, 2013, p. 5).

Como puede apreciarse la normativa se divide en dos partes en su primer párrafo, se contextualiza la censura previa en los términos de derecho comparado y la doctrina, argumentando que ningún funcionario público e incluso tercero, puede ejercer esta figura, dentro de los contenidos que pretende transmitir un medio de comunicación.

El antagonismo jurídico se produce dentro de la segunda parte del primer párrafo, en el que se tergiversa el concepto de la figura, determinando que los medios de comunicación tienen la obligación de cubrir y difundir los hechos de interés público, estableciendo que la omisión deliberada y reiterada de esta obligación constituye censura previa, que es sancionada por el órgano administrativo de control de forma pecuniaria, adicionalmente de las responsabilidades que se pudieran derivar, según indica el segundo párrafo del artículo citado.

Con estos antecedentes, resulta necesario plantear ciertas interrogantes que permitan entender la orientación que posee la censura previa dentro del contexto nacional expresado dentro de la Ley Orgánica de Comunicación. En este sentido, surge el primer planteamiento con la finalidad de una mejor comprensión ¿hecho es igual a juicio de valor? En este contexto, como se pudo evidenciar en el concepto de la libertad de expresión, este derecho garantiza la trasmisión-recepción de información y de juicios de valor.

Consecuentemente, esta pregunta se hace desde el punto de vista de las repercusiones que podría sufrir un medio de comunicación, que se niegue a cubrir o difundir juicios de valor, como sería el caso de las opiniones de un político. Aunque esto suene inverosímil, es vergonzoso que, en la práctica de la aplicación de la censura previa en Ecuador, ya se registren este tipo de sanciones. Como es el caso del Diario La Hora, que no concurrió a cubrir, ni difundir un acto oficial del Alcalde de Loja-Ecuador, por lo que, el medio fue sancionado por la Superintendencia de Información y Comunicación, con una multa de $3540,00 USD.

Desde esta primera prerrogativa, ya se evidencia el alcance desmedido que la ley da al gobierno, para editar la noticia. Como se demuestra en el caso señalado, el no cubrir ni difundir un juicio de valor, puede ser entendido como hecho de interés público, ante lo cual, los políticos afines al gobierno pueden obtener toda la atención de los medios de comunicación y los medios en defecto, deben levantar una cobertura enorme para este fin, lo cual resulta: injusto, falseado y tendencioso.

Asimismo, la siguiente interrogante que nace para comprender la orientación que posee la censura previa en nuestro país es ¿retransmitir una publicación no contrastada, puede resultar en proporcionar una información veraz? Evidentemente no, a pesar que esto último es el objetivo de la comunicación social, Al respecto De Aguinaga (1998, p. 124) manifiesta que «al establecer el derecho a la libertad de información... se refiere al reconocimiento y protección del derecho a comunicar o recibir libremente información veraz por cualquier medio de difusión».

En este sentido, vale agregar también que, según el marco constitucional ecuatoriano, determina a la información veraz, como un derecho civil y como una obligación de la comunicación, de este modo el párrafo primero, del artículo 81 de la Constitución de la República del Ecuador aprobada en el año 2008, establece que:

El Estado garantizará el derecho a acceder a fuentes de información; a buscar, recibir, conocer y difundir información objetiva, veraz, plural, oportuna y sin censura previa, de los acontecimientos de interés general, que preserve los valores de la comunidad, especialmente por parte de periodistas y comunicadores sociales (Constitución de la República de Ecuador, 2008, p. 10).

De igual menara dentro de la Ley Orgánica de Comunicación, específicamente dentro del artículo 22, paradójicamente la información veraz, se enuncia también como derecho, en la cual se establece lo siguiente:

Derecho a recibir información de calidad. - Todas las personas tienen derecho a que la información de relevancia pública que reciben a través de los medios de comunicación sea verificada, contrastada, precisa y contextualizada. La verificación implica contrastar que los hechos difundidos efectivamente hayan sucedido. La contrastación implica recoger y publicar, de forma equilibrada, las versiones de las personas

involucradas en los hechos narrados, salvo que cualquier de ellas se haya negado a proporcionar su versión, de lo cual se dejará constancia expresa en la nota periodística (Ley Orgánica de Comunicación, 2019, p. 9).

Bajo los parámetros de la base doctrinaria, constitucional y legal, se determina que el proporcionar una información veraz, es el objetivo fundamental de la comunicación y un derecho civil de la sociedad. Por lo tanto, la información debe ser contrastada como requisito previo a su difusión. No obstante, como se verá en líneas posteriores, dentro de la aplicación de la censura previa, se ha sancionado a medios ecuatorianos por resistirse a difundir publicaciones sin la debida contrastación y que, por tanto, no constituía información veraz.

Finalmente, en torno a ¿quién determina que contenido es de interés público? La respuesta es el gobierno según lo estipula la Ley Orgánica de Comunicación a través de la Superintendencia de Información y Comunicación. Lo cual quiere decir que el Ejecutivo tiene el papel de gran editor, decretando que contenido es de interés público y, por tanto, ocasionando que los medios de comunicación deban desplegar su trabajo en esta función. Lo que resulta bastante irresponsable, puesto que se pasa a distraer intencionalmente a los medios, impidiéndoles realizar un verdadero trabajo periodístico, que palpablemente es importante.

Una vez que han sido abordadas las interrogantes planteadas concernientes al entendimiento de la orientación que posee la censura previa dentro del contexto nacional expresado dentro de la Ley Orgánica de Comunicación se puede manifestar que en Ecuador existe una normativa legal, por la que el gobierno puede obligar a los medios de comunicación a transmitir determinada información, bajo el subterfugio de que ésta es de interés público, aunque no lo sea, coaccionando a los medios a través de sanciones de carácter pecuniario, que se establecen por un órgano de control estatal que actúa como ejecutor. Lo cual ha resultado en persecuciones a los medios no alineados al régimen, limitación a las expresiones de la oposición política nacional y en un excesivo beneficio hacia el grupo de gobierno.

## 6. Procesos Administrativos Dentro DE LA Aplicación DE LA Censura Previa

El caso sujeto a estudio, para demostrar la aplicación de la censura previa en la práctica ecuatoriana, según la Ley Orgánica de Comunicación, es la multa, que estableció la Superintendencia de Información y Comunicación, organismo encargado de la regulación y control de medios de comunicación en Ecuador, a siete medios de comunicación, acusándoles de incurrir en censura previa, al no reproducir una publicación de un medio de comunicación extranjero, en el cual se difamaba a un candidato presidencial de oposición.

Es prudente advertir desde este punto, que la publicación del medio de comunicación argentino nunca fue contrastada; es decir, que la publicación de dicho medio no se validó, por lo que no puede considerarse como una información veraz, en términos de Llamazares (2007, p. 276) «el derecho a recibir información veraz constituye una garantía constitucional sin esa característica las noticias se falsean, se tergiversan mostrando solo una determinada y tendenciosa vertiente». No obstante, la Superintendencia de Información y Comunicación al momento de aplicar la sanción de censura previa, argumentó que los medios de comunicación ecuatorianos se resistieron a retransmitir una publicación, que ha criterio del organismo contenía una información importante para el tiempo de elecciones, lo cual es falso. A partir de ello, y para una mejor comprensión, se cita lo expuesto por Villanueva quien establece lo siguiente:

Otro de los grandes retos es ponderar la importancia de que los medios ofrezcan informaciones debidamente contrastadas. Ello reclama de los medios la independencia necesaria para cumplir su cometido de mantener informada a la sociedad, con una pluralidad de datos y fuentes, el deber de los medios es adoptar una postura crítica frente a las fuentes informativas. Sin embargo, tampoco se debe aceptar que la única voz visible sea la de la autoridad encargada de aplicar la ley (Villanueva, 2013, p. 134).

La Superintendencia de Información y Comunicación intento invocar la teoría de la libertad de expresión, denominada autogobierno de una sociedad democrática, argumentando que la publicación aludía a un candidato presidencial en tiempo de elecciones y que la sociedad debía conocer dicha publicación, para poder ejercer su derecho al voto, en democracia. Lo cual evidentemente es una interpretación maliciosa de esta teoría, intentando así incidir en la retransmisión de esta publicación de forma intencional, misma que no cataloga como información veraz y que perjudicó al candidato presidencial de oposición, beneficiando al candidato de gobierno.

Sobre este razonamiento, se puede argumentar que la intención de la Superintendencia de Información y Comunicación fue presionar a los medios de comunicación, bajo la amenaza de sancionarlos con la aplicación de la censura previa, para que retransmitan una publicación no contrastada. En síntesis, este organismo de gobierno intento editar el contenido que transmiten los medios de comunicación ecuatorianos. Finalmente, cabe destacar que la actuación de los medios de comunicación sancionados que, a pesar de las circunstancias de presión, se resistieron a retransmitir de forma irresponsable una publicación extranjera, cuyas expresiones nunca se lograron probar.

## 7. Metodología

El enfoque de investigación con el cual se trabajó dentro del presente estudio fue de carácter mixto; es decir, cuali-cuantitativo. Cualitativo porque bajo la perspectiva de Hernández y Mendoza (2018, p. 7) hace referencia a la naturaleza, carácter y propiedades de los fenómenos. En este contexto, el investigador comienza el proceso examinando los hechos en sí y revisando los estudios previos, ambas acciones de manera simultánea a fin de generar una teoría que sea consistente con lo que está observando que ocurre.

Bajo este escenario, dentro de la investigación se hizo un acercamiento hacia las principales características de un caso específico que sucedió en el país con la aplicación de la censura previa según la Ley Orgánica de Comunicación. Y cuantitativo porque según

Hernández y Mendoza (2018, p. 7) en la indagación cuantitativa se busca conocer o capturar la realidad externa o fenómeno estudiado tal y como es, o al menos aproximarse lo mejor posible a ello. A partir de lo mencionado dentro de la investigación se aplicó un instrumento de recolección de información que permitió obtener el criterio de la población investigada (Jueces de Unidades Judiciales) con la finalidad de validar científicamente el tema investigado.

En relación a la tipología de investigación esta se encuentra dada por un estudio de tipo dogmático-jurídica; dado que, para estos casos se investiga lo que los humanos dicen que hacen con el derecho; es decir, se utilizará esta denominación a todo estudio cuyo basamento sean las normas jurídicas y siempre que se las analice de modo abstracto o teórico. En este contexto, como se sabe, las normas jurídicas pueden proceder formalmente de la legislación, la jurisprudencia, la costumbre, la doctrina y los principios generales del derecho; por consiguiente, en este tipo de investigación se estudian a detalle las normas jurídicas procedentes de estas fuentes formales (Tantaleán, 2016, p. 3). Es decir, se realizó una revisión del marco jurídico en el ámbito nacional e internacional referente al tema planteado determinando conceptos, procedimientos y normativas vigentes dentro del contexto en el cual se desenvuelve, es decir dentro de la investigación jurídica.

Por otro lado, en cuanto se refiere a la modalidad de investigación fue necesario desarrollar un estudio bibliográfico y de campo; debido a que en primera instancia como se detalló en el epígrafe anterior fue necesario obtener información de investigaciones realizadas con anterioridad en el ámbito jurídico, libros, normas, códigos y leyes gubernamentales, los mismos que fueron procesados en su totalidad escogiendo información relevante que se encuentra descrita en el presente documento. Mientras que posterior a ello, dentro del estudio de campo, se aplicó el instrumento diseñado a la población conformada por Jueces de Unidades Judiciales de quienes se receptó valiosa información que se encuentra detallada más adelante.

Asimismo, en relación al alcance del estudio, éste se centra en un nivel descriptivo; dado que, permite conocer la situación real del caso a través de la descripción de actividades realizadas (Hernández, Fernández y Baptista, 2014, p. 92). En este caso, a través del análisis de caso y la recolección de información se pudo identificar la situación real de los involucrados.

Finalmente, la población de la presente investigación se encuentra estructurado por 25 Jueces de diferentes Unidades Judiciales de las provincias de Bolívar, Los Ríos, Cotopaxi y Chimborazo, es decir, se escogió una población con características similares quienes a través de sus criterios permitieron tener un panorama general en relación al tema planteado.

## 8. Resultados

A continuación, se presentan de forma general los principales resultados encontrados en torno al tema planteado. Para ello, en la primera parte de este apartado se detalla la morfología de un caso en la cual se sancionaron a diferentes medios de comunicación bajo el escenario de censura previa, asimismo se describirá los parámetros generales de las resoluciones con las que se sancionaron a los medios involucrados, las implicaciones jurídicas del caso, el estado actual del mismo y el análisis general y la aplicación de la censura previa en la práctica ecuatoriana.

a) **Morfología del caso:** El 19 de abril del año 2017, la Superintendencia de Información y Comunicación declaró que siete medios de comunicación habían incurrido en censura previa, al no haber reproducido una publicación del medio de comunicación argentino "Página 12", referente a la supuesta vinculación del candidato presidencial de oposición Guillermo Lasso, acusándole de tener 49 empresas offshore, con el claro objeto de perjudicar al presidenciable y beneficiar al candidato correísta de gobierno Lenin Moreno, estableciéndose una multa de USD 3.750,00 dólares a cada uno de los siete medios.

**Tabla 1 Resoluciones con que la Superintendencia de Información y Comunicación, sancionó a los medios**

| Nombre del medio | Tipo de medio | Nombre del funcionario | Resolución | Sanción económica |
|---|---|---|---|---|
| El Comercio | Prensa escrita | | N° 006-2017-DNJRD-INPS, de 19 de abril de 2017 | $3.750,00 |
| TV Centro | Medio televisivo | | N° 007-2017-DNJRD-INPS, de 20 de abril de 2017 | $3.750,00 |
| El Universo | Prensa escrita | Superintendente Carlos Ochoa | N° 008-2017-DNJRD-INPS, de 20 de abril de 2017 | $3.750,00 |
| Ecuavisa | Medio televisivo | | N° 009-2017-DNJRD-INPS, de 20 de abril de 2017 | $3.750,00 |
| Teleamazonas | Medio televisivo | | N° 010-2017-DNJRD-INPS, de 20 de abril de 2017 | $3.750,00 |
| Expreso | Prensa escrita | | N° 011-2017-DNJRD-INPS, de 20 de abril de 2017 | $3.750,00 |
| La Hora | Prensa escrita | | N° 012-2017-DNJRD-INPS, de 20 de abril de 2017 | $3.750,00 |

b) **Parámetro general de las resoluciones con las que se sanciona a los siete medios de comunicación:** Como se detalló dentro de la tabla 1, cada medio de comunicación tuvo un procedimiento y una resolución administrativa individual, en la práctica las resoluciones indican taxativamente lo mismo, por tanto, se citará la parte medular

de una de ellas, contenido que se replica en las otras. Resolución NO 006-2017-DNJRD-INPS: Se ha determinado la relevancia que tenía la difusión del hecho noticioso materia del presente procedimiento administrativo; por ende, era obligación del medio de comunicación social, cubrir y difundir esta información de interés general más aún cuando se refería a asuntos relacionados con los candidatos a la presidencia de la nación (Superintendencia de la Información y Comunicación, 2017a, p. 4).

c) **Implicaciones jurídicas del caso:** La figura jurídica por la cual se procedió a la sanción es la de censura previa, la Superintendencia de Información y Comunicación, ha indicado que la base de su argumento, es que los medios censuraron previamente una noticia generada por un medio de comunicación argentino, resistiéndose a retransmitirla en Ecuador.

d) **Estado actual del caso:** La Resolución de la Superintendencia de Información y Comunicación se halla en firme. La percepción de la opinión pública sobre el caso, es de rechazo como es el caso de FUNDAMEDIOS, que califica a esta sanción, como una persecución a los medios de comunicación no alineados al gobierno, así también, denuncia al gobierno de Correa como un gran editor de los medios de comunicación, según Ricaurte (2017, p. s/n) decidiendo "arbitrariamente sobre que noticias deben publicar y que información no debe publicarse, en función de sus intereses personales". Teleamazonas uno de los siete medios de comunicación sancionados, planteó una acción constitucional en contra de la resolución emitida por la Superintendencia de Información y Comunicación, posteriormente el resto de medios accionaron el mismo trámite, no obstante, las acciones constitucionales han sido desechadas por los administradores de justicia. Seguramente, el hecho de que el

candidato de gobierno ganó las elecciones presidenciales no influyo en tal decisión.

e) **Análisis general del caso y la aplicación de la censura previa en la práctica ecuatoriana:** Desde la puesta en vigencia de la Ley Orgánica de Comunicación (LOC-2013), se ha trastocado la figura jurídica de la censura previa en Ecuador, malinterpretándola intencionalmente como un mecanismo del gobierno para editar la información que se publica en los medios de comunicación, forzando a estos a publicar la información que más beneficia a sus intereses. De esta forma, queda claro que la Ley Orgánica de Comunicación (LOC-2013), se orienta a crear una figura jurídica de censura previa, que en la práctica resulta perversa y que contradice su verdadera definición, extendiendo al gobierno a través de sus organismos de control, como es el caso de la Superintendencia de Información y Comunicación, la facultad de sancionar a los medios de comunicación, que se resistan a transmitir la información impuesta. Este tipo de sanción se constituye en una persecución a los medios de comunicación no alineados al gobierno, entendida como una sanción administrativa sin justificación, con el objetivo de causar daño a un medio, sanción que cuando se aplica de forma repetitiva puede llegar a ocasionar el cierre del mismo. Dentro del caso de estudio, se acusa una supuesta censura previa de siete medios de comunicación, por no sumarse a la campaña presidencial del correísmo, por el simple hecho de resistirse a la orden de retransmitir una publicación que evidentemente perjudicaba al candidato presidencial de la oposición. Una vez descrito el caso en todas sus dimensiones, a continuación, se presenta un contraste de información a través del criterio emitido por Jueces de distintas Unidades Judiciales del país quienes dan su criterio en relación a la aplicación de la censura previa concebida dentro de la Ley Orgánica de Comunicación.

**Tabla 2. Resultados generals**

| Preguntas / Respuestas | La censura previa limita el derecho de libertad de expresión, cual debería dirigirse sobre el tema que deseen las personas o medios de comunicación. | | La censura previa concebida en la Ley Orgánica de Comunicación es un medio para dirigir la noticia en ventaja de lo que desee el gobierno. | | La censura previa concebida en la Ley Orgánica de Comunicación, influye en la constitución de una sociedad democrática, por cuanto dirige las noticias en función de lo que desea el gobierno. | | La censura previa concebida en la Ley Orgánica de Comunicación, vulnera directamente el derecho de libertad de expresión | |
|---|---|---|---|---|---|---|---|---|
| Alternativas | Frecuencia | Porcentaje | Frecuencia | Porcentaje | Frecuencia | Porcentaje | Frecuencia | Porcentaje |
| Totalmente en desacuerdo | 2 | 8% | 0 | 0% | 2 | 8% | 1 | 4% |
| Bastante en desacuerdo | 0 | 0% | 2 | 8% | 0 | 0% | 0 | 0% |
| Indiferente | 2 | 8% | 3 | 12% | 2 | 8% | 2 | 8% |
| Bastante de acuerdo | 8 | 32% | 6 | 24% | 9 | 36% | 7 | 28% |
| Totalmente de acuerdo | 13 | 52% | 14 | 56% | 12 | 48% | 15 | 60% |
| TOTAL | 25 | 100% | 25 | 100% | 25 | 100% | 25 | 100% |

Dentro de la primera interrogante planteada, la mayoría de Jueces Constitucionales abordados consideran que la censura previa limita en todo sentido la libertad de expresión, debido a que de cierta manera restringe el desarrollo de un tema determinado. Adicional a ello, la censura previa concebida en la Ley Orgánica de Comunicación de Ecuador (LOC-2013), se orienta a dirigir la información que se transmite en los diferentes medios de comunicación generando de esta forma una restricción en relación al abordaje de ciertos temas limitando así la libertad de expresión.

Asimismo, en relación al tema de que la censura previa concebida en la Ley Orgánica de Comunicación es un medio para dirigir la noticia en ventaja de lo que desee el gobierno gran parte de la población objeto de estudio se encuentra de acuerdo con dicho planteamiento pues existe un consenso de que la Ley Orgánica de Comunicación de Ecuador (LOC-2013), fue creada con la finalidad de que el gobierno de turno edite la información que se

transmite en los diferentes medios de comunicación.

Por otro lado, de acuerdo al criterio dado por la mayor parte de los Jueces Constitucionales encuestados, la censura previa concebida en la Ley Orgánica de Comunicación influye en la constitución de una sociedad democrática, por cuanto, permite la edición de las distintas noticias en función de lo que desea el gobierno. En este contexto, de lo explicado en líneas anteriores, la libertad de expresión se sustenta en la teoría del autogobierno de una sociedad democrática, consecuentemente, la Ley Orgánica de Comunicación de Ecuador (LOC-2013) influye negativamente en este fin.

Finalmente, ante la pregunta planteada en torno a que, si la censura previa concebida en la Ley Orgánica de Comunicación vulnera directamente el derecho de libre expresión, la respuesta por parte de los magistrados encuestados es afirmativa. Es decir, a través de la aplicación de ella, la vulneración hacia el derecho de libertad es eminente lo que afecta directamente a los diferentes medios de comunicación quienes se ven limitados en la realización de su trabajo.

### 9.  Discusión

En Ecuador, la Ley Orgánica de Comunicación dispone que los medios de comunicación se clasifiquen por sectores, en este sentido pueden ser públicos, privados y comunitarios debido a la función social que cumplen y a la estructura administrativa que tienen cada uno de ellos. Sin embargo, la forma en la que funcionan las empresas periodísticas, y su razón social, varía de acuerdo a las tradiciones de comunicación, la regulación y la capacidad económica de los diferentes países.

En este contexto, en Ecuador durante la última década se ha registrado un giro total en el sistema de comunicación, debido específicamente a dos factores que han influido directamente en el estímulo de la transformación del ejercicio informativo. En este sentido, la implementación de un marco legal de comunicación que cuenta con dos entidades encargadas de regular y de supervisar el trabajo de los medios como la Cordicom y Supercom; y la creación de los medios públicos, ya sea por la creación de canales nuevos o por la incautación de algunos medios privados que ahora funcionan como organizaciones de tipo estatal (Henao y Barredo, 2019, p. 5).

Posterior a la aprobación de la Ley Orgánica de Comunicación en Ecuador, los temas con mayor dificultad para ser publicados se relacionan, en primer lugar, con todo aquello que haga referencia a la situación política actual del país, lo cual se encuentra directamente vinculado a la falta de transparencia, la dificultad de acceso a la información pública, y quizá en mayor proporción debido a la habitual negativa de las autoridades del país a mantener una fluida relación con los diferentes medios de comunicación (Oller, 2017). Adicional a lo mencionado, la indagación y posterior difusión de estos temas se complica aún más por lo establecido en el artículo 22 de esta Ley, la cual obliga a los distintos profesionales del periodismo a evidenciar de donde obtienen dicha información.

La esencia del procedimiento administrativo en general es la de asegurar el cumplimiento posible de los fines de la administración con respeto a los derechos subjetivos y a los intereses legítimos del administrado, de acuerdo con el ordenamiento jurídico (Montalvo, 2016, p. 63). El procedimiento administrativo se informa, nutre y estructura a partir de una serie determinada de principios, que en la mayoría de los casos tienen un sustento supralegal. Así pues, los principios constituyen los pilares para orientar los procedimientos (Rojas, 2014, p. 182).

De esta manera, los principios jurídicos indispensables del procedimiento administrativo son pautas directrices que definen su esencia y justifican su existencia, permitiendo explicar, más allá de las regulaciones procesales dogmáticas, el porqué y el para qué del mismo. Son especies de ideas pétreas inmodificables por la regulación formal, que explicitan el contenido del procedimiento (Botassi y Cabral, 2018, p. 117). La libertad de expresión es el derecho por el cual las personas pueden transmitir y recibir información o incluso opiniones de cualquier tipo públicamente, sin restricción alguna, salvo las limitaciones que determina la censura previa, entendida en los términos de doctrina o derecho comparado, como un filtro que evita se conozca información en casos específicos (Lutuala, 2014, p. 40-59). No obstante, de esta clara definición, Ecuador ha creado una figura paralela de censura previa que permite que el gobierno fuerce a los medios de comunicación a transmitir determinada información, todo esto en función a sus intereses políticos.

Del análisis del caso de estudio, se puede extraer que la censura previa concebida en la Ley Orgánica de Comunicación de Ecuador (LOC-2013), es un mecanismo malicioso, que plantea multas pecuniarias, generándose así, una persecución a los medios de comunicación no alineados al régimen, dentro del estudio doctrinario se ha podido constar que este tipo de prácticas suelen ocasionar el cierre permanente de los medios de comunicación, lo cual es el objetivo principal de los gobiernos totalitarios.

De los resultados obtenidos de las encuestas a los Jueces Constitucionales, se puede extraer información importante: los expertos consideran que la censura previa concebida en la Ley Orgánica de Comunicación de Ecuador

(LOC-2013), plantea la vulneración del derecho de libertad de expresión, por cuanto permite que el gobierno imponga la información que debe ser transmitida. Es en tal situación, que la democracia se ve coaccionada, por cuanto se impone a la población a conocer una información trastocada, distrayendo su atención de asuntos importantes.

## 10. Conclusiones

Durante la última década, la legislación en Ecuador se caracterizó por un progresivo incremento de ciertas herramientas que permitieron al Estado restringir, ya sea de forma directa como indirecta, el derecho de las personas y en especial de los periodistas a buscar y difundir libremente información, así como también expresar de manera libre ideas y opiniones relacionadas con el ámbito político.

En este sentido, estas restricciones afectaban de forma directa a quienes se expresaban a través de los diferentes medios de comunicación tradicionales como televisión, radio y prensa escrita, así como también a quienes hacían uso de su derecho a la protesta social con la finalidad de cuestionar las políticas administrativas aplicadas por el Ejecutivo en su momento.

A partir de las restricciones señaladas, resulta indispensable resaltar la importancia del derecho a la libertad de expresión, mismo que funda otros tantos derechos como es el acceso a la información. Sobre esta base, el derecho a la libertad de expresión coadyuva al autogobierno de una sociedad democrática, que libre de transmitir y recibir tanto información, como opiniones, escudriña la administración pública y de esta forma al gobierno, por lo que, faculta a la sociedad para ejercer un voto consiente.

La prohibición de la censura previa, es en concepto doctrinario y en derecho comparado una figura saludable, que beneficia a la libertad de expresión, ya que evita que el Estado restrinja la información de interés general. No obstante, la censura previa normada por la Ley Orgánica de Comunicación de Ecuador, es un mecanismo perverso, que confiere al gobierno el papel de gran editor, facultándole para obligar a los medios de comunicación, a publicar la información que más beneficie a sus intereses, bajo la amenaza de una sanción pecuniaria, que aplicada de forma reiterada puede ocasionar el cierre del medio de comunicación.

En este contexto, de forma general, el Estado ecuatoriano, más que estimular el buen ejercicio de la función periodística, a través de la aprobación de la Ley Orgánica de Comunicación se ha encargado de obstaculizar la labor de los periodistas, sobre todo en aquellos contenidos que pueden ser perjudiciales en términos de reputación del poder político debido a que esta herramienta legislativa a blindado el discurso público.

De la opinión experta de Jueces Constitucionales, se puede corroborar los conceptos que se han vertido a lo largo del trabajo de investigación referentes a la libertad de expresión y a la censura previa; así también, esta opinión experta ha permitido determinar que la censura previa aplicada según Ley Orgánica de Comunicación de Ecuador, vulnera abiertamente la libertad de expresión.

## Referencias Bibliográficas

1. Aberastury, P., & Blanke, H. J. (2012). Tendencias actuales del procedimiento administrativo en Latinoamérica y Europa (I Edis.). Buenos Aires: Editorial Universitaria de Buenos Aires.

2. Barrera Rivera, A. (2018). La libertad de prensa en el pensamiento de Rafael Correa. Repertorio Americano, 28, 1—11. https://doi.org/10.15359/ra.1-28.11

3. Bassa, J., & Mondaca, D. (2019). Protesta social y derecho: una tensión irresoluble. Izquierdas, 46, 105—136.

4. Bianchi, H., & Gullco, E. (2009). El derecho a la libre expresión (11 Ed). La Plata: Librería Editora Platense.

5. Blasco Hedo, E. (2018). Ley Floral 5/2018, de mayo, de Transparencia, Acceso a la información pública y buen gobierno. Actualidad Jurídica Ambiental, 81, 163—169.

6. Botassi, C. A., & Cabral, P. O. (2018). Derecho administrativo, dominio público, responsabilidad estatal, procedimiento y proceso administrativo. La Plata: Editorial de la Universidad de la Plata.

7. Cabezas, V. (2015). Algunos nuevos paradigmas sobre la Libertad de Expresión. El Outsider, 3, 6—14.

8. Comisión Interamericana de Derechos Humanos. (1969). Convención Americana sobre Derechos Humanos.

9. Constitución de la República del Ecuador, Asamblea Nacional, Registro Oficial 449 de 20-oct-2008.

10. Correa, C., Guanipa, M., Cisneros, Y., & Cañizález, A. (2007). Libertad de expresión. Una discusión sobre sus principios, límites e implicaciones. Caracas: Editorial CEC,

11. Corte Interamericana de Derechos Humanos. (2004). Caso Herrera Ulloa Vs. Costa Rica.

12. De Aguinaga, E. (1998). ¿Información veraz? Estudios Sobre El Mensaje Periodístico, 4, 123-133.

13. Editorial Cep S.L. (2017). Auxiliar administrativo a. Madrid: Editorial Cep S.L.

14. Henao Bedoya, R., & Barredo Ibáñez, D. (2019). ¿Cuáles son las respuestas de los periodistas de Ecuador tras la implementación de la Ley Orgánica de Comunicación? Una entrevista a periodistas de medios nacionales públicos y privados. Signo y Pensamiento, 38(74), 1—14. https://doi.org/http://doi.org/10.11144/Javeriana.syp38-74

15. Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, P. (2014). Metodología de la investigación (VI Edic.). México D.F.: McGraw Hill.

16. Hernández Sampieri, R., & Mendoza Torres, C. P. (2018). Metodología de la investigación las rutas cuantitativa, cualitativa y mixta (I Edic.), México D.F.: McGraw Hill.

17. Llamazares Fernández, D. (2007). Derecho de la libertad de conciencia (Tomo I). Madrid: Thomson.

18. Ley Orgánica de Comunicación, Asamblea Nacional, Registro Oficial No. 22 de 25-jun2013, (2013)

19. Ley Orgánica de Comunicación (reformado). Asamblea Nacional. Registro Oficial Suplemento 22 de 25-jun-2013, (2019).

20. Loreti, D., & Lozano, L. (2014). El derecho a comunicar. Los conflictos en torno a la libertad de expresión en las sociedades contemporáneas (I Edic.). Buenos Aires: Siglo XXI.

21. Lutuala Cuchiparte, C. A. (2014). Control represivo a la libertad de expresión (Tesis de pregrado). Universidad Técnica de Cotopaxi. Latacunga.

22. Melo Cevallos, M. (2015). La nueva Ley de Comunicación y su aplicación para el ejercicio periodístico y el derecho a la libertad de expresión en el Ecuador (I Edic.). Quito: Pontificia Universidad Católica del Ecuador.

23. Mendoza Escalante, M. (2007). Conflictos entre derechos fundamentales. Expresión, Información y Honor (I Edic.). Lima: Palestra.

24. Montalvo Yánez, H. J. (2016). Tutela efectiva de derechos en el procedimiento administrativo impugnatorio vigente en materia de propiedad intelectual en el Ecuador (Tesis de posgrado). Universidad Andina Simón Bolívar, Quito.

25. Oller, M. (2017). La relación de amor/odio entre gobierno, medios de comunicación y periodistas en Ecuador. E-Revista de Estudios Interculturales Do CEI-ISCAP, 5(5), 1-30.

26. Ponce Rivera, C. A. (2017). La actividad probatoria como parte del debido procedimiento en los procedimientos administrativos sancionadores. Lex, 20(15), 341—370.

27. Ricaurte, C. (2017). Fundamedios condena la sanción ordenada por Correa contra 7 medios. Fundamedios. Recuperado de: http://www.fundamedios.org/alertas/fundamedios-condena-la-sancion-ordenadapor-correa-para-los-medios-que-se-sumaron-campana-contra-candidato-deoposicion/

28. Rojas Franco, E. (2014). El debido procedimiento administrativo. Derecho PUCP, 2(67), 177-188.

29. Sabando Delgado, R., Cedeño Bravo, M., & Vélez Triviño, Y. (2018). Análisis del impacto de la Ley Orgánica de Comunicación a partir de los artículos publicados sobre el tema. Revista Científica Dominio de Las Ciencias, 4(1), 523-534. https://doi.org/http://dx.doi.org/10.23857/dom.cien.pocaip.2017.4.1.

30. Salinas Valverde, H. M. (2017). Vulneración del derecho de imparcialidad en el papel de la SUPERCOM en el juzgamiento y sanción a los medios de comunicación. Universidad Nacional de

31. Sánchez Calderón, H., Yánez Balarezo, S., & Martínez Segovia, M. (2017). Impacto de la Ley Orgánica de Comunicación en la publicidad ecuatoriana. Prisma Social, 17, 464—473.

32. Suing, A., & Quezada Morocho, M. B. (2017). Promoción de derechos y sanción. La regulación de la comunicación en Ecuador. Index.comunicación, 7(3), 121-143.

33. Superintendencia de la Información y Comunicación. (2017a). Resolución NO 006-2017DNJRD-INPS.

34. Superintendencia de la Información y Comunicación. (2017b). Resolución N°007-2017DNJR-WPS.

35. Superintendencia de la Información y Comunicación. (2017c). Resolución N°008-2017DIVJR-INPS.

36. Superintendencia de la Información y Comunicación. (2017d). Resolución N°009-2017DNJR-INPS.

37. Superintendencia de la Información y Comunicación. (2017e). Resolución N°010-2017DNJR-INPS.

38. Superintendencia de la Información y Comunicación. (2017f). Resolución N°011-2017DNJR-INPS.

39. Superintendencia de la Información y Comunicación. (2017g). Resolución N°012-2017DNJRD-WPS.

40. Tantaleán Odar, R. M. (2016). Tipología de las investigaciones jurídicas. Derecho y Cambio Social, l, 1—37.

41. Todorov, T. (2008). El hombre desplazado (1 Edic.). Madrid: Taurus.

42. Torrealba Mesa, L. (2017). Impacto de las leyes de comunicación de Ecuador y Venezuela en el ejercicio de la libertad de expresión, a partir de 6 casos emblemáticos. Revista de Investigación Científica Tsafiqui, 9, 1—42.

43. Villanueva, E. (2013). Moral Pública y Libertad de Expresión (I Edic.). México D.F.: JUS Editorial.

44. Zárate, S. (2013). La Censura Previa y el Estado Regulador: Propuestas para una Configuración. Revista Chilena de Derecho, 40(1), 323—339.

# STUDENTS PERSPECTIVE OF ONLINE LEARNING

**M. Vyas**

Department of Management Studies, S. K. Somaiya College of Arts, Science and Commerce, Mumbai
_____

## ABSTRACT

*The current ongoing pandemic has created havoc on every aspect of society globally. Covid-19, as a global pandemic, has called for social distancing. It has made people mandatory to sit indoor and work from home. It has caused profound disruption in almost all fields especially to the education system as governments around the world have temporarily closed educational institutions to contain the spread of the coronavirus due to which the whole educational system from elementary to tertiary level has been collapsed. E-learning has become the mandatory component of all educational institutions like schools, colleges, and universities. Face-to-face classes have been canceled and moved to online classes, bringing about the rise of online learning that has allowed learners to continue their education. The sudden transition from face-to-face to online learning has, however, posed abundant challenges for students, teachers, administrators, and education leaders. Institutions and teacher educators had to quickly respond to an unexpected and 'forced' transition from face-to-face to remote teaching. By considering the sudden shift to online teaching-learning due to COVID-19 pandemic the author aims to study the E-learning process among students. A survey was conducted on 241 students to uncover their perspectives on online teaching-learning. The data, collected by questionnaire, were analyzed, using percentage and frequency. Results indicated that students were enjoying online learning, they liked the Flexibility during online learning but sometimes poor network, unavailability of proper devices is the biggest challenge for them. Along with this the lack of interaction with their own friends, their teachers, interruptions from home environment during lectures and one-sided learning were mentioned as its disadvantages.*

_____

*Keywords: COVID-19 pandemic; Online teaching-learning; Students' perspective.*

## Introduction

The COVID-19 is a highly infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), originated in Wuhan city of China, has already taken on pandemic proportions, affecting across all the continents, mostly spread among individuals during close contact now resulting in millions of death. The beginning of the novel coronavirus has made everything upset right from world economies to social rituals. One of the most desired ways to soothe the effect of this disaster is to apply the COVID-19 containment measures in their respective grounds. Nowadays lockdown is a common saying that has been considered over by the people during corona pandemic. In fact, lockdown is a state of the emergency protocol implemented by the Central and State governments to restrict people from leaving their place of living which has resulted in mass quarantines and stay-at-home across the world since March 2020. The coronavirus triggered the first phase nationwide lockdown in India which began on March 25, 2020, for 21 days and subsequently repeated on April 15, 2020, for 19 days as the second phase; on May 04, 2020, for 14 days as the third phase; on May 18,

2020, for 14 days as the fourth phase and on June 01, 2020, only for containment zones taking 16 days. To get control over COVID-19 pandemic is possible to a greater extent with people's willpower for maintaining social distancing, use of mask at every place, following medically instructed quarantine process and implementation of sanitation.

The purpose of education is to mold a person to be perfect. Education provides the pathway to students to reach their destiny. Anything accidently that happens will always leave its impact on education. And so the epidemic of COVID 19 has its footprints on education. The occurrence of this dangerous virus has forced educational institutions to shut down to control the spread of this virus. Prior to the COVID-19 pandemic, the concept of blended learning a combination of face-to-face learning and online learning was introduced at some universities, but it was not really a common learning method. The beginning and effect of COVID-19 have changed everything. As schools and universities were ordered to close to hold the spread of the coronavirus, traditional physical classes were transitioned to an online mode of learning. The transition was unexpected, making a lot of challenges for students,

teachers, school administrations, and even parents. This happening made the teaching professionals think of alternative methods of teaching during this lockdown.

It is quite obvious that no pedagogical approach can replace the traditional physical classes. But, after COVID-19 crisis, online education became a pedagogical shift from traditional method to the modern approach of teaching-learning from classroom to Zoom, Google classroom, Microsoft teams etc. And it seems that it would gradually replace the traditional education system if the same type of circumstances will continue over long time. In today's scenario learning has stepped into the digital world. In which teaching professionals and students are virtually connected. The use of a desktop, laptop, or smartphones and the internet forms a major component of this learning methodology.

### Scope of the Study

This study is to find out the students attitude towards e-learning during COVID-19 Pandemic. The study was done for SY and TY students of S. K, Somaiya College of Arts, Science and Commerce to gain information regarding their perspective on e-learning during this pandemic.

### Objectives

- To know the E-learning resources available with students.
- To know the internet facility available with students.
- To understand the level of stress as well as the level of happiness that students are going through during online learning.
- To identify their perspective about their teachers who all are managing themselves to teach online.
- To identify students choice between traditional physical classes and online classes.

### Methodology

This study is based on primary data. The data have been collected from students, who are currently pursuing their undergraduate degrees in S. K. Somaiya College of Arts, Science and Commerce. The questionnaire was prepared and it was sent online through Google Forms to all students for collecting data. The sample size is 241 and the period of study is the month of March- April 2021.

### Analysis

The analysis of 241 responses of questionnaire is as follows,

The first two questions were general questions on the name of student and Gender.

The third question was on class, whether SY or TY for which the responses were as follows,

### Table 1: Class of Students

| Class | No. of students | Percentage |
|-------|-----------------|------------|
| SY | 129 | 53.8 |
| TY | 112 | 46.5 |

Out of 241 respondents (in this study its students), 129 (53.8%) of students belongs to SY class and 112 (46.5%) of students belongs to TY class.

The fourth question was on the high speed internet facility available at their home which gives an idea on whether the students have the internet facility to attend the online classes properly or they are missing their studies due to lack of internet facility at home. Various responses for the same were as follows.

### Table 2: High speed internet facility at home.

| Response | No. of students | Percentage |
|----------|-----------------|------------|
| Yes | 179 | 74.3 |
| No | 62 | 25.7 |

179(74.3%) students out of 241 students have high speed internet at home and 62(25.7%) students out of 241 students does not have high speed internet at home.

The fifth question was on availability of device at their home for attending online lectures. The responses for the same were as follows,

### Table 3: Device type used for learning online

| Device | No. of students | Percentage |
|--------|-----------------|------------|
| Laptop | 74 | 30.7 |
| Desktop | 4 | 1.7 |
| Smartphone | 159 | 66 |
| Tablet | 4 | 1.7 |

Out of 241 students, 74(30.7 %) of students uses laptop, 4(1.7%) of students, uses Desktop, 159(66%) of students uses smartphone, 4(1.7%) of students uses Tablet for learning online.

The sixth question was on their enjoyment in online learning, the responses were as follows,

**Table 4: Happiness during online learning**

| Options | No. of students | Percentage |
|---|---|---|
| Yes, absolutely | 55 | 22.8 |
| Yes, but I would like to change few things | 72 | 29.9 |
| No, there are quite few challenges | 76 | 31.5 |
| No, not at all | 38 | 15.8 |

From 241 students, 55(22.8%) said that yes they are enjoying online learning, 72(29.9%) said that they enjoy but they would like to change certain things, 76(31.5%) said no as there are few challenges during online learning, 38(15.8%) said that they are not at all enjoying online learning.

The seventh question was on how stressful online learning for the students, the responses were as follows,

**Table 5: Stress level during online learning**

| Options | No. of students | Percentage |
|---|---|---|
| Not at all stressful | 32 | 13.3 |
| Slightly stressful | 70 | 29 |
| Moderately stressful | 105 | 43.6 |
| Very stressful | 21 | 8.7 |
| Extremely stressful | 13 | 5.4 |

From 241 students, 32 (13.3%) of students feels online learning as not at all stressful, 70 (29%) of students feels it is slightly stressful, 105 (43.6%) of students feels it is moderately stressful, 21 (8.7%) of students feels it is very stressful, 13 (5.4%) of students feels it is extremely stressful.

Eighth question was on the effect of online learning on students which gives an idea about whether teaching online brings any change in students or not, the question was asked via likert scale wherein 1 indicates poor effect and 5 indicates excellent effect.

**Table 6: Effectiveness of online learning**

| Likert scale (1=poor to 5=Excellent) | No. of students | Percentage |
|---|---|---|
| 1 | 16 | 6.6 |
| 2 | 60 | 24.9 |
| 3 | 104 | 43.2 |
| 4 | 45 | 18.7 |
| 5 | 16 | 6.6 |

Out of 241 students, 16 (6.6%) of students are having poor effect on their studies during online classes, 60 (24.9%) of students are having slight effect on their studies, 104(43.2%) of students are having average effect, 45 (18.7%) of students are having Good effect, 16(6.6%) of students are having excellent effect on their studies during online classes.

Ninth question was on whether their teachers are helpful to them during online classes, various responses via likert scale were as follows,

**Table 7: Teachers help during online learning**

| Likert scale | No. of students | Percentage |
|---|---|---|
| 1 | 2 | 0.8 |
| 2 | 12 | 5 |
| 3 | 81 | 33.6 |
| 4 | 86 | 35.7 |
| 5 | 60 | 24.9 |

From 241 students, 2(0.8%) students said that teachers are not at all helpful, 12(5%) students said that teachers are slightly helpful, 81(33.6%) students said that teachers are moderately helpful, 86(35.7%) students said that teachers are very helpful and 60(24.9%) students said that teachers are extremely helpful.

Tenth question was on the peaceful environment at their home during online classes, the responses on likert scale were as follows,

**Table 8: Peaceful environment at home**

| Likert scale | No. of students | Percentage |
|---|---|---|
| 1 | 23 | 9.5 |
| 2 | 52 | 21.6 |
| 3 | 75 | 31.1 |
| 4 | 49 | 20.3 |
| 5 | 42 | 17.4 |

For 23 (9.5%) of 241 students the environment at home is not at all peaceful during online classes, For 52(21.6%) of 241 students the environment at home is slightly peaceful, For 75(31.1%) of 241 students the environment at home is moderately peaceful, For 49(20.3%) of 241 students the environment at home is very peaceful, For 42(17.4%) of 241 students the environment at home is extremely peaceful during online classes.

Eleventh question was on their time spent during online classes, the responses were,

**Table 9: Time spent for online learning**

| Time | No. of students | Percentage |
|---|---|---|
| < 2 hrs | 39 | 16.2 |
| 2-4 hrs | 168 | 69.7 |
| 4 -6 hrs | 29 | 12 |
| >6 hrs | 5 | 2.1 |

Out of 241 students, 39(16.2%) of students spends less than 02 hours, 168(69.7%) of students spends between 02 to 04 hours, 29(12%) of students spends between 04 to 06 hours, and 5(2.1%) of students spends more than 06 hours. Twelfth question was on whether online classes saves their time as compared to traditional physical classes as they have to sit at their home only and not to travel, the responses were,

**Table 10: Online classes saves their time as compared to traditional physical classes**

| Options | No. of students | Percentage |
|---|---|---|
| Yes | 198 | 82.2 |
| No | 43 | 17.8 |

198(82.2%) of 241 students said yes it saves their time, 43(17.8%) students said no it does not saves their time.

Thirteenth question was on how often they are getting an opportunity to have one to one discussion with their teachers, various responses were as follows,

**Table 11: often 1-1 discussion with teachers during online learning**

| Options | No. of students | Percentage |
|---|---|---|
| Daily | 42 | 17.4 |
| Weekly | 78 | 32.4 |
| Fort-nightly | 27 | 11.2 |
| Monthly | 45 | 18.7 |
| More than a month | 49 | 20.3 |

42(17.4%) students are having one to one discussion with their teachers daily, 78(32.4%)

are having it weekly, 27(11.2%) are having it fort-nightly, 45(18.7%) are having it monthly and 49(20.3%) are having it after a month.

Fourteenth question was on student's opinion for their teacher's situation and the responses were as follows,

**Table 12: Teachers situations during online teaching as per student's perception**

| Options | No. of students | Percentage |
|---|---|---|
| Teachers are much comfortable for online teaching | 88 | 36.5 |
| It will be a big challenge for them | 153 | 63.5 |

From 241 students, 88(36.5%) feels that teachers are much comfortable teaching online and 153(63.5%) feels that it will be a big challenge for teachers to teach online.

Fifteenth question was on overall impact of online learning on them,

**Table 13: Overall impact of online learning**

| Likert scale (1=poor to 5=Excellent) | No. of students | Percentage |
|---|---|---|
| 1 | 23 | 9.5 |
| 2 | 46 | 19.1 |
| 3 | 96 | 39.8 |
| 4 | 50 | 20.7 |
| 5 | 26 | 10.8 |

Out of 241 students, For 23(9.5%) of students the impact is poor, For 46(19.1%) of students the impact is moderate, For 96(39.8%) of students the impact is on an average, For 50(20.7%) of students the impact is good and For 26 (10.8%) of students the impact is excellent.

Sixteenth question was on choice given to them between online and traditional physical offline learning, the responses were as follows,

**Table 14: Choice given to students**

| Options | No. of students | Percentage |
|---|---|---|
| Online | 53 | 22 |
| Offline(physical class) | 62 | 25.7 |
| Both | 33 | 13.7 |
| Depends upon the subject | 32 | 13.3 |
| Offline as there is an opportunity to meet their friends and visit college | 61 | 25.3 |

Out of 241 students, 53(22%) prefers online learning, 62(25.7%) prefers traditional physical offline learning, 33(13.7%) prefers both online as well as offline, 32(13.3%) prefers online or offline learning depending upon the subject, 61(25.3%) prefers offline learning as there is an opportunity for them to meet their friends and visit college.

## Conclusion

Amongst COVID-19 Pandemic, internet has become justifying tool to rescue education from severe effects of lockdown and closure. By closing the gates of many educational institutions, coronavirus pandemic has provided an opportunity to practice digital form of teaching and learning. The findings of this study are based on primary data which reflects its impact on e-learning and student's interest as well as disinterest in learning via online classes. The high speed internet, happiness for something different, time saving, interesting for certain theory based subjects are a part of advantages during online learning for them. while on the other side stress, smartphone as the only one device to attend classes which is not comfortable for practical based subjects, losing contacts with friends, losing one to one discussion with teachers, highly challengeable for teachers to teach online, Non peaceful environment at home etc. are the part of disadvantages during online learning for them. At the end when it was asked to them about given an opportunity between online and traditional learning which one they prefer, majority of them preferred traditional learning instead of online learning. To conclude, the study analysis proved that students are not that comfortable with online learning and they want traditional physical classes but due to unavoidable situation they are managing themselves and trying to complete their studies which will make their future bright.

## References

1. Carmen Carrillo and Maria Assuncao Flores, "COVID-19 and teacher education: a literature review of online teaching and learning practices", European journal of teacher education, volume 43, Issue 4, 466-487.
2. Kimkong Heng and Koemhong Sol, "Online learning during COVID-19: key challenges and suggestions to enhance effectiveness", Cambodian education forum, 1-15.
3. Lokanath Mishra et al, "online teaching learning in higher education during lockdown period of COVID-19 pandemic", International journal of education research open 1, 100012.
4. Nazia hasan and Naved hasan khan, "Online teaching-learning during covid-19 pandemic: students perspective", the online journal of distance education and e-learning, volume 8, issue 4, 202-213.
5. R.Radha et al, "E-Learning during Lockdown of Covid-19 Pandemic: A Global Perspective", International journal of control and automation, volume 13, issue 4, 1088-1099.

# WOMEN EMPOWERMENT THROUGH KANYASHREE PRAKALPA SCHEME IN SOUTH 24 PARGANAS DISTRICT OF WEST BENGAL: INVOLVING THE ROLE OF PUBLIC LIBRARIES

**M.Y. Akhter and P. Deb**

Department of Lifelong Learning & Extension, University of Kalyani, India

md.yeosufakhter@gmail.com

_____

## ABSTRACT

*The task of public libraries is multi-faceted in West Bengal. Apart from book distribution, knowledge dissemination is now the most challenging duties before public librarians. Considering the gravity and importance of their works, the Government of West Bengal gave reemployment of 184 retired public librarians. The present study conducted in Canning-II Community Development Block of South 24 Parganas district among 100 girl students explores the effects and benefits who received one-time Kanyashree scholarship grant of Rupees Twenty Five Thousand after attaining the age of 18 years. The principal objective of the study is to assess the role of public libraries in empowering women. Some marginal variables like Educational status, Occupation of parents, Monthly income of parents, Monthly income of family, Availability of food during school /college hour, Electricity at home, The school's or college's distance from your home, How you go to school or college, Accessibility of private tuition, Effectiveness of Kanyashree grant for dropout girls, Role of Schools in getting Kanyashree grant, Role of Gram Panchayat in getting Kanyashree grant and Role of Block Development Office in getting public services had massive implications on the level of perception of students about the effectiveness of Kanyashree one time grant towards the empowerment of women. It is further recognized that variables such as availability of public library, use of public library, role of public libraries towards public services, role of public libraries towards women empowerment, role of public libraries towards job related training, role of public libraries towards kind of information etc. had a great significance on the level of students' view to evaluate the function of public libraries regarding women empowerment.*

_____

*Keywords: Public Library, Women Empowerment, Girl child Education, and Kanyashree Prakalpa etc.*

## Introduction

21st century has become the witness of NARI PRAGATI, the welfare of women. They are advancing with the males equally. They will no longer remain at the whim of men. By realising their value, their status they have reached almost everywhere. It is only education that makes every impossible possible for them. To this end, KANYASHREE PRAKALPA launched by Mamata Banerjee, the hon'ble Chief Minister of West Bengal in 2013 has played a great role. By utilizing the financial help through this said prakalpa a good many numbers of girl students have established themselves as teachers, doctors, nurses, airhostesses and what not. It is hoped that in near future there will be renaissance in the arena of women world.

Government of West Bengal pioneered Kanyashree Prakalpa, a Conditional Cash Transfer (CCT) Scheme, to save girls currently at-a-high-risk of dropping out of school and from the tentacles of Hydra headed monster of child marriage. Adolescents between the ages of 13 and 18 are the target groups of Kanyashree Prakalpa. The CCT ingredients of the scheme are supported by a multi faceted communication strategy addressing key stakeholders' attitudes and practices towards female adolescents. The state and district administrators are to implement the same. The ingredients of this CCT are divided into three classes, viz, K1. K2 and K3.

K1 is to be given away to the girl students between 13 and 18 years of age from or above 8th standard in a formal school, madrassah or equivalent open school course for every year so that they can pursue education, provided they are unmarried at the time.

K2 is given away as a one-time grant of Rs. 25000/- to girls who are between the age of 18 and 19, provided she is enrolled in an educational institution and is unmarried.

K3 is the third benefit which enables all girls whether single or married, to receive financial assistance from Kanyashree Prakalpa, while studying postgraduate degrees in West Bengal. But the primary condition is that these girls have scored at least 45% in graduation and pursuing a postgraduate degree in the Arts,

Commerce or Science. For Arts and Commerce stream, beneficiaries will be paid a grant of Rs 2,000 and Rs. 2500 per month for Science, thus forming a gateway to empower girl students in West Bengal.

Public Library is a place from where all kind of information especially Kanyashree Prakalpa related information are disseminated to the common people. These types of information are very crucial to the female students concerning their empowerment.

Flaherty (2015) found in his study that the result was a lively, well-attended adult program, with a lengthy and likely contentious social process defused, and many new faces in the library. As public libraries evolve to become vital community centers, they can be exploited as natural settings for consumer health information provision and health promotion. Full-blown statewide initiatives like Delaware's may not be realistic in all communities, especially given current funding constraints.

Haruna et al. (2016) found out that the results from this assessment revealed that health science libraries in Tanzania are faced with the challenges of insufficient infrastructure, old technology, limited facilities and furniture, inadequate and incompetent library staff, lack of health sciences librarians, outdated and insufficient resources, and low knowledge and use of information technologies by library clients. Most respondents would prefer to have both physical and electronic libraries, as well as librarians with specialized health information science skills, to cope with changing nature of the medical field.

Bishop et al. (1999) stated an empirical study of community information exchange and computer access and use among low-income, predominantly African-American residents in one locale.

Patil and Pradhan's (2014) paper enumerates the concept of library promotion and marketing of library services. Academic libraries are having all type of collections. To promote the collection in use it is necessary to market library products. This paper suggests practical solutions, ways and means of marketing the library services.

According to Gandhimathi (2020), the study is predicated on purely from secondary sources.

The study reveals that ladies of India are relatively disempowered and that they enjoy somewhat inferiority than that of men in spite of the many efforts undertaken by Government. It is found that acceptance of unequal gender norms by women are still prevailing within the society. The study concludes by an observation that access to Education, Employment and alter in social organization are only the enabling factors to Women Empowerment.

Vendasalapathi and Santhanalakshmi (2020), reveals significant differences in the nature and conditions of work, income between men and women in work place. The study outlines the worse conditions of work that women face, due to their low educational qualifications and skills the women workers has less access to better working conditions, promotions, leave facilities, occupational safety, The survey tries to highlight. Some of the best practices with respect to women workers so that the employers in the organizations could bring about some changes in work conditions and increase the income of the employers and provision of the trade union especially in apparel industries.

Begum and Lakshmi's (2020) research tries to scrutinize on the influence of SHGs with regards to Muslim women empowerment on firsthand information. This tries to identify initiatives taken by SHGs to attain individual and communal empowerment in Guntur city. Individual empowerment is examined via their level of awareness, leadership skills, communalization, economic liberation, and empathy from family, improved way of living, acknowledgement, and contribution in the process of taking decision. Collective empowerment is observed through schemes provided, involvement in social and political aspects.

In the study of Vijayalakshmi and Karunanithi (2020), entrepreneurship is considered to be a key for women empowerment especially in rural areas and hence promotion of women entrepreneurs is focused highly by the government. Majority of the rural women of SHGs are micro entrepreneurs very few are associated with small scale enterprises. Women are not only developing with sustainable

economy but also able to develop other women economically sustainable by providing job opportunities. The rural women entrepreneurs with the sustainable economic development are able to contribute to the family's, community's and the nation's development. This paper tries to highlight the role of rural women entrepreneurs in sustainable development in southern region of Tamil Nadu.

According to Bammanal (2020), the present study focused on socioeconomic conditions of SHGs members and impact of self-help groups on women empowerment in Haveri District of Karnataka. The two research questions (hypothesis) that are (I) Micro Finance creates Women Empowerment and (II) The SHGs are the best econometric tool for poverty alleviation and employment generation. Based on the analysis of women empowerment through self-help groups in Haveri district, the major findings of this study there is a positive impact of Self Help Groups on Women empowerment in Haveri District of Karnataka.

Devi (2020) found in her study that more than half of the respondents were not involved decision in spending money (66.8 percent), household purchase (51.4 percent), contraception (53.7 percent), and health care (50.3 percent). Among the background variables like age, occupation, place of residence education and wealth index were shown significantly associated with women's role in decision making as Chi-square tests suggests .Improvement of female education and family income is quite needed to increase female autonomy in near future can be recommended from the findings.

## Objective of the Study
## General Objectives

The present study aims at determining the perceptions of students and their attitudes towards public libraries and the infrastructure to empower women in the Canning II community development Block of 24 South Parganas District, West Bengal. It also intends to explore the components that influence the acceptability, accessibility, and exploitation of women's education through different public services activities.

## Specific Objectives of the Study

- To identify the dropout rates of girls after receiving basic education.
- Identify the correlation between female dropouts, poverty and child marriage in the study area.
- To identify the role of Kanyashree Prakalpa regarding the girls education.
- To learn about the impact of public services through the public library in the Canning II Community Development Area, located in South 24 Parganas District, West Bengal

## Scope of the Study

The scope of this study is to frame students' views and attitudes towards public libraries and women's empowerment in the Canning-II community development block in South 24 Parganas District, West Bengal.

## Methodology

This study has been developed on a stringent household survey conducted at the Canning II Community Development Block, South 24 Parganas district, West Bengal from September, 2019 to October, 2019. 100 students were chosen at random. These students are the recipients of one-time grant of Rs. 25000 from Kanyashree. There was a structured schedule that contained 31 different questions / statements / opinions and that was given to all the subjects. The study also interviewed to measure the education status, the age of the interviewees, the occupation of the parents, etc of the 100 subjects chosen at random. We used different statistical methods such as correlation, regression, and step down regression with the help of SPSS 2.0 version to reach a conclusion to this study.

## Measures
## Outcomes

Outcomes of the present analysis are of three steps. First one analysis determines effectiveness of Kanyashree one-time grant (Y), is expressed from 17 independent variables such as Educational status ($X_2$), age of the respondent ($X_3$), occupation of parents ($X_4$), monthly income of parents ($X_5$), monthly income of family ($X_6$), go to regular school or College ($X_7$), availability of food during school

/college hour ($X_8$), electricity at home ($X_9$), availability of Aadhaar card ($X_{10}$), the school's or college's distance from your home ($X_{11}$), how you go to school or college ($X_{12}$), Accessibility of private tuition ($X_{13}$), effectiveness of Kanyashree grant for dropout girls ($X_{14}$), family consent for studying in school or college ($X_{15}$), role of Schools in getting Kanyashree grant ($X_{16}$), role of Gram Panchayat in getting Kanyashree grant ($X_{30}$) and role of Block Development Office in getting public services ($X_{31}$).

The second one analysis the perception level of students on women empowerment (Z) from different independent variables such as educational status ($X_2$), age of the respondent ($X_3$), occupation of parents ($X_4$), monthly income of parents ($X_5$), monthly income of family ($X_6$), go to regular school or College ($X_7$), availability of food during school /college hour ($X_8$), electricity at home ($X_9$), availability of Aadhaar card ($X_{10}$), the school's or college's distance from your home ($X_{11}$), how you go to school or college ($X_{12}$), accessibility of private tuition ($X_{13}$), effectiveness of Kanyashree grant for dropout girls ($X_{14}$), family consent for studying in school or college ($X_{15}$), role of Schools in getting Kanyashree grant ($X_{16}$), role of Gram Panchayat in getting Kanyashree

grant ($X_{30}$), role of Block Development Office in getting public services ($X_{31}$), effectiveness of Kanyashree one time grant ($X_1$), impact of women empowerment ($X_{17}$), public services will help the women empowerment ($X_{19}$), encourage about job related work ($X_{20}$), role of public libraries towards women empowerment ($X_{24}$) and role of public libraries in getting information towards women empowerment ($X_{26}$).

The third one analysis the perception level of students role of public libraries in getting information towards women empowerment (W) from different independent variables like effectiveness of Kanyashree one time grant ($X_1$), impact of women empowerment ($X_{17}$), public services will help the women empowerment ($X_{19}$), encourage about job related work ($X_{20}$), the perception level of students on women empowerment ($X_{18}$), availability of public library ($X_{21}$), use of public library ($X_{22}$), role of public libraries towards public services ($X_{23}$), role of public libraries towards women empowerment ($X_{24}$), role of public libraries towards job related training ($X_{25}$), role of public libraries towards kind of information ($X_{27}$), uses of school or college library ($X_{28}$), and kind of books uses of school or college library ($X_{29}$).

## Result and Discussion

## Table - I: Correlation Analysis between dependent variable effectiveness of Kanyashree one time grant (Y) and 17 casual variables

| Variables | 'r' Value |
|---|---|
| Educational status ($X_2$) | -0.0420 |
| Age of the respondent ($X_3$) | 0.2170* |
| Occupation of parents ($X_4$) | -0.6259** |
| Monthly income of parents ($X_5$) | -0.7401** |
| Monthly income of family ($X_6$) | -0.7255** |
| Go to regular school or College ($X_7$) | 0.3972** |
| Availability of food during school /college hour ($X_8$) | 0.3852** |
| Electricity at home ($X_9$) | -0.7152** |
| Availability of Aadhaar card ($X_{10}$) | -0.7401** |
| The school's or college's distance from your home ($X_{11}$) | -0.6434** |
| How you go to school or college ($X_{12}$) | -0.7122** |
| Accessibility of private tuition ($X_{13}$) | -0.7821** |
| Effectiveness of Kanyashree grant for dropout girls ($X_{14}$) | 0.4852* |
| Family consent for studying in school or college ($X_{15}$) | -0.1936 |
| Role of Schools in getting Kanyashree grant ($X_{16}$) | 0.7451** |
| Role of Gram Panchayat in getting Kanyashree grant ($X_{30}$) | 0.6343** |
| Role of Block Development Office in getting public services ($X_{31}$) | 0.6257** |

Critical value (2-Tail, 0.05) = +or- 0.197        *Significant at 5% level
Critical value (2-Tail, 0.01) = +or- 0.256        ** Significant at 1% level

Table I describes the students perception on the effectiveness of Kanyashree one time grant (Y) from 17 independent variables such as educational Standard ($X_2$), age of the Interviewee ($X_3$), parents' occupation ($X_4$), parents' Income per Month ($X_5$), family Income per Month ($X_6$), regular Attendance to a School or College ($X_7$), accessibility of Food During School/College Hours ($X_8$), electric Connection at Home ($X_9$), accessibility of Aadhar Card ($X_{10}$), distance of School/College from the Interviewee's Home ($X_{11}$), mode of commuting to School/College ($X_{12}$), accessibility of Private Tutors ($X_{13}$), usefulness of Kanyashree for Dropout girls ($X_{14}$), whether Family Granted Permission to Study in a School/College ($X_{15}$), helpfulness of Schools in Procuring Kanyashree ($X_{16}$), helpfulness of Gram Panchayat in Procuring Kanyashree ($X_{30}$) and role of Block Development Office in getting public services ($X_{31}$) had applied a significant impact on the dependent variable that is, on the level of perception about the effectiveness of Kanyashree one time grant.

The variables such as age of the Interviewee ($X_3$), regular Attendance to a School or College ($X_7$), accessibility of Food During School/College Hours ($X_8$), usefulness of Kanyashree for Dropout girls ($X_{14}$), helpfulness of Schools in Procuring Kanyashree ($X_{16}$), helpfulness of Gram Panchayat in Procuring Kanyashree ($X_{30}$) and role of Block Development Office in getting public services ($X_{31}$) had positive impact on the level of perception about the effectiveness of Kanyashree one time grant. On the other hand the variables named parents' occupation ($X_4$), parents' Income per Month ($X_5$), family Income per Month ($X_6$), electric Connection at Home ($X_9$), accessibility of Aadhar Card ($X_{10}$), distance of School/College from the Interviewee's Home ($X_{11}$), mode of Commuting to School/College ($X_{12}$) and accessibility of Private Tutors ($X_{13}$) had strong negative impact on the level of perception about the effectiveness of Kanyashree one time grant.

## Table II: Multiple Regression Analysis

| Variables | "β" value | "t" value |
|---|---|---|
| Educational standard ($X_2$) | -0.023283 | -0.346 |
| Age of the interviewee ($X_3$) | 0.186708 | 2.782** |
| Parents' occupation ($X_4$) | -0.106064 | -0.994 |
| Family income per month ($X_6$) | 0.158671 | 0.527 |
| Regular attendance to a School or College ($X_7$) | -0.182096 | -0.616 |
| Accessibility of food during School/College Hours ($X_8$) | 0.148530 | 0.505 |
| Electric connection at Home ($X_9$) | 0.023746 | 0.088 |
| Accessibility of Aadhar Card ($X_{10}$) | -0.509273 | -1.912 |
| Distance of School/College from the interviewee's home ($X_{11}$) | 0.485215 | 2.885** |
| Mode of commuting to School/College ($X_{12}$) | -0.814108 | -4.948** |
| Accessibility of private tutors ($X_{13}$) | -0.607711 | -2.757** |
| Usefulness of Kanyashree for dropout girls ($X_{14}$) | -0.015452 | -0.197 |
| Whether family granted permission to study in a School/College ($X_{15}$) | -0.050197 | -0.843 |
| Helpfulness of Schools in procuring Kanyashree ($X_{16}$) | -0.792481 | -0.791 |
| Role of Block Development Office in getting public services ($X_{31}$) | 0.026637 | 0.125 |

Critical value (2-Tail, 0.05) = +or- 1.989     *Significant at 5% level
Critical value (2-Tail, 0.01) = +or- 2.637     ** Significant at 1% level

| | |
|---|---|
| Multiple R | = 0.86741 |
| R Square | = 0.75239 |
| Adjusted R Square | = 0.70818 |
| Standard Error | = 0.48375 |

### Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 15 | 59.73256 | 3.98217 |
| Residual | 84 | 19.65744 | .23402 |

F =     17.01658         Signif F = .0000

It is found from Table II that all seventeen (17) variables show their regression effects with β and corresponding t values, their effectiveness on Kanyashree one-time grant (Y), and they explain 75.23 per cent of the total aggregation effect ($R^2$ = 0.75239). Four variables were

identified in turn, such as age of the interviewee $(X_3)$, distance of School/College from the interviewee's home $(X_{11})$, mode of commuting to School/College $(X_{12})$ and accessibility of private a tutor $(X_{13})$ which are the most important and explains the effect of total regression on predictors.

### Table III: Step-down Regression Model

Step I: $X_{13}$
| | |
|---|---|
| Multiple R | = 0.78214 |
| R Square | = 0.61174 |
| Adjusted R Square | = 0.60778 |
| Standard Error | = 0.56083 |

Step II: $X_{12}$
| | |
|---|---|
| Multiple R | = 0.82575 |
| R Square | = 0.68187 |
| Adjusted R Square | = 0.67531 |
| Standard Error | = 0.51027 |

Step III: $X_{11}$
| | |
|---|---|
| Multiple R | = 0.84403 |
| R Square | = 0.71239 |
| Adjusted R Square | = 0.70340 |
| Standard Error | = 0.48770 |

Step IV: $X_3$
| | |
|---|---|
| Multiple R | = 0.85428 |
| R Square | = 0.72980 |
| Adjusted R Square | = 0.71842 |
| Standard Error | = 0.47519 |

From the variables in Table III to the regression model of regression analysis, it is found that after step 4, four variables are Accessibility of Private Tutors $(X_{13})$, mode of Commuting to School/College $(X_{12})$, distance of School/College from the interviewee's home $(X_{11})$ and age of the interviewee $(X_3)$ had explained 72.98 per cent of the total effect. Therefore, the remaining 13 variables explain only about 2.25 percent of the total effect.

### Table - IV: Correlation Analysis between dependent variable the perception level of students on women empowerment (Z) and 23 casual variables

| Variables | 'r' Value |
|---|---|
| Educational standard $(X_2)$ | -0.0121 |
| Age of the interviewee $(X_3)$ | -0.0798 |
| Parents' occupation $(X_4)$ | 0.6576** |
| Parents' income per month $(X_5)$ | 0.6092** |
| Family income per month $(X_6)$ | 0.6187** |
| Regular Attendance to a School or College $(X_7)$ | -0.3665** |
| Accessibility of food during School/College hours $(X_8)$ | -0.3574** |
| Electric connection at home $(X_9)$ | 0.6020** |
| Accessibility of Aadhar Card $(X_{10})$ | 0.5953** |
| Distance of School/College from the interviewee's home $(X_{11})$ | 0.3162** |
| Mode of commuting to School/College $(X_{12})$ | 0.3533** |
| Accessibility of private tutors $(X_{13})$ | 0.6398** |
| Usefulness of Kanyashree for dropout girls $(X_{14})$ | -0.3642** |
| Whether family granted permission to study in a School/College $(X_{15})$ | 0.0851 |
| Helpfulness of Schools in procuring Kanyashree $(X_{16})$ | -0.5983** |
| Helpfulness of Gram Panchayat in procuring Kanyashree $(X_{30})$ | -0.5415** |
| Role of Block Development Office in getting public services $(X_{31})$ | -0.5319** |
| Effectiveness of Kanyashree one time grant $(X_1)$ | -0.5294** |
| Impact of women empowerment $(X_{17})$ | 0.3676** |
| Public services will help the women empowerment $(X_{19})$ | 0.5920** |
| Encourage about job related work $(X_{20})$ | -0.6207** |
| Role of public libraries towards women empowerment $(X_{24})$ | -0.1266 |
| Role of public libraries in getting information towards women empowerment $(X_{26})$ | -0.1052 |

Critical value (2-Tail, 0.05) = +or- 0.197       *Significant at 5% level
Critical value (2-Tail, 0.01) = +or- 0.256       ** Significant at 1% level

Table IV describes the perception level of students on women empowerment (Z) from 23 causal factors, such as educational standard $(X_2)$, age of the interviewee $(X_3)$, parents' occupation $(X_4)$, parents' income per month $(X_5)$, family income per month $(X_6)$, regular attendance to a School or College $(X_7)$, accessibility of food during School/College hours $(X_8)$, electric connection at home $(X_9)$, accessibility of Aadhar Card $(X_{10})$, distance of School/College from the interviewee's home $(X_{11})$, mode of commuting to School/College $(X_{12})$, accessibility of private tutors $(X_{13})$, usefulness of Kanyashree for dropout girls $(X_{14})$, whether family granted permission to study in a School/College $(X_{15})$, helpfulness of

Schools in procuring Kanyashree ($X_{16}$), helpfulness of Gram Panchayat in procuring Kanyashree ($X_{30}$), usefulness of Block Development Office in getting public services ($X_{31}$), effectiveness of Kanyashree one time grant ($X_1$), impact of Women Empowerment ($X_{17}$), role of public services in women empowerment ($X_{19}$), encouragement about job related work ($X_{20}$), role of Public Libraries towards women empowerment ($X_{24}$) and usefulness of Public Libraries in getting information regarding women empowerment ($X_{26}$).

Here the variables such as parents' occupation ($X_4$), Parents' income per month ($X_5$), family income per month ($X_6$), electric connection at home ($X_9$), accessibility of Aadhar Card ($X_{10}$), distance of School/College from the interviewee's home ($X_{11}$), mode of commuting to School/College ($X_{12}$), accessibility of private tutors ($X_{13}$), Impact of women empowerment ($X_{17}$) and role of public services in women empowerment ($X_{19}$) had a strong positive impact on the perception level of students on women empowerment. On the other hand the variables named regular attendance to a School or College ($X_7$), accessibility of food during School/College hours ($X_8$), usefulness of Kanyashree for dropout girls ($X_{14}$), helpfulness of Schools in procuring Kanyashree ($X_{16}$), helpfulness of Gram Panchayat in procuring Kanyashree ($X_{30}$), usefulness of Block Development Office in getting public services ($X_{31}$), effectiveness of Kanyashree one time grant ($X_1$) and encouragement about job related work ($X_{20}$) had a strong negative bearing on the perception level of students on women empowerment.

## Table V: Multiple Regression Analysis

| Variables | "β" value | "t" value |
|---|---|---|
| Educational standard ($X_2$) | -0.016778 | -0.213 |
| Age of the interviewee ($X_3$) | 0.043473 | 0.551 |
| Parents' occupation ($X_4$) | 0.604708 | 5.022** |
| Family income per month ($X_6$) | 1.066776 | 3.119** |
| Regular attendance to a School or College ($X_7$) | -0.722831 | -2.007* |
| Accessibility of food during School/College Hours ($X_8$) | -0.720019 | -1.997* |
| Electric connection at home ($X_9$) | 0.215120 | 0.708 |
| Accessibility of Aadhar Card ($X_{10}$) | 384363 | 1.260 |
| Distance of School/College from the interviewee's home ($X_{11}$) | -0.117877 | -0.544 |
| Mode of commuting to School/College ($X_{12}$) | -0.017548 | -0.076 |
| Accessibility of private tutors ($X_{13}$) | 1.645900 | 4.841** Usefulness |
| of Kanyashree for dropout girls ($X_{14}$) | 0.164353 | 1.871 |
| Whether family granted permission to study in a School/College ($X_{15}$) | -0.111595 | -1.657 |
| Helpfulness of Schools in procuring Kanyashree ($X_{16}$) | 4.191211 | 5.375** |
| Usefulness of Block Development Office in getting public services ($X_{31}$) | 0.051263 | 0.216 |
| Effectiveness of Kanyashree one time grant ($X_1$) | 0.498841 | 3.114** |
| Impact of women empowerment ($X_{17}$) | 1.735457 | 4.933** |
| Role of Public Services in women empowerment ($X_{19}$) | -0.172669 | -0.901 |
| Encouragement about job related work ($X_{20}$) | -0.139862 | -0.748 |
| Role of Public Libraries towards women empowerment ($X_{24}$) | -0.101734 | -0.519 |
| Role of public libraries in getting information towards women empowerment ($X_{26}$) | -0.032699 | -0.166 |

Critical value (2-Tail, 0.05) = +or- 1.991    *Significant at 5% level
Critical value (2-Tail, 0.01) = +or- 2.642    ** Significant at 1% level

| | |
|---|---|
| Multiple R | = 0.84572 |
| R Square | = 0.71524 |
| Adjusted R Square | = 0.63857 |
| Standard Error | = 0.58014 |

### Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 21 | 65.93803 | 3.13991 |
| Residual | 78 | 26.25197 | .33656 |

F = 9.32931    Signif F = .0000

It is found from Table V that all twenty three (23) variables show their regression effects with β and corresponding t values, their perception level of students on women empowerment (Z), and they explain 71.52 per

cent of the total aggregation effect ($R^2 = 0.71524$). Eight variables were identified in turn, such as parents' occupation ($X_4$), family income per month ($X_6$), regular attendance to a School or College ($X_7$), accessibility of food during School/College hours ($X_8$), accessibility of private tutors ($X_{13}$), helpfulness of Schools in procuring Kanyashree ($X_{16}$), effectiveness of Kanyashree one time grant ($X_1$) and impact of women empowerment ($X_{17}$) which are the most important and explains the effect of total regression on predictors.

**Table VI: Step-down Regression Model**

Step I: $X_4$
| | |
|---|---|
| Multiple R | = 0.65757 |
| R Square | = 0.43240 |
| Adjusted R Square | = 0.42660 |
| Standard Error | = 0.73072 |

Step II: $X_{13}$
| | |
|---|---|
| Multiple R | = 0.68620 |
| R Square | = 0.47087 |
| Adjusted R Square | = 0.45996 |

| | |
|---|---|
| Standard Error | = 0.70915 |

Step III: $X_{16}$
| | |
|---|---|
| Multiple R | = 0.71238 |
| R Square | = 0.50749 |
| Adjusted R Square | = 0.49210 |
| Standard Error | = 0.68772 |

Step IV: $X_6$
| | |
|---|---|
| Multiple R | = 0.73555 |
| R Square | = 0.54103 |
| Adjusted R Square | = 0.52171 |
| Standard Error | = 0.66738 |

Table VI presents the step down regression model was applied to separate the prominent independent variables, then it was found that after step 4, four variables are parents' occupation ($X_4$), accessibility of private tutors ($X_{13}$), helpfulness of Schools in procuring Kanyashree ($X_{16}$) and family income per month ($X_6$) had explained 54.10 per cent of the total effect. Therefore, the remaining 19 variables explain only about 17.42 per cent of the total effect on the perception level of students on women empowerment.

**Table - VII: Correlation Analysis between dependent variables, the perception level of students' usefulness of Public Libraries in getting information regarding women empowerment (W) from 13 consequent variables**

| Variables | 'r' Value |
|---|---|
| Effectiveness of Kanyashree one time grant ($X_1$) | 0.0602 |
| Impact of women empowerment ($X_{17}$) | -0.2207* |
| Role of public services in women empowerment ($X_{19}$) | -0.1206 |
| Encouragement about job related work ($X_{20}$) | 0.0484 |
| The perception level of students on women empowerment ($X_{18}$) | -0.1052 |
| Availability of public library ($X_{21}$) | 0.8990** |
| Use of Public Library ($X_{22}$) | 0.9480** |
| Role of Public Libraries towards public services ($X_{23}$) | 0.8354** |
| Role of Public Libraries towards women empowerment ($X_{24}$) | 0.9204** |
| Role of Public Libraries towards job related training ($X_{25}$) | 0.7671** |
| Role of Public Libraries towards kind of information ($X_{27}$) | 0.8693** |
| Uses of School or College Library ($X_{28}$) | -0.0801 |
| Kind of books uses of School or College Library ($X_{29}$) | -0.0683 |

Critical value (2-Tail, 0.05) = +or- 0.197    *Significant at 5% level
Critical value (2-Tail, 0.01) = +or- 0.256    ** Significant at 1% level

Table VII describes the students' views on the role of public libraries in women's empowerment (W) from 13 consequent variables such as effectiveness of Kanyashree one time grant ($X_1$), impact of women empowerment ($X_{17}$), role of public services in women empowerment ($X_{19}$), encouragement about Job related work ($X_{20}$), the perception level of students on women empowerment ($X_{18}$), availability of public library ($X_{21}$), use of Public Library ($X_{22}$), role of Public Libraries towards public services ($X_{23}$), role of Public

Libraries towards women empowerment ($X_{24}$), role of Public Libraries towards job related training ($X_{25}$), role of Public Libraries towards kind of information ($X_{27}$), uses of school or college Library ($X_{28}$), and kind of books uses of school or college Library ($X_{29}$).

Here the variables named Impact of women empowerment ($X_{17}$) had negative impact on the perception level of student's usefulness of Public Libraries in getting information regarding women empowerment. And on the other hand the variables such as availability of

Public Library ($X_{21}$) , use of Public Library ($X_{22}$), Role of Public Libraries towards public services ($X_{23}$), Role of Public Libraries towards women empowerment ($X_{24}$), role of public libraries towards job related training ($X_{25}$) and

role of Public Libraries towards kind of information ($X_{27}$) had strong positive impact on the perception level of student's usefulness of Public Libraries in getting information regarding women empowerment.

### Table VIII: Multiple Regression Analysis

| Variables | "β" value | "t" value |
|---|---|---|
| Effectiveness of Kanyashree one time grant ($X_1$) | -0.014691 | -0.244 |
| Impact of women empowerment ($X_{17}$) | -0.039727 | -0.694 |
| Role of public services in women empowerment ($X_{19}$) | 0.124171 | 1.301 |
| Encouragement about job related work ($X_{20}$) | 0.037963 | 0.457 |
| The perception level of students on women empowerment ($X_{18}$) | 0.001421 | 0.034 |
| Availability of Public Library ($X_{21}$) | 0.237548 | 2.521* |
| Use of Public Library ($X_{22}$) | 0.558112 | 4.565** |
| Role of Public Libraries towards public services ($X_{23}$) | -0.105242 | -1.265 |
| Role of Public Libraries towards Women Empowerment ($X_{24}$) | 0.551829 | 4.223** |
| Role of Public Libraries towards job related training ($X_{25}$) | 0.001442 | 0.020 |
| Role of Public Libraries towards kind of information ($X_{27}$) | -0.275674 | -2.838** |
| Uses of School or College library ($X_{28}$) | -0.006524 | -0.045 |
| Kind of books uses of School or College Library ($X_{29}$) | -0.082818 | -0.465 |

Critical value (2-Tail, 0.05) = +or- 1.988     *Significant at 5% level
Critical value (2-Tail, 0.01) = +or- 2.634     ** Significant at 1% level

| | |
|---|---|
| Multiple R | = 0.96170 |
| R Square | = 0.92487 |
| Adjusted R Square | = 0.91351 |
| Standard Error | = 0.55596 |

### Analysis of Variance

| | DF | Sum of Squares | Mean Square |
|---|---|---|---|
| Regression | 13 | 327.20813 | 25.16986 |
| Residual | 86 | 26.58187 | .30909 |

F = 81.43172      Signif F = .0000

It is found from Table VIII that all thirteen (13) variables show their regression effects with β and corresponding t values, their perception level of student's usefulness of Public Libraries in getting information regarding women empowerment (W), and they explain 92.48 per cent of the total aggregation effect ($R^2 = 0.92487$). Four variables were identified in turn, such as availability of Public Library ($X_{21}$), use of Public Library ($X_{22}$), role of Public Libraries towards women empowerment ($X_{24}$) and role of Public Libraries towards kind of information ($X_{27}$) which are the most important and explain the effect of total regression on predictors.

### Table IX: Step-down Regression Model

Step I: $X_{22}$

| | |
|---|---|
| Multiple R | = 0.94800 |
| R Square | = 0.89871 |
| Adjusted R Square | = 0.89767 |
| Standard Error | = 0.60471 |

Step II: $X_{24}$

| | |
|---|---|
| Multiple R | = 0.95386 |
| R Square | = 0.90985 |
| Adjusted R Square | = 0.90799 |
| Standard Error | = 0.57341 |

Step III: $X_{27}$

| | |
|---|---|
| Multiple R | = 0.95685 |
| R Square | = 0.91556 |
| Adjusted R Square | = 0.91292 |
| Standard Error | = 0.55785 |

Step IV: $X_{21}$

| | |
|---|---|
| Multiple R | = 0.95979 |
| R Square | = 0.92119 |
| Adjusted R Square | = 0.91787 |
| Standard Error | = 0.54175 |

Table IX presents the step down regression model was applied to separate the prominent independent variables, then it was found that after step 4, four variables are use of Public Library ($X_{22}$), role of Public Libraries towards women empowerment ($X_{24}$), role of Public Libraries towards kind of information ($X_{27}$) and availability of Public Library ($X_{21}$) had explained 92.11 per cent of the total effect. Therefore, the remaining 9 variables explain only about 0.37 per cent of the total effect on the perception level of student's usefulness of Public Libraries in getting information regarding women empowerment.

## Recommendations

- Public Libraries aim at empowering villagers by improving their information literacy. Established on the results of a study on the level of empowerment levels, it can be concluded that the entire villagers in Canning II used the technology in their daily life to seek information to solve problems related to work, school or any other related sphere. Technology and social life are intertwined and are closely related to social life and are now considered to be an integral part of it. The elderly people are not adept at using technology, while people in other age groups are quite comfortable.

- It is the role of the librarians to help change the minds about the use of ICT for collection development and therefore, librarians must be trained and retrained.

- Librarians and staff in public libraries should know how user needs are inter-related to a particular community's information literacy. When public libraries know this, they can improve the quality of their services and the community. Thereby the library can be called a user-oriented library.

- In Canning- II block one Librarian of a Public Library takes charge of two or three libraries: this is how limited resources can hamper the services of public libraries in a greater scale.

- It is an absolute necessity to take initiatives to improve the collections of the Library.

- Different training programmes, seminars, workshops etc. should be regularly organized for the development and up gradation of library staff by the Public Library Management.

## Conclusion

Needless to say, the Public Library is of great importance. Besides giving much information to the readers who have greater quest for learning the Public Library has enabled them to be self supporting in the practical field of life. Particularly, the weaker sexes, the women who are subjugated by the mail dominated society are greatly benefited. They have earned a good deal of knowledge about the project like S.H.G (Self Help Group) and Kanyashree Prakalpa (2013). They have availed themselves of the opportunity of getting financial help of the said Prakalpa and established themselves as teachers, nurses, airhostesses, clerks etc. in many sectors of our country. The inferiority complex of them in regard to the male ones is removed. Thus they are noticed in the present age irrespective of cast, creed and colour everywhere.

## References

1. Bammanal, S.H. (2020). Women Empowerment through Self-Help Groups: An Empirical Study in Haveri District of Karnataka. Our Heritage, 68(54), 813-819.

2. Begum, M.N. & Lakshmi, K.D. (2020). Self-Help Groups: A Study on Their Roles and Impacts on Muslim Women Empowerment in Guntur District of Andra

Pradesh. Studies in Indian Place Names, 40(3), 5699- 5711.

3. Bishop, A. P., Tidline, T.J., Shoemaker, S. & Salela, P. (1999). Public Libraries and Networked Information Services in Low-Income Communities. Library & Information Science Research, 21, 361–390.

4. Devi, K.H.B. (2020). Role of Tribal Women in Household Decision Making - Study in Madhya Pradesh. Our Heritage, 68(30), 9089- 9096.

5. Flaherty, M. G. (2015). Health information resource provision in the public library setting. Meeting Health Information Needs Outside of Healthcare, pp.97-116. http://dx.doi.org/10.1016/B978-0-08-100248-3.00005-6

6. Gandhimathi, M. (2020). A study on issues and challenges of women empowerment in India. Studies in Indian Place Names, 40(41), 309- 322.

7. Haruna, H., Mtoroki, M., Gerendasy, D.D. & Detlefsen, E.G. (2016). Health Libraries and Information Services in Tanzania: A Strategic Assessment. annals of global health, 82, pp. 912-924. http://dx.doi.org/10.1016/j.aogh.2016.10.003

8. Patil, S. K. & Pradhan, P. (2014). Library promotion practices and marketing of Library services: A role of Library professionals. Procedia - Social and Behavioral Sciences, 133, 249 – 254.

9. Vendasalapathi, G. & Santhanalakshmi, V. (2020). A study on impact of apparel industries in women Empowerment in Tamilnadu with special reference to Thoothukkudi district. Studies in Indian Place Names, 40(41), 323- 332.

10. Vijayalakshmi, N. & Karunanithi, G. (2020). Role of rural women entrepreneurs in Sustainable development – a study with Reference to southern region of Tamilnadu. Our Heritage, 68(54), 361-365.

# DATA SUMMARIZATION AND ANALYSIS OF E-WASTE MANAGEMENT USING R IN IT-HUB OF INDIA BANGALORE

## R. Velmurugan[*] and Muruganantham A.
Kristu Jayanti College (Autonomous), Bangalore
velmurugan@kristujayanti.com

_____

## ABSTRACT

*E-Waste management is a growing challenge worldwide. The waste generated from electronic and electrical appliances, like gadgets, computers accessories, type-writers, mobile phones and chargers, headphones, remotes, batteries, compact discs, LCD/Plasma TVs, air conditioners, refrigerators, and fluorescent and other mercury containing lamps etc., consist of e-waste (1). This waste consists of Iron and steel (50%), plastics (21%), non-ferrous metals like copper aluminum and gold (13%), and other components (16%) (2). The rapid increase of e-waste and the unawareness of society about the hazards of e-waste management poses serious threats. The careless disposal of e-waste results in contamination of air, soil and water bodies (3). It becomes more severe in a nation like India where waste management systems are unorganized. Creating awareness among common man and IT professionals and making an attempt to improve the e-waste management system is of utmost importance. Hence the present study intends to find the current status of awareness about e-waste management among Bangaloreans.*
_____

## Introduction

E-Waste management is a growing challenge worldwide. The waste generated from electronic and electrical appliances, like gadgets, computers accessories, type-writers, mobile phones and chargers, headphones, remotes, batteries, compact discs, LCD/Plasma TVs, air conditioners, refrigerators, and fluorescent and other mercury containing lamps etc., consist of e-waste (Step Initiative. (2014). This waste consists of Iron and steel (50%), plastics (21%), non-ferrous metals like copper aluminum and gold (13%), and other components (16%). The rapid increase of e-waste and the unawareness of society about the hazards of e-waste management poses serious threats. The careless disposal of e-waste results in contamination of air, soil and water bodies. It becomes more severe in a nation like India where waste management systems are unorganized. Creating awareness among common man and IT professionals and making an attempt to improve the e-waste management system is of utmost importance.

Managing e- waste is a challenge, especially in a city like Bengaluru where systematic waste disposal is implemented partially only. Since it is the IT hub, the e-waste generated in the city also is expected to be comparatively larger when compared to other places. Hence analyzing the awareness among the Bangalore citizens regarding the hazards of improper e-waste management system and methods of proper handling is of greater significance. The present study intends to find the current status of awareness about e-waste management among Bangaloreans. The objective of the project is to assess the awareness of citizens in Bangalore city with specific target on educational institutions, industry and household.

## Review of Literature

Lack of proper management of e-waste has manifold effects of human health and environment. It includes contamination of food cycle by toxic substances, occupational exposure to toxic substances etc (Awasthi (2016a)). Grant et al. (2013) presents a systematic analysis of e-waste handling methods and tries to provide effective handling methods. Kumar a et al (2016) highlights that the maximum ewaste generated in India is from Karnataka. Hagelüken, C., Corti, C.W.(2010) reveals the importance of gold content that can be obtained from scrap. Hagelüken C (2006) discusses that Umicore is a speciality materials group which integrates metals smelter and refinery are a crucial part of the Waste Electrical and Electronic Equipment - recycling chain, which can further increase its efficiency if interfaces to pre-processing are consequently optimised. Their ability to recover numerous metals at high yields and without any "downcycling" in quality can contribute to a

significant future supply of secondary metals. Moreover, such operations can offer possibilities to utilise plastic fractions contained in WEEE as feedstock substitute for coke. P.K. Jatindra and K. Sudhir (2009) has launched an extensive study on e-waste management in Bangalore. Their analysis and survey include e-waste management in organisations line BEL, government organisations like Karnataka State pollution Control Board (KSPCB), the formal recyclers handle maximum E-waste recycling. E-Parisaraa, Ash recyclers and their customers HP, IBM, GE, Intel, Motorola, ABB, Philips, Sony etc. E-waste has been a problem of great concern not only for the government but also for the public due to their hazardous material contents currently, the main options for the treatment of electronic waste are involved in reuse, remanufacturing, and recycling, as well as incineration and landfilling. The hierarchy of treatment of E-waste encourages reuse of whole equipment first, remanufacturing and upgradation, then recovery of materials by recycling techniques, and as a last resort, disposal by incineration and landfilling. However, landfilling of E-wastes can lead to the leaching of lead into the groundwater. If the CRT is crushed and burned, it emits toxic fumes into the air (Ramachandra, T. V., & Saira, V. K. (2004)). Borthakur and Sinha (2013) discusses the range of diverse stakeholders from formal and non- formal sectors in the E-waste management system in India and the current practices in e-waste management adopted. The study finds, India provides a domestic market for a variety of electronics, most notably mobile phones, personal computers, televisions, refrigerators, and washing machines. But Indian customers are unaware of how to dispose of the products once it's obsolete. It is estimated that 75% of electronic items are stored due to uncertainty of how to manage them. Thus, unused electronics lie unattended in homes, offices, and warehouses until they are eventually mixed in with regular waste and dumped in landfills. N. Milovantseva, J.-D. Saphores (2013) investigates the effect of state e-garbage removal prohibitions on family unit reusing of e-squander. Creator investigated both past removal conduct of old mobile phones and

goals to discard garbage TVs. The emphasis was on PDAs and TVs since they are mainstream, they speak to separately little and bigger purchaser electronic items and they were (in any event for TVs) the target of initial e-waste disposal bans. Afroz et al (2013) suggested that the government could manage the WEEE by passing effective rules; setting up convenient collection centers for proper disposal of e-waste and also organizing campaigns, seminars and workshops to increase the level of awareness of the households and to motivate them to recycle their e-waste. Shah, Anuj (2014) prepared a novel study in India which attempts to assess public awareness of both toxic chemicals in WEEE and federal policies governing proper disposal and management. Their study greatly substantiated previous claims that technological innovation has led to rapid product obsolescence, as a majority of respondents indicated that the need or desire for new technology motivates them to purchase new products. The results pointed to a lack of government incentive for the consumer to participate in formal e-waste management strategies. The number of respondents who knew of formal services outnumbered those who actually participate in them.

The present study is conducted when the whole world went on an unprecedented lockdown and witnessed a boom in the usage of gadgets and electronic devices for communication. This is the time when the users are supposed to have a clear awareness on the management of damaged or unused electrical and electronic devices.

## Hypothesis

i.   Bangalore city lacks an integrated approach in e-waste handling
ii.  Common man is unaware of the proper disposal of e-waste materials
iii. Lack of knowledge of the hazardous effects created by the e-waste components

## Result and Discussion

A random sampling method was adopted to collect data from residents of Bangalore to analyze the awareness of the residents of the city about e- waste. The study majorly focused

on finding three aspects: Are the residents of Bangalore aware of-

i. e-waste and methods of disposal of e-waste
ii. Hazards due to improper management of e-waste
iii. Availability of formal e-Waste management systems

**Demographic Details of the Participants**

The data was collected from random sample of 200 dwellers of Bangalore City. It includes students, working professionals, few business owners and home-makers too. The age ranges from 20-60 years. The socio demographic profile of the respondents is presented in Table1.

**Table 1: Socio-demographic profile of the respondents**

| Age group (Years) | No. of Respondents | % |
|---|---|---|
| 20-30 | 158 | 79 |
| 30-40 | 20 | 10 |
| 40-50 | 14 | 7 |
| 50-60 | 8 | 4 |
| Gender | No. of Respondents | % |
| Female | 83 | 41.5 |
| Male | 117 | 58.5 |
| Total | 200 | 100 |

Majority (79%) of the participants are youth of the age group 20-29 years. 22% of respondents comprised of 40 years of age and above. 58.5 % of the respondents are males. To analyze the acquaintance of the respondents with electronics/ electrical/ IT based products, frequency distribution of the profession is presented in Table 2.

**Table 2: Information on Profession of the respondents**

| Profession | No. of Respondents | % |
|---|---|---|
| Student | 152 | 76 |
| Employed | 23 | 11.5 |
| Others | 24 | 12 |
| Grand Total | 200 | 100 |
| Field of employment | No. of Respondents | % |
| Student in the field of electronics or IT | 66 | 33 |
| Professions related to electronics or IT field | 8 | 4 |
| Student not in the field of electronics or IT | 27 | 13.5 |
| Professions not related to Electronics and IT | 47 | 23.5 |
| Not employed | 52 | 26 |
| Total | 200 | 100 |

Among the 46.5% who are students, 33% are involved in studies related to electronics and IT field. Also among the 49.5% of respondents who are working class, 4% are employed in electronics or IT related professions. In all 37%

of the respondents either they are students or working with IT and electronics related fields. Hence a general awareness on e-waste, management of e-waste and hazards of e-waste is expected. The distribution on awareness of various aspects related to electronic waste is presented in Table 3.

**Table 3: Awareness about the materials used in electronic/electrical products**

| On a scale of 1-7, how much do you know about the materials used in electronic/electrical products? | No of Respondents | % |
|---|---|---|
| 1 Very Low | 11 | 5.5 |
| 2 | 18 | 9 |
| 3 | 42 | 21 |
| 4 | 62 | 31 |
| 5 | 47 | 23.5 |
| 6 | 13 | 6.5 |
| 7 Very High | 7 | 3.5 |
| Grand Total | 200 | 100.00 |

The frequency table provides a truly critical revelation that the level of awareness about the materials used in electronic/electrical products is below average (score of 1 to 3) 35.5% of the respondents. Only 10% of the respondents have a clear (score 6 & 7) awareness. Remaining 54.5% of the respondents have very minimal or moderate awareness only which signals the lack of awareness.

A general frequency analysis of the awareness of the hazards of improper e-waste management is presented in Table 4.

**Table 4: Awareness of the hazards of improper e-waste management**

| On a scale of 1-7, how much do you know hazards due to improper management of electronic/electrical products? | No of Respondents | % |
|---|---|---|
| 1 Very Low | 5 | 2.5 |
| 2 | 7 | 3.5 |
| 3 | 51 | 25.5 |
| 4 | 104 | 52 |
| 5 | 7 | 3.5 |
| 6 | 4 | 2 |
| 7 Very High | 1 | 0.5 |
| Grand Total | 200 | 100.00 |

A very similar scenario is observed in the case of awareness of the hazards too. A majority of 83.5% have very poor awareness or no awareness about the hazards generated. Hence it is very essential that the authorities and academic institutions take necessary steps to improve the quality of e-waste management systems and create awareness among the citizens.

**The Purchase and Disposal pattern of electronic and electrical equipment**

To comprehend the buying and usage pattern of the e-goods and products, the respondents were asked on how many products they purchase a year, annual expense on these items and also how they dispose unused or damaged items. The purchase/buying behavior is presented in the Table 5.

**Table 5: Details of Purchase and disposal of Electronic/ electrical goods**

| No. of electronic good bought a year | Frequency | Percent | Amount spent per year | Frequency | Percent | Disposal of Electronics goods | Frequency | Percent |
|---|---|---|---|---|---|---|---|---|
| 0-1 | 38 | 19.00% | 0 - 10,000 Rupees | 96 | 48.00% | 0 | 16 | 8.00% |
| 2-4 | 122 | 61.00% | 10,000 - 25,000 Rupees | 64 | 32.00% | 1 - 2 | 130 | 65.00% |
| 5-7 | 33 | 16.50% | 25,00 - 50,000 Rupees | 27 | 13.50% | 2- 4 | 43 | 21.50% |
| More than 8 | 7 | 3.50% | 50,000 - 1,00,000 Rupees | 11 | 5.50% | 4- 6 | 11 | 5.50% |

From the table it can be observed that all of the respondents make at least one purchase a year and the purchase go beyond 8 units for some of them, though very less (3.5% respondents only). 80% of the respondents buy 0-4 units spending less than Rs 25000.

At the same time 73% of the respondents dispose up to 2 units per year and 37% dispose more than 2 units per year. These disposals are not made in a scientific manner is the matter of concern. The purchase versus disposal comparison is made using cross table which is presented in Table 6.

**Table 6: Cross table for comparison of purchase versus disposal**

| Purchase | Disposal | | | | |
|---|---|---|---|---|---|
| | 0 | 1 - 2 | 2- 4 | 4- 6 | Grand Total |
| 0-1 | 10 | 26 | 2 | | 38 |
| 2-4 | 6 | 83 | 25 | 8 | 122 |
| 5-7 | | 17 | 14 | 2 | 33 |
| More than 8 | | 4 | 2 | 1 | 7 |
| Grand Total | 16 | 130 | 43 | 11 | 200 |

Among the 150 respondents who buy 4 or less units, 130 of them dispose 1 or 2 items. The disposal rate is also high for those who buy more units.

**Finding association between various factors that influence the awareness of the material used in electronic and electrical items**

To analyze the association between awareness with various attributes, Chi-square test is performed. The test has a null hypothesis of 'no association'. The attributes considered are (i) gender, (ii) age and (iii) profession of respondents.

Among the 158 youngster (20-29 age group), 30.38% (48) of the youngsters are aware or well aware of the components, while 53 of them (33.54%) are not very sure of it. Among the 20 respondents of age group 30-39, 13 of them (55%) are not having any awareness or have very minimal awareness.

**Table 7: Result of Chi square test**

|  | Pearson Chi-Square | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Age Vs Awareness on components | 91.898 | 116 | 0.000 |
| Gender Vs Awareness on components | 16.740[a] | 6 | .010 |
| Profession Vs Awareness on components | 78.745 | 30 | 0.025 |
| Age Vs Awareness of e-waste hazards and proper management | 171.440[a] | 174 | 0.541 |
| Gender Vs Awareness of e-waste hazards and proper management | 3.167[a] | 6 | 0.788 |
| Profession Vs Awareness of e-waste hazards and proper management | 31.255[a] | 30 | 0.403 |
| Age Vs Awareness of formal Waste collection system | 77.974[a] | 58 | 0.412 |
| Gender Vs Awareness of formal Waste collection system | .562[a] | 2 | .755 |
| Profession Vs Awareness of formal Waste collection system | 8.495[a] | 10 | 0.581 |

The Chi square test proves that (Chi square = 91.898, p- value < 0.05) age has a significant influence on the awareness on the components. And the data also provides enough evidence that youngsters possess better awareness on the components of the electronics goods. The Chi square statistic is 16.74 with p-value 0.01 < 0.05; hence the null hypothesis is rejected and inferred that Gender is significantly associated with the Awareness about the materials used in e-materials.

The awareness of the hazards of e-waste starts with the awareness of the components used in the making of various electronics good. E-waste is a complex mixture of Ag, AU, Pb and Pt as precious metals; Cu, Al, Ni, Si, Zn and Fe as base metals; Hg, Be, Cd, Cr (VI), As, Sb and Bi as metals of concern due to their toxicity along with halogens and combustible (plastics, flame retardants) many of which are toxic (Hagelüken and Art, 2006). They also cause harm to the environment and create health hazards. The chi square value = 78.745 with p-value < 0.05, indicates, profession has a significant influence on one's awareness

Among the 158 youngster (20-29 age group), only 52.53% of the youngsters are aware that improper disposal of e-waste will yield both health and environment hazards. , while 38 of them (24.05%) believe there is no specific hazard. Among the other respondents of age group more than 30, almost all 39 of them are aware of its hazards. Is age associated with this awareness? The Chi square test proves that (Chi square = 171.4, p- value 0.541 > 0.05) age does not have a significant influence on the awareness on the components The Chi-Square

test proves that (Chi-Ssquare = 3.167, p- value 0.788 > 0.05) gender does not have a significant influence on the awareness on the health and environment hazards.

A close observation of the frequency table indicates that the level of awareness on health hazards due to improper handling of e-waste is not much different between people who are dealing with electrical/ electronic items in their profession and those who don't. This is confirmed by Chi square test. The test statistic value is 31.252 with p- value 0.403 > 0.05; hence the null hypothesis of no association between the two attributes is accepted confirming that professionals of IT are equally unaware of the hazards of e-waste. This indicates, irrespective of the person has learnt about technology, most of them are unaware of the impacts of e-waste on nature and our health.

Most of the citizens are not aware of the systems set up by authorities for scientific e-waste collection methods. In Bangalore, there are more than 30 such centers available in city premises, but most of the residents are not aware of their services. They are mostly not in search of such centers or organizations, because e- waste is disposed either with other dry wastes or through rag pickers.

Irrespective of the age people are unaware about a scientific system of e-waste collection, it is to be noted that a good majority of the respondents are unaware of the formal systems of e-waste collection. More than 50% of each age group is unaware of the formal systems. The chi square test result (Chi square = 77.974 with p- value 0.412 > 0.05) confirms that

irrespective of age the awareness is very poor among the sample. The chi square test (chisquare = 0.562 with p- value 0.755 >0.05) confirms that the awareness is not associated with gender. Irrespective of the profession respondents seem to be unaware about a scientific system of e-waste collection, it is to be noted that a good majority of the respondents are unaware of the formal systems of e-waste collection. More than 50% of each age group is unaware of the formal systems. The chi square test (Chi Square = 8.495 with p- value 0.581 >0.05) confirms that the awareness is not associated with profession.

To find the influence of Age, Gender and profession and one's relation with IT related items on awareness of the components of E-waste products and health hazards due to unscientific handling of e-waste using Regression Analysis

To analyse the impact of Gender, Age, Profession and work/ study related to IT on the Awareness on the material used on e-products/ items is analyzed using regression model

Hypothesis model: Awareness = $B_0$ + $B_1$Gender + $B_2$Age + $B_3$Profession + $B_4$Related to IT in work/study.

## Table 8: Multiple Regression model

|  | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
|  | B | Std. Error | Beta |  |  |
| (Constant) | 2.252 | 0.797 |  | 2.825 | 0.005 |
| Age | 0.037 | 0.020 | 0.236 | 1.888 | 0.060 |
| Gender | 0.667 | 0.187 | 0.241 | 3.562 | 0.000 |
| Profession | 0.139 | 0.413 | 0.043 | 0.336 | 0.737 |
| IT related or not | 0.580 | 0.211 | 0.200 | 2.751 | 0.006 |

Awareness = 2.252 + 0.667*Gender + 0.037*Age + 0.139*Profession + 0.58*Related to IT in work/study.

Age is a numeric variable, gender a dummy variable, profession a dummy variable and is your work/ study is related to IT or not is also a dummy variable. The model suggests that age is positively related to the awareness, that better than students others have more awareness. Men have comparatively more awareness, since the dummy variable

regression coefficient is 0.667 (Male=1, Female=0). People with profession related to technology/ electronics seems to be better aware (profession related to technology=1, others =0). If one's profession is related to IT, they seem to be way ahead with respect to awareness)

However, gender and professional relation to IT industry are the significant variables (t-test, p-value <0.05) and Profession and age seems to be not significant.

## Table 9: Model summary and ANOVA

| Model Summary | | | | | ANOVA | |
|---|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | F | Sig. |
| 1 | .361[a] | .130 | .112 | 1.2908 | 7.298 | .000[b] |

The model accuracy is too low; only 13% variation in awareness is captures by this model. However, ANOVA test suggests the model is acceptable as significant.

To analyse the impact of Gender, Age, Profession and work/ study related to IT on the Awareness on the health hazards due to e-waste is analyzed using regression model

**Table 10: Regression model for awareness on health hazards**

| | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | 5.101 | 0.900 | | 5.665 | 0.000 |
| Age | -0.002 | 0.022 | -0.011 | -0.084 | 0.933 |
| Gender | 0.084 | 0.212 | 0.028 | 0.399 | 0.690 |
| Profession | -0.924 | 0.466 | -0.266 | -1.981 | 0.049 |
| IT related or not | 0.480 | 0.238 | 0.153 | 2.017 | 0.045 |

Awareness on health hazards= 5.101 - 002*Age +0.084* Gender -0.924*Profession +0.480*Related to IT or not.

Age and Gender is not significantly related to the awareness, and they have very weak regression coefficients too. Working class seems to be negatively correlated with awareness level. That is, students seem to have better awareness on health hazards. Also the relation to IT field in one's profession has a positive impact on awareness. People who are related to IT sector have better awareness.

**Table 11: Model summary and ANOVA**

| Model Summary | | | | | ANOVA | |
|---|---|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | F | Sig. |
| 1 | .247ᵃ | .061 | .042 | 1.4577 | 3.169 | .015 |

Though this model has low prediction accuracy, which can be attributed to note including more relevant variables. However, ANOVA test result (F = 3.169, p- value 0.015) suggests that the model is significant.

Both the regression model suggests people who are related to IT Field in profession and students are more aware of e-waste and its health hazards. This emphasizes on the need of increasing the awareness among common people who are not related to the IT and electronic sector.

## Findings

The study is based on a random sample of 200 adults who are students and professionals. The study reveals the shocking state of unawareness of the citizens of Bangalore city about e-waste, health hazards of e-waste and availability of formal e-waste management systems. The awareness of the components used in electronic and electrical products is comparatively high among youngsters and also professionals in the field of IT and electronics. More than women, men have better idea about this. The awareness on the health hazards and the environment hazards are not associated with gender, age or profession. Irrespective of all these, there is a dearth in this knowledge. The response to the query on awareness of formal e-waste management system revealed that, irrespective of age and gender. A good majority of the respondents are unaware of it. The working-class people and students of IT sector have a better awareness about the formal e- waste disposal systems. This throws light on the need to educate people more on the constituents of e-waste and hazards because of its improper management.

## Conclusion

The research was carried out to analyse the awareness on e-waste management among citizens of Bangalore. The findings point out that youngsters are better aware of the hazards of improper management of e- waste. But they are not fully aware of the possibilities of formal waste management systems that are available in the city. Men are more aware than women and also the students and professionals involved in IT and technical field the study hints on the immediate requirement to increase the awareness about what is e-waste, the adverse effects, unscientific handling and disposing e-waste and also the formal systems available for e-waste management. There is an urgent need to increase the facilities/ provisions of e-waste collection and disposal in a formal way.

## Future Scope

The study is confined to individuals; it is to be extended to organizations (IT firms/ educational institutions/ NGOs)

## References

1. Afroz et al. (2013) -_Journal of Cleaner Production Volume 52, 1 August 2013, Pages 185-193
2. Awasthi AK, Zeng X and Li J (2016a) Relationship between electronic waste recycling and human health risk in India: A critical review. Environmental Science and Pollution Research 23: 11509–11532
3. Borthakur, Anwesha, Sinha K.(2013) Electronic Waste Management in India: A Stakeholder's Perspective. Electronic Green Journal p1.36
4. Central Pollution Control Board (2016) List of Registered E-Waste Dismantler/Recycler in the country (as on 29–12–2016). New Delhi, India, Central Pollution Control Board. Available at: http://www.cpcb. nic.in/List_of_E-waste_Recycler_as_on_29.12.2016.pdf (accessed 15 July 2017)
5. E-Waste Management: A Case Study of Bangalore, India, (2009) Res. J. Environ. Earth Sci., 1(2): 111-115
6. Grant K, Goldizen FC, Sly PD, et al. (2013) Health consequences of exposure to e-waste: a systematic review. Lancet Global Health 1: E350–E361.
7. Hagelüken, C., Corti, C.W. (2010) Recycling of gold from electronics: Cost-effective use through 'Design for Recycling'. Gold Bull 43, 209–220. https://doi.org/10.1007/BF03214988
8. Hagelüken and Art, (2006);Recycling of Electronic Scrap at Umicore's Integrated Metals Smelter and Refinery World of Metallurgy – ERZMETALL, 59, No. 3
9. Kumar et al (2016), E-waste management in India: A mini-review: Waste Management & Research 2018, Vol. 36(5)

408–414                    DOI: 10.1177/0734242X18767038
10. Mahdi Ikhlayel (2018), "An integrated approach to establish e-waste management systems for developing countries, Journal of Cleaner Production", Volume 170, 1 January 2018, Pages 119-130
11. Natalia Milovantseva a,1 , Jean-Daniel Saphores N. Milovantseva, J.-D. Saphores (2013) E-waste bans and U.S. households' preferences for disposing of their e-waste, / Journal of Environmental Management 124
12. P.K. Jatindra and K. Sudhir 2009), " E-Waste Management: A Case Study of Bangalore, India" (2009). Research Journal Environmental and Earth Sciences. October 2009, Pages 111-115
13. Rajya Sabha (2011) E-waste in India. New Delhi, India, Research Unit (LARRDIS) Rajya Sabha Secretariat. Available at: http://rajyasabha.nic. in/rsnew/publication_electronic/E-Waste_in_india.pdf (accessed 23 June 2017)
14. Ramachandra, T. V., & Saira, V. K. (2004). Environmentally sound options for e-wastes management. Envis Journal of Human Settlements, 5.
15. Shah, Anuj (2014), "An Assessment of Public Awareness Regarding E-Waste Hazards and Management Strategies" Independent Study Project (ISP) Collection.                    1820. https://digitalcollections.sit.edu/isp_collecti on/1820
16. Step Initiative. (2014). Solving the E-waste problem (Step) white paper. One Global Definition of E-waste, Bonn, Germany, 1-11.

# A QUANTITATIVE ANALYSIS OF AN ACADEMIC ACHIEVEMENT OF SPORTS HOSTEL PLAYERS - A PILOT STUDY

## B. Kumasi[1] and Ravindra Gouda S M[2]

[1,2]Dept. of P.G. Studies and Research in Physical Education, Kuvempu University, Shivamogga, Karnataka
[1]basavarajkumashi@gmail.com

---

## ABSTRACT

*The primary objective of this research is to determine if the relationship between stress categories and study involvement inventory (SII) is to be found or is to be found on the basis of the questionnaire developed and make a categorical study for the analysis of academic stress among the student stress prevailing in A random sample of 62 students from various hostel-level institutions in Karnataka was selected to conduct the research. Of the 62 informants, 43 were male, while 19 were female. A quantitative method for the collection of the data was used and mixed methods were used to analyse the data. For this study, questionnaires were given to students who'd been and were educated in sports hostels. In order to measure the frequency, the answers were classified and stratified and the finding was analysed quantitatively and qualitatively to evaluate the stress level the individuals feel in the sports hostels.*

---

*Keywords: Academic Stress, Sports Hostel, Study Involvement and Academic Achievements.*

Stress is a key factor in many psychological diseases which plague society today. As a result, 73% of people experienced certain psychological symptoms caused by stress in the American Psychiatric Association (APA) and the National Center of Stress survey in 2014. Furthermore, results from 2009 show that youth are time complexity as a result of the academic pressures.

The increasing incidence of suicide amongst students throughout the world has led to academic stress among academic institutions and policymakers. A student from T&T College of Science, Technology and Applied Arts (COSTAATT) was disappointed in 2012 by her academic achievement and committed suicide since she was unable to cope with the stress of examinations. A 2012 Lancet reported that students from Indian universities have found that it is difficult to cope with exam failure. The National Crimes Records Bureau (NCRB) revealed that in 2015, 8,934 students committed suicide because their tests were depressed and many unreported suicide attempts are probably much higher **(Saha, D 2017).**

Suicide rates amongst students are described as higher than they were, as described in the data cited in Psychology Today by the American College Health Association. Patel **(Clunies-Ross, et., al. 2008)** also found that students who are stressed are usually self-defeating. Students can experience poor management skills when they have been stressed, making them unable to manage their workload and consequently poor performance.

Many teachers expect their students high despite the lessons being very difficult and the stress of many students. If students are stressed, however, they are not only affected, but also their teachers and the institution as a whole. Due to high demands of teachers and poor performance, teachers are affected negatively and suffer stress and disease **(Patel PJ 2016).** The institution may experience low registration due to low pass rates or drop-outs of students.

Most students find it incredibly difficult to fulfill academic requirements, present seminars and recite what they learned from each course contents for examinations. With an endless stream of work in such a brief span of time, students will suffer from academic stress and cannot achieve their academic achievement. In addition, students often feel on events which take place internally and externally and can paralyze them in a way that they are not able to do so in full and provoke thoughts of how they are stressed academically, which also affect their academic performance.

## Statement Purpose

The aim of this research is to determine the correlation among academic stress and

academic performance among students: A quantitative analysis of a sports hostel player's academic performance – A pilot study.

## Questions Research

The research aimed at examining whether students at the hostel level are facing pressure due to the divide among students – teacher relations, students – teacher interpersonal communication, the lack of teaching aids, library and laboratory facilities, etc. Taking all of these into account, the study developed two hypotheses as follows:

- H1: There is a connection between academic stress, study and institutional arrangements at the sports hostel level.
- H0: There is no significant relationship between students' stress, study participation and institutional arrangements for sports hostels.

The first is the hypothesis of research that tends to be proven and when the hypothesis is refuted there is also a null theory, which is a null hypothesis, that students are unable to feel pressure on account of the institutions' poor educational arrangements

## Design Research

The subjects were randomly preferred to take part in this study and a convenience sample was used for the study. These students were asked to complete and complete a formalised questionnaire to collect certain information. Kim (1970), who was approved by Rajendren and Kaliappan and Dr. Asha Bhatanagar's (2004) Study Involvement Inventory for their research into the link for both academic stress, study involvement and academic performance, submitted this questionnaire. Results from the survey data had been divided into five divisions, analysed and compared among the categories for students at the hostel level to investigate where stress is experienced and

how academic stress is exacerbated by the thorough arrangements of institutions, the lack of availability of place especially and cultural obstacles faced by a student at the very moment.

## Participants

The study's target population were students who currently enrol in educational institutions in sports hostels across the state, that is to say, both the male and the female state of Belagavi and Davanagere Karnataka have been used to collect the data. The 62 participants answered the questionnaire. The 62 participants included 43 male and 19 female participants. Respondents have been selected by convenience sampling, the students willingly followed by researchers from the schools and pre-university students. Academic performance is measured by using the GPA in academic performance measurement.

## Procedure

The data were collected by administering the survey for a group of students at the hostel level. Prior to class starting, the respondents were approached and instructed to perform a self-administered questionnaire of 40 (ASS) questions and an inventory of study involvement (SII). Then, several learners were contacted by mail and allowed to respond according to ASS & SII. Percent of the participants responded properly, collecting data from 62 respondents. After data collection, the scoring and analysis were made using statistical instruments to reach meaningful concussions.

- Descriptive Analysis
- Correlation Analysis
- Regression Analysis

## Data Analysis

Descriptive Analysis

**Table 4.1: Mean and Standard Deviation of the variable Academic Stress, Study Involvement and Academic Performance/Achievement of Sports Hostel Players.**

| Variable | N | Mean | St Dev | Min | Max |
|---|---|---|---|---|---|
| Academic Stress Scale | 62 | 40.55 | 25.90 | 0.00 | 86.00 |
| Study Involvement Inventory | 62 | 46.419 | 5.629 | 31.000 | 58.000 |
| Academic Achievement (Last Year Result) | 62 | 75.69 | 12.79 | 35.00 | 98.00 |

Source: Primary Data

Basic summary statistics for the relevant variables in academic achievement data are given in Table 4.1, and these begin to give us a picture of these data. There is quite a bit of variation in <u>Academic Stress</u> (Mean = 40.55, St Div = 25.90), with values between a minimum of 0 and a maximum of about 86. Study involvement in academics (Mean = 46.419, St Div = 5.629), with values between a minimum of about 31 and a maximum of about 58 of sports hostel players.

**Table 4.2: Correlations: Academic Stress Scale Score, Study Involvement Inventory, Last Year Result**

|  | Academic Stress | Study Involvement |
|---|---|---|
| Study Involvement | -0.613 | 0.000 |
| Academic Stress | 0.000 | -0.613 |
| Last Year Result | -0.026 | 0.348 |
|  | 0.840 | 0.006 |

Cell Contents: Pearson Correlation P-Value

### Pearson Correlation coefficient

The correlation coefficient is usually given the symbol $r$ and it ranges from $-1$ to $+1$. A correlation coefficient quite close to 0, but either positive or negative, it implies little or no relationship between the variables. The Pearson Correlation test was run to find the relationship among the variables of Academic Stress and Study Involvement on Academic Achievement of Sports Hostel Players.

### Regression Analysis:
**Academic Achievement versus Academic Stress, Study Involvement.**

**Table 4.3: The Regression Equation: The regression equation is Academic Achievement (Last Year Result) =13.6 +0.148 Academic Stress Scale Score +1.21 Study Involvement Inventory**

| Predictor | Coefficient | SE Coef | $t$ | $p$ |
|---|---|---|---|---|
| Academic Achievement | 13.61 | 17.83 | 0.76 | 0.448 |
| Academic Stress | 0.148 | 0.0738 | 2.01 | 0.049 |
| Study Involvement | 1.208 | 0.3398 | 3.55 | 0.001 |
| S = 11.7997 || R-Sq = 17.7% | R-Sq (adj) = 14.9% ||
| Note: $*p < .05$, $**p < .01$, $***p < .001$; |||||

Study result indicates the beta coefficients values such as Academic Stress (0.148, $p < .05$), and Study Involvement (1.208, $p > .05$). Therefore, Academic Stress and Study Involvement variables are statistically significant because calculated $|t|$ is greater than table 't' value at 1%, 5% and 10%. Hence, significantly not influencing on the Academic Achievement. The model summary $R^2$ provides the proportion of variation in the dependent variable that is explained by the independent variables in the model. It observed that 14.9% of the variance in Academic Performance/Achievement explained by the variance in the variables.

Figure 4.1 Correlation Matrix of Academic Achievement

**Table 4.4 Analysis of Variance for proposed motor fitness MLR model.**

| Source | DF | SS | MS | F | $p$ |
|---|---|---|---|---|---|
| Regression | 2 | 1766.4 | 883.2 | 6.34 | 0.003 |
| Residual Error | 59 | 8214.8 | 139.2 |  |  |
| Total | 61 | 9981.2 |  |  |  |
| Note: The regression equation is Academic Achievement=13.6 + 0.148 Academic Stress Scale Score +1.21 Study Involvement Inventory ||||||

The entire motor fitness MLR model was found to be significant at 95% confidence level (p < 0.05). The importance of regression coefficients was also assessed by F-value. The results showed that all 5 predictors explained 14,9% of the variance (R2=0,14, F(2,59)=6,34, p<0,05). The F-value was significantly higher than the F-values that confirmed the acceptable

MLR model. Academic stress, study engagement variables were found to predict significantly the academic achievement of sport hostel players.

### Conclusive Findings

In 0.01, two main hypotheses were tested. Pearson-Moment Correlation The data were analysed using co-efficient and t-test. The study reveals that university stress and study involvement are significantly positively correlated with academic achievement. At the same time, the high academic stress rate reduces academic performance and the study implication results in high academic performance.

### Recommendations

This research means that students are faced with pressures that had not previously been clearly identified in the perspective of belagavi, Davanagere and that will help authorities, curriculum designers, school/university administrations and students themselves to recognize and try to eliminate these problems. Besides the 4 dimensions of academic stress scale, main dimensions are more than medium stress and student involvement are also lacking in order to maintain the correct management of time required for students. To ensure stress-free hostel education, it is recommended:

- In the institutions, an advisory cell must be established to identify and mentor the case with personal inadequacy;
- The institution must tackle the cultural, social obstacles that a student presents at the very beginning of the hostel level in order for it to gradually address the new atmosphere;
- Authority should concentrate on the preparation of instructional materials, texts and teacher training, as students are stressed by the shortage of elements mentioned.

### Acknowledgement

### References

1. Avianti, D., Setiawati, O. R., Lutfianawati, D., & Putri, A. M. (2021). Hubungan efikasi diri dengan stres akademik pada mahasiswa fakultas kedokteran universitas malahayati program studi pendidikan dokter. PSYCHE: Jurnal Psikologi, 3(1). https://doi.org/10.36269/psyche.v3i1.283

2. Clunies-Ross, Penny, Little, Emma, Kienhuis, Mandy, Sgm, Francis. (2008) Self reported and actual use of proactive and reactive classroom management strategies and their relationship with teacher stress and student behavior. Educational Psychology ;28:693-710

3. Dwi, I., Izzati, C., Tentama, F., & Suyono, H. (2020). Academic stress scale: a psychometric study for academic stress in senior high school. European Journal of Education Studies, 7(7).

4. K, A., & D, S. (2020). Academic stress among high school children. IP Indian Journal of Neurosciences, 4(4). https://doi.org/10.18231/2455-8451.2018.0042

5. Patel PJ. (2016) Research Culture in Indian Universities. Sage Journals.;46(2): 238-259

6. Phillips, S. C., Halder, D. P., & Hasib, W. (2020). Academic Stress among Hostel Level Students: A Categorical Analysis of Academic Stress Scale in the Context of Bangladesh. Asian Journal of Advanced Research and Reports. https://doi.org /10.9734/ajarr/2020/v8i430203

7. Reddy, K. J., Menon, K. R., & Thattil, A. (2018). Academic stress and its sources among university students. Biomedical and Pharmacology Journal, 11(1). https://doi.org/10.13005/bpj/1404

8. Saha, D. (2017) Every hour, one student commits suicide in India;. Available:https://www.hindustantimes.com /health-and-fitness/every-hour-one-studentcommits-suicide-in-

9. Tan, Edwin T., Golberg, Wendy A. (2008) Study school involvement in relation to children's grade and adaptation to school, Journal of Applied Development Psychology, V30 n4 P442-453 July-Aug.

# A STUDY OF DEVELOPMENT OF MUSEUMS IN INDIA: CIRCA 18TH CENTURY TO 20TH CENTURY AD

**R. Singh**

Department of Art History and Visual Arts, Panjab University, Chandigarh

_____

## ABSTRACT

*This paper focuses on the origin and development of museums in India from 18th century to 20th century AD. Museums have been a means of communication between the present and the past. Museums house the treasure of history which joins us with our roots. One can communicate with the past through museums. The term 'museum' has come from the West in India but the idea of it was already being practised since ages in the form of storages and collections. In India, temples are one of the most adequate examples with collections of images and sculptures of deities, manuscripts along with other important things. Major factors which helped the origin and growth of museums in India like the British, the Princely states, museum movement and the emergence of the Archaeological Survey of India are discussed in the paper.*

_____

Human beings have always been fascinated with things of the past and have been collecting them since ages. This collection of things tells the story of the life of that period. At one point of time, a need was felt to house the things so collected, therefore the concept of 'museums' came into being, this term was first used in Europe and later adopted by India. The term 'museum' can be traced back to more than 2000 years. 'A temple house dedicated to the Goddesses of learning, the Muses, was situated in the Alexandria Museum in Alexandria, Egypt in 283 BC. 'Mouseion' is a Greek word denoting sanctuary dedicated to Muses from which the word 'museum' was derived. The word mouseion was first used in Italy ('museo' in Italianized form) in the beginning of 16th century AD' (Dilip Kumar Roy- 16).

During the 16th and 17th century AD, a few princes and noblemen in Europe started collecting antiquities and artefacts out of curiosity and ego-motive. With the passage of time the house of these collections took the shape of a museum which was initially opened to provide some intellectual entertainment only for a small community of Lords and nobles. Later on, these centres were open to all the people in the society who desired to seek knowledge and entertainment from them. 'The first exhibition for the public was exhibited in an Art Museum of Europe 18th century AD' (Dilip Kumar Roy- 17). Thus the concept of museum underwent a sea change in the middle of 18th century.

'The British Museum, London was established in 1756 while the Louvre Palace was opened as the museum in France in 1759. These establishments set forth a new perspective in manifesting the cultural wealth across the world. The concept of museum developed and spread worldwide and a term was coined as the 'museum movement' for it. The museum movement in India was initiated in British rule by foreign scholars in 18th century AD which was later on embraced by Indian Scholars' (Alok Tripathi-20). Earlier only small pieces of artistic objects were placed in museums. Larger objects, especially paintings were placed in long galleries, which may be described as the immediate predecessor of the Art-Gallery of 19th century AD. The main differences between museum and galleries were architectural and structural.

India has been a rich country in many forms. British were one of the foreigners who came to India for the sole purpose of trade. In India, with the entry of the British, French and other traders beginning in the 13th century, the objects of trade such as textiles and decorative arts garnered much interest and appreciation. The European idea of the museum was brewed in India in the 18th century with the colonization of British in the Indian subcontinent. The British were intimidated by the beauty of Indian history. They played a

significant role in the collection and documentation of items of Indian history, culture, art and inventions. Numbers of centres were established to conserve them.

The institutions such as the Geological Survey of India, the Botanical Survey, the Archaeological Survey and the Asiatic Society were established by the officers of British army, administrations and scholars who were interested in Indian art and culture. 'Early findings were transported back to Britain which are still on exhibit in the British Museum, the Victoria and Albert Museum and the India Office Library, in London' (Shobita Punja- 20). With the support from the princely states and their rulers, the museum movement in India got enhanced. 'The inception of the Archaeological Survey of India (ASI) in 1861 with Alexander Cunningham as its Archaeological Surveyor was another big step in its development. It was the feather in the cap of the museum movement for archaeology that began receiving attention in museums' (Alok Tripathi-20).

'The first important museum was the Indian Museum in Calcutta which was established in 1875' (Shobita Punja- 21). Indian museum is one of the largest museums in India. The earliest Indian museums are now over 100 years old. The invaluable contributions by the Viceroy, Lord Curzon and the head of the Archaeological Survey, Sir John Marshall resulted in the setup of site museums located at important places of historical interest. The magnificent examples of colonial architecture could be witnessed at the Prince of Wales Museum in Bombay and the Government State Museum in Madras. The establishment of archaeological museums with the start of 19$^{th}$ century throughout the country was another big step in the development of museum movement in India. 'Most important museums were established at Baripada (1903), Chhamba (1908), Jodhpur (1909), Khajraho and Gwalior (1910), Bijapur (1912) and Dacca (1913). The survey also established museums at Sarnath (1904), Agra (1906), Peshawar (1907), Delhi Fort (1909), Mandalay (1905), Delhi (Central Asian Antiquities Museum, 1929) and Lahore Fort (1928), in addition to half a dozen created on excavated sites' (S.F. Markham and H. Hargreaves- 10). 'The first Directory of Indian Museums appeared in 1911' (S.F. Markham and H. Hargreaves- 11).

India was declared democratic republic after the independence with an end to the Maharaja rule. Later the former palaces were set up as public museums housing the art treasures, archives and memorabilia collected by royal families. The development of Indian art and craftsmanship through the age could be studied and classified with these royal collections. These collections have been in the families for centuries and possess immense value in the construction of documentation of Indian history. Indian art in history has been more inclined to aesthetical expressions (or emotions) and philosophical ideology instead of perspective, realism or naturalism. It makes Indian art unique and special which is the reflection of Indian culture. The concept of museum was introduced by the British administrators, thus the credit for the conservation of Indian history goes to them. The museum movement in India kept on developing even after independence by Indian Government and private parties. Economically sound Indians took interest in the museum movement and began to collect and assemble material of historical importance. The importance of museums was well understood in order to conserve history for the sake of future generations. The richness of history, culture and various traditions of India are encapsulated in museums of India. Moreover, on 26$^{th}$ January, 1950 under the new Constitution, museums as a subject were placed in the State list implying that it was for the primary responsibility of the State to set up museums and maintain them.

The Museum Association of India strengthened the museum movement that was founded in 1944. It provided a council to the museum profession for the exchange of views, news and ideas and its annual discussion on specific topics. This enabled it to highlight the nagging problems and offer as well as invite suggestions for their solution. 'The annual Journal of the Museums Association of India and the occasional News Letter also added up for the benefit of the museum professionals. A Central Museums Advisory Board was set up

by the Central Government in 1956 for surveying the progress of the museums in India. It further helped the movement with constructive criticism and moral and professional support. The setup of UNESCO in 1946, constitution of the International Council of Museums in the same year and the enrolment of members among the States parties to the U.N.O., heightened the level of Indian museums on the international scene. It provided the professionals with an international forum, especially after the setting up of the Museums Division in 1949. The journal, 'Museum' started in 1948, is the purveyor of latest advances in museological knowledge and technique of international standards on a global level. India joined the Council at the very outset and has been a beneficiary, also as a participant at the triennial general meetings of the ICOM or at periodic symposia on specified subjects. All such factors have helped strengthening the museum movement in the country tremendously' (N.R. Banerjee- 25, 26).

The first prime minister of independent India, Jawaharlal Nehru, contributed significantly in the development of museum movement in India. 'He dreamed of creating a secular state, based on economic and social justice, which would offer moral leadership to the Third World. He was a modernist who favoured state interventions in all spheres, symbolized by the Five Year Plans. He played a proactive part in a national art policy headed by the Lalit Kala Akademi (an officially sponsored artists' forum) and the National Gallery of Modern Art in the capital' (Partha Mitter- 205). "The National Museum was established in 1949, in the premises of Rashtrapati Bhawan, New Delhi and later shifted to the present building, in 1960" (S.P. Gupta- vii).

The whole point of museums from the very start was to collect either the handiwork of man or of nature, or of both. With the increase in numbers, the collections could no longer be contained in their original storehouses. The problems like preservation against natural decay was one of the most concerned ones. So the proper place, a caretaker and documentation were needed to solve and reduce the problems. The objects also had to be handled, classified, listed, displayed or stored neatly. The concept of a museum has widened beyond recognition in modern times and became a centre of education, research and entertainment to boot. 'The financial resources and the width of vision, energy and competence of the curator are the two most important pillars in the development of museums in India. The quality and standard of all the activities of a museum depend upon how informed, enlightened, enthused and active the Curator is and how able he is to transmit his spirit to the community he serves' (N.R. Banerjee- 4).

The objects or images inside museums are not only displayed but are preserved under particular manner and rules so as to keep them intact, safe and preserve for as many years as possible. Most of early objects were collected by kings and princes without the procedure of preserving them from climate and other factors. Such unintentional measures resulted in the loss of contents until the development of organizations of modern science that took steps in preservation and care of the museums. The procedures were standardized to bring order out of chaos. Numbers of scientific developments were invented that are being practiced on artefacts, documents and all for their preservation.

The documentation procedure is an important aspect of museum organisation. The documentation methods have undergone considerable change with time and inventions in the technologies. For the recording of the objects in a museum a scientific method was formulated. The documentation included the movement of objects inside and outside the premises. The objects in museums gained the great value as a national treasure, thus their documentation became important and necessity measure. The details about an exhibit like its background, material, the artists or artisans who created them must be recorded as well as the information about the catalogues and books where they were reproduced. The scientifically organised and maintained museum documentation makes it quick and easy to do so. So the confusion and difficulty can be avoided in locating museum objects with scientific recordings.

Documentation turned out to be one of the most important factors related to the development and conservation of museums. "Learning is a basic characteristic of life and man can learn as a result of every experience he undergoes." (Timothy Ambrose- 10). Documentation plays a significant role in research studies for academic purposes by enabling scholars to make use of the data regarding the details of museum objects. Moreover documentation also helps in case of theft in identifying the object and enabling officials to distinguish the original from fake object. So the museum documentation should be scientifically organised and maintained properly. As this procedure secures the information about the exhibit like who created it, brought it or sold it, its origin, material, technique, time, its publications etc.

The 20th century has been remarkable for the growth of museums in India. Although initially the number of archaeology and art museums were more but the museum devoted to specific subjects also started establishing eventually like The Craft Museum, New Delhi, the Health Museum, Hyderabad and the Textile Museum, Ahmedabad. The museums related to the history and personalia are very few in number. Some of the examples of these kinds are The Victoria Memorial Calcutta, for the British period, the Ravindranath Tagore Museum, Shantiniketan, the Gandhi Smarak Sangrahalaya, New Delhi, the Fort St. George Museum, Madras and the Nehru Memorial Museum at Tinmurti Bhavan in New Delhi.

The structural designs of various museums in India are according to its collection. Like to give visitors a purview of India's rural traditions, a village-style layout has been made of the Craft Museum in New Delhi. 'The Museum of Man devoted to the earliest periods of history is situated in Bhopal, Madhya Pradesh. There are caves with paintings dating back to the Stone Age (before 2500 BC) containing delightful drawings of man, the hunter amidst graceful animals of the wild' (Shobita Punja- 37).

## Conclusion

Every aspect of India's rich traditions would have destroyed with time if not collected and preserved in museums. Our past from thousands of years has been preserved in museums. We still use some objects that were invented by our ancestors hundreds of years ago like earthen pots which are so beneficial for our health. With time museums have changed like other social institutions.

After the independence of India, museums have played a significant role in the preservation of cultural and historical heritage of India for the development of the country. The basic concepts, the functions and their form have changed with new innovations and demand of the progress in society. The museums have developed as supplementary educational institutions instead of just the repository of objects. The museums in India are in the much better place than ever before because of the factors discussed above.

## References

1. Alok Tripathi, (2012) "Museum Studies", Sharada Publishing House, Delhi, pp. 20.
2. Anil Roy Choudhury, (1964) "Art Museum Documentation and Practical Handling", Choudhury & Choudhury, India.
3. Dilip Kumar Roy, (2006) "Museology: Some Cute Points", Kalpaz Publications, Delhi, pp. 16, 17.
4. H. S. Nalwa, Editor, (2003) "Magnetic Nanostructures", American Scientific Publishers, Los Angeles.
5. H. Sarkar, (1981) "Museums and Protection of Monuments and Antiquities in India", Sundeep Prakashan, New Delhi.
6. N.R. Banerjee, (1990) "Museum and Cultural Heritage in India", Agam Kala Prakashan, Delhi, , pp. 4, 25-26.
7. Partha Mitter, (2001) "Indian Art", Oxford University Press", New York, pp. 205.
8. S.F. Markham and H. Hargreaves, (1936) "The Museums of India", The Museum Association, London, pp. 11.

9.  S.P. Gupta, (1985) "Masterpieces from the National Museum Collection", National Museum, New Delhi, pp. vii.

10. Shobita Punja, (1990) "An Illustrated Guide to Museums of India", Guidebook Co, India, pp. 20, 21, 37.

11. Smita J Baxi and Vinod P Dwivedi, (1973) "Modern Museum: Organisation and Practice in India", Abhinav Publications, New Delhi.

12. T. Ambrose, (1987) "Education in Museums, Museums in Education", Unipub.

# A STUDY ON ENTREPRENEURIAL ASPIRATION AMONG MANAGEMENT STUDENTS IN KALABURAGI, KARNATAKA

**R. Basavapattan**

Department of Management Studies, Visvesvaraya Technological University, Belagavi, PG Center Kalaburagi

rajshekhar7007@gmail.com

---

## ABSTRACT

*Education in India has played a prominent role in the development of the economy. The introduction of New Education Policy has been initiated to cope up with international standards. Government introduced the new industrial policy in the year 1991 to focus on the rapid industrial developments in the country. During the same time Management Education in India also gained huge demand and reputation. There are countless problems associated with the Indian management education in developing and motivating the students to become entrepreneurs. Therefore this paper presents the factors that influence the students to undertake entrepreneurship.*

---

*Keywords: Entrepreneurial aspiration, management education, ED Programmes, factors motivating students to become entrepreneurs.*

## Introduction

Management education in India was introduced in 1950s, which paved a way for the aspirations among the youths. India has excelled in the field to educate the students and continuously striving to create entrepreneurs catalyzed by new schemes and policies both at centre and state. Karnataka government has aligned its goals along with the goals of the center and started 'Invest Karnataka'. This was a stride to attract the investors and also boost up the youths to implement their innovative ideas.

Presently there are 1202 government, 637 aided, 1936 unaided, 165 bifurcated and 13 corporation pre-univerity colleges in the state. There is a growing trend towards higher education in the state. There are 413 government first-grade colleges, 325 14 universities and and 19 private universities. Technical education is classified as a polytechnic, junior technical schools, and engineering courses. There are 325 government, aided and unaided, 12 junior technical institutes and 254 engineer colleges. There are 57 MBBS , and 38 dental, both government and private colleges in the state,. There are a total of 290 nursing colleges in Karnataka, Karnataka is being termed as "home to nursing education" in India. Students who have pursued nursing education in Karnataka are successfully serving both in India and Arab Countries. . There are more 76 nationally reputed educational institutions in the State which offer Ayush, Ayurveda, Unani, Homeopathy, Yoga and Naturopathy courses for the students.

At present there are 257 and a total of 897 government management colleges in Karnataka. There are 412 First Grade Degree Colleges and 315 Private aided colleges. Students pursuing the courses are being trained and educated not only for the job but to start their enterprises too. There are other short term courses offered to enhance the skill set of the students as per industry standards.

There are presently six types of management education organizations. They are

(1) Indian Institutes of Management (IIMs) set up by the Government of India.
(2) University departments of management studies.
(3) Colleges (government or private) affiliated to universities.
(4) Private or government institutes approved by the All India Council for Technical Education (AICTE).
(5) Private colleges or institutes not affiliated to any universities nor approved by AICTE and
(6) Private colleges or institutes offering MBA courses in India in collaboration with foreign universities, where degree/diploma/certificate is awarded by the foreign university.

## Objectives

- To analyze various factors affecting the entrepreneurial aspirations among management students.
- To assess the influence of current management education on motivating management students towards becoming an entrepreneur
- To find out the impact of management education on entrepreneurial aspirations among management students
- To analyze the perception and attitude of Management students towards becoming an entrepreneur

## Study Significance

Entrepreneurs are considered as the catalyst of economic development. The socio-economic problems like unemployment, inequitable distribution of income and health, poverty etc., can be overcome by them. By considering the important contribution of entrepreneurship the government both at center and state is providing importance to the entrepreneurship development activities. It is the management education which can provide well trained entrepreneurs to the industrial sector. The study aims to understand the entrepreneurial aspirations among management students and their perception and attitude towards entrepreneurship as a career option.

## Sources of Data

The data for achieving the above said objectives was collected from both primary and secondary source. Secondary data was sourced from various literatures, books, journals agency reports etc,. The primary data was collected through a structured questionnaire, that was given to the students.

## Sampling Method

Convenient sampling method was adopted to collect the data from the students.

## History of Management Education in India

The history of management education in India dates back to the late 1950s. This was a fascinating period in country's history which witnessed the building up of a new nation. A number of industrial and commercial enterprises were set up in accordance with the Nehruvian vision and there was a need to manage those enterprises. The existing commerce colleges emphasized only on the theoretical aspects and hardly focusing on the practical work or research. All India Council for Technical Education (AICTE), a national level advisory body for management education was set up in 1947 to advise the Government. Table below highlights the key events in promoting management education.

**Table 1: Management education in India**

| Decade | Event |
|---|---|
| 1940s | • First management institute, XLRI, started few courses in management (1949) |
| 1950s | • Short term programmes by MIT and AIMA<br>• First full time management programme started by IISWBM (1953)<br>• 3 year part-time post graduate management programme in DSE, University of Delhi (1954)<br>• First diploma programme for public sector executives started by IISc (1954)<br>• Diploma in business management, DMS, University of Madras (1955)<br>• Management training by IIPA (1954), ASCI (1956) and NPC (1958)<br>• Prof. George Robbins, University of California invited by Ford Foundation (1959) |
| 1960s | • IIMC and IIMA set up (1961)<br>• NITIE for engineers (1963)<br>• Full time management programmes in JBIMS, University of Bombay (1965), MoNIRBA, Allahabad University (1965), FMS, Banaras Hindu University (1968), Department of Commerce and Business Management, now UBS, Punjab University (1968) |

| 1970s | • IIMB set up (1972) |
| | • DIME, IIT Kanpur (1974) |
| | • School of System and Management Studies, IIT Delhi (1976) |
| | • MDI, Gurgaon (1973), SIBM, Pune (1978), IRMA, Anand (1979), LIBA, Chennai (1979) |
| 1980s | • IIML set up (1984) |
| | • IMT, Ghaziabad (1980), TAPMI, Manipal (1980), KJSIM, Mumbai (1981), IMI, New Delhi (1981), BVB's SPJIMR, Mumbai (1981), IBS, Hyderabad (1985), BIMT, Greater Noida (1988) |
| 1990s | • DMS, IIT Delhi (1993) |
| | • VGSoM, IIT Kharagpur (1993) |
| | • Management school in IIT Bombay (1995) renamed as SJMSoM (2000) |
| | • DoMS, IIT Roorkee which was then University of Rookee (1998) |
| 2000s | • 189 institutes set up on an average every year from 2000-2006 (Dayal, 2002) |

### Regulation of Management Education

This historical account is incomplete without the mention of different organizations set up for the regulation, growth and development of management education in India. The post graduate courses in management are part of higher education and fall under the ambit of the Department of Higher Education, a branch of the Ministry of Human Resource Development (MHRD), entrusted with the role of improving the access and quality of higher education through several bodies and institutions (MHRD, 2013). A brief description of the bodies associated with management education follows.

### AICTE

The prime body for planning, co-ordination and regulation of management education in India is the All India Council for Technical education (AICTE), which was set up as an advisory body in 1945 and given a statutory status in 1987 by the National Policy on Education, 1986 (AICTE Act, 1987). Under the AICTE, a separate Board of Management Studies (BMS) was set up to 'advise' the executive committee of the Council on issues like 'norms, standards, model curricula, model facilities and structure of courses' for management institutes (AICTE Act, 1987). The AICTE has been instrumental in shaping management education in India but has been criticised for its engineering centricity. Professor Ashoka Chandra, a former Special Secretary and Education Advisor (Technical Education) to the MHRD said in an interaction with the authors on February 5, 2013 at his residence in Noida, 'the approach of AICTE is very mechanical. Since, it cannot deal with complexity and diversity; it is reducing it by forcing uniformity.' It has also been criticised for not being able to monitor quality. According to Dayal (2002), 'while sanctioning a large number of institutions, AICTE was unable to create adequate machinery for monitoring the quality standards in the institutions.'

### University Grants Commission

The departments (or faculties) of management in universities fall under the scope of the University Grants Commission (UGC) which was established in 1956 for the 'coordination, determination and maintenance of standards of university education in India' (UGC Act, 1956). The departments refer to the UGC for allocation and disbursal of funds, recommendations for improving quality, institutional support, collection and furnishing of any information and so on (UGC Act, 1956).

### Accreditation

The key body for accreditation of management programmes is the National Board of Accreditation (NBA), set up under section 10(u) of the AICTE Act in 1987. With effect from January 7, 2010, it was given an autonomous status to achieve 'assurance of quality' and 'relevance of education' (NBA, 2013). Apart from the NBA, the National Assessment and Accreditation Council

(NAAC), also accredits institutions of management education in India (NAAC, 2013).

### Other Bodies

Other bodies like (a) the All India Management Association (AIMA) which is the topmost body for professional management in the country that has more than 30,000 individuals, 3000 institutions and 60 local management associations associated with it (AIMA, 2013), (b) the Association of Indian Management Schools (AIMS) which is the largest 'network of management schools' in India (AIMS, 2013) and (c) the Education Promotion Society of India (EPSI), Directorate of Technical Education in States etc., which differ in their form and structure, also have an effect on different aspects of management education in India.

### Student's Response to the Questionnaire

**Table 2: showing the motivational factors to undertake entrepreneurship**

| Particulars | Yes | No |
|---|---|---|
| Entrepreneurial aspiration | 71.9 | 28.1 |
| Motivation by Family and friends | 68.4 | 31.6 |
| Motivation from experts | 75.4 | 24.6 |
| Risk taking | 63.2 | 36.8 |
| Profit | 61.4 | 38.6 |

Source: Primary data

From the above table it can be inferred that the students aspire to become an entrepreneur through the motivation and support extended to them from family and friends and were highly influenced by the interaction done with the industrial experts. The students also preferred taking risk to engage in entrepreneurial activities.

**Table 3: Showing the factors related to institutions and others**

| Particulars | Yes | No | May be |
|---|---|---|---|
| Affect of culture | 38.6 | 24.6 | 36.8 |
| Government schemes | 47.4 | 19.3 | 33.3 |
| ED cell | 49.1 | 50.9 | |
| College environment | 82.5 | 17.5 | |
| Industrial visits | 59.6 | 40.4 | |
| Curriculum | 86 | 14 | |
| Management games | 84.2 | 15.8 | |
| Assignments and learning aspects | 89.5 | 10.5 | |
| EDP | 56.1 | 43.9 | |
| MOU's with ED agencies | 42.1 | 57.9 | |
| Case study discussion | 91.2 | 8.8 | |

The students strongly opined that the institutional factors greatly influences on the students decision of becoming an entrepreneur. The other government related factors also motivates an individual to undertake entrepreneurial activities.

### Students Suggestions

Students suggested few points to be implemented by the institutions to facilitate entreprneurship

- There will a good opportunities nd independent business nd he will be owner of it soo entrepreneurship is good and important part of management
- By becoming entrepreneurs you can be owner of your own company and need not to work under any one so it is a good platform to be entrepreneurs
- Organize Entrepreneurship program in institution and make an industrial visit to student.
- Institute should work on personality skills and need to conduct campus recruitment and need to conduct more competitive program with other institutions ...
- All the institutions should explain their students about the entrepreneurship and its future benefits
- Conduct the entrepreneurs session
- Attend events learn from the expert
- Management Students must learn entrepreneurship skills to develop the

business idea and to start their own business.

- Give opportunities to every individual person to become entrepreneurs
- Use proper methodology
- Monitor student commitment
- Give a opportunity to the students to implement their new ideas
- Motivate students to undertake risk and find best practices to run their enterprises
- It is more reliable to take entrepreneurship as a career option by management students because management students know the inside out about business and social issues
- Give students practical knowledge instead of book knowledge
- Good planning and correct execution may lead the great entrepreneurs
- In lockdown students are suffering so much because of ineffective communication through online classes.
- Please do Webinar of Successful entrepreneur in all institution and motivate the students
- Showing the life style they will live after becoming a entrepreneur may create a intrest to them
- Make an industrial visit
- Entrepreneurship program conduct in our institution yearly helps students to become an entrepreneur
- People will never listen the failure stories all that can get motivated by listening to their successful stories of the winners like Ritesh Agarwal , Bjyu Ravindran and the like , the winners will be heard, so such talk can make sense

- Due to the rapidly changing business environment there are more opportunities for a student to choose their entrepreneurial career
- To Become an entrepreneur we have go gain more practical knowledge rather than theoretical, an institute should focus more to provide practical knowledge rather than theoretical concepts
- If you are having capital and affordable to purchase the items needed for idea , then go for it and risk on it. When you get settled as a entrepreneur help others to become entrepreneurs in monetary terms.
- Change the academic curriculum for students to become Entrepreneur
- Make hands-on activities in colleges to provoke students develop startup mind

## Conclusion

The present study undertaken mentions the requirement of the students in promoting entrepreneurship as a career option by the management students. It is a good institutional factors like learning aspects case study methods, industrial visits, ED Programmes, interaction with industry experts and MOU's with ED agencies influences a lot on the students. In order to motivate the students to choose entrepreneurship as a career option soon after completion of their management graduation and post graduation courses. Apart from this family and friends support and the support from the government schemes and policies also inspiring the students to start their enterprise or become an entrepreneur.

## References

- All India Management Association (2013) Retrieved 7 November 2013, from http://www.aima.in/discover-aima/overview/aima-overview.html
- ASSOCHAM (2013). Only 10% graduates employable despite robust MBA demand: Report. Retrieved 24 May 2013, from http://www.business-standard.com/article/management/only-10-graduates-employable-despite-robust-mba-demand-assocham-113013000223_1.html
- Dr. Ritika Mahajan 2015, India's

Management Education Growth Story: A Retrospect, AIMA Journal of Management and Research, Volume 9 Issue 2/4.
- ICFAI Business School (2013). Retrieved 8 November 2013, from http://www.ibsindia.org/
- Mahajan, R., Agrawal, R., Sharma, V. & Nangia, V.K. (In press). Factors affecting Quality of Management Education in India: An Interpretive Structural Modelling Approach. Journal of Educational

Management, 28(4).

- National Board of Accreditation (2013).
- http://www.nbaind.org/views/Home.aspx#s thash.VBtjF1fA.dpbs
- National Assessment and Accreditation

Retrieved 8 November 2013, from

Council (2013). Retrieved 7 November 2013, from http://www.naac.gov.in /NAAC_Overview.html

# A STUDY ON INVESTMENT PATTERN OF EMPLOYEES WORKING IN PUBLIC SECTOR

**R.E. Walunj**

Sinhgad College of Science, Ambegaon(bk), Pune

_____

## ABSTRACT

*India is a developing country. For improving Per Capita Income there is need to proper circulation flow of money in various sectors like manufacturing, service, export, technology etc. Development depends upon availability of a high volume of capital. Availability of funds depend on working conditions of intermediaries like banks, non-banking finance companies, post office, and share markets. These organizations play a vital role in helping investors to save and invest their money by giving various investment avenues. In anticipation of some positive rate of return in future, people are investing their money in different investment avenues. They have understood idle money never gives growth in value but it decreases the value of money. Nowadays people are updating themselves about the market and financial conditions for investment purposes. Employees working in public sector companies are smart enough to take their investment decisions. Instead of investing money in single avenues they are diversifying their savings into a number of investment options where they are getting satisfaction about features or objectives behind respective investment options. As a salary earner there is hardly a chance to avoid their tax liability due their transparent and accountable money. So they always think twice before spending their hard money. Employees have awareness about various investment avenues available in the market with their positive and negative features. As per their considerations like safety, liquidity, security, marketability, tax benefits, risk involved etc they are selecting the best one from their point of view and investing the money in a particular avenue. This study focused on the investment pattern of employees working in the Public Sector with special reference to the banking sector of Pune.*

_____

## 1. Introduction

Salaried employees who are having fixed source of income and having capacity to save regularly and invest. They invest the money for achieving additional income or growth of value of money. Investment includes additional income on invested money or growth of value in the form of interest, dividends, rent, premiums etc. There are many investment avenue are available in the market like bank fixed deposits, post office savings, Life Insurance Scheme, Provident Fund, Public Provident Fund, Equity, Real Estate, Mutual Funds, Commodities etc. Investment pattern determined by the individual expectations from different investment avenues which carried their different features like safety, liquidity, marketability, returns, tax benefits, risk etc. Successful investment depends upon awareness about the investment opportunities and level of knowledge. Amount should be saved in a such way that some benefits will receive in future. It is commitment of funds with positive rate of return. Salary earner individuals are more transferable and accountable to the government. They cannot avoid tax. Now a days for tax benefit investment plays important

role. Employees working in public sector are much secured and having safety about their job. They are ready to invest in different investment avenues. Traditionally individual used to keep idle cash for future security. But now a days investment awareness is created in the society whether public sector employees or private sector employees. Attitude towards investment avenue is different according to its features. The risk bearing capacity of employees are different according to income, family size, age, expenditure pattern etc. Normally a person with higher income is having capacity to bear higher risk or invest in long term security where he/she gets high returns. There are three golden rules for all investors that is invest early, invest regularly and invest for long term but not for short term The study is undertaken to analyse the investment pattern of employees working in public sector with their

## 2. Objectives

1) To study the mode of investment avenues of the public sector employees

2) To study the behavioural pattern of investments among the employees working in public sector.
3) To understand the factor influencing investment behaviour of the employees working in public sector.

### 3. Review of Literature

**Sonal Patil & Kalpan Nandawar (2014)** found that investors are cautious about their investment and they are well aware about available investment avenues with their features. Majority of the people prefer a safe and secured form of investment like bank deposit, gold and insurance.

**Sushi Kumar Mehta(2011)** examined that investors are conservative for investing purposes and save their money in the safe nature of investment avenue. Instead of growth of money they preferred safety and security measures. There is a significant relationship of income with the appropriate investment period but there is no relationship of age, gender, occupation, education with the appropriate investment period.

V. Balkrishnan (2011) observed that investors preferred a wait and watch policy for taking their investment decisions. There is a significant relationship between age and the industry prospects in the decision making criteria.

### 4. Research Methodology

The data has been collected through primary and secondary sources. The study sample consisted of 50 salaried employees working in the public sector with reference to nationalized banks situated in Pune city. A questionnaire consisting of 16 closed end and open end questions covering demographic profile and behavioural investment pattern with its objectives, most preferred investments avenues and factors influencing the investment pattern. Secondary data collected from Journals and newspapers, reports etc. For the data analysis percentage method has been implemented. The study is restricted to public sector employees working in the nationalised banking sector in Pune city.

### 5. Scope of the Study

This study is focused on the investment pattern of the employees working in the public sector with reference to the banking sector in selected nationalised banks. This analysis is discussed on the information collected from salaried employees about their knowledge, perception, behaviour pattern on the different investment avenues.

### 6. Data Analysis

### 6.1 Demographic Profile of the respondent

**Table No. 6.1 : Demographic Profile of the respondent**

| Variable | Respondents( %) | Variable | Respondents % |
|---|---|---|---|
| Gender | | Investment Frequency | |
| Male | 50 | Weekly | 0 |
| Female | 50 | Monthly | 10 |
| Age | | Quarterly | 20 |
| Below 25 | 8 | Half yearly | 25 |
| 25-35 | 52 | Yearly | 45 |
| 36-45 | 36 | Reason for choice of Investment | |
| Above 55 | 4 | Self-awareness | 34 |
| Marital status | | Friends OR Family Advice | 32 |
| Single | 49 | Broker Advice | 10 |
| Married | 51 | Media | 4 |
| Annual Investment | | Financial Adviser | 20 |
| Below 25000 | 19 | Sort of Investment preferred | |
| 25001-50000 | 29 | Short Term | 15 |
| 50001-100000 | 31 | Long Term | 39 |
| 100001-200000 | 13 | Medium Term | 46 |
| 200001 & Above | 8 | | |

From the above percentage analysis it is inferred that 50 percent respondents are male and female each. 51 percent of respondents are married. While making savings and investment demographic factors play important roles like Income level, family type whether it is nuclear family or not.

60 percent respondents annual investments is in between 25,000 to 1Lakhs, 19 percent respondents investments are below Rs. 25000, 13 percent respondents annual investment is in between One lakh to two lakh and only 8 percent respondents annual investments are above 2 Lakhs.

45percents respondents are preferred to invest on a yearly basis, 25 percent half yearly and 30 percent respondents are preferred to invest monthly and quarterly.

Nowadays people are aware and have market updates for betterment of investment patterns. 34 percent respondents are self-aware, 32 percent respondents are taking advice from friends and family members, 20 percent respondents are dependent on financial advisers for investment decisions.

39 percent respondents preferred Long term investment policy, 46 percent preferred medium term and only 15 percent respondent preferred short term investment. Long term investment gives good return as compared to short term investment so people preferred long term investment options.

### 6.2 Basic of Investment Objectives
**Table No. 6.2: Basic of Investment Objectives**

| No. | Objectives | Percentage |
|-----|------------|------------|
| 1 | Future Safety and Security | 35 |
| 2 | Tax Benefit | 48 |
| 3 | High return | 7 |
| 4 | Liquidity | 10 |

Individuals invest money with specific objectives. Selection of investment patterns or saving habits depends on their expectation from various investment avenues. As per requirement or level of significance investors diversified the amount of investment in different investment avenues. Effective diversification of investment requires scientific financial planning so that the investor gets satisfaction with their investments or their respective objective of investment. Salary earners are more accountable and transparent to the government so employees give their first priority for minimising their tax liability. Here also 48 percent of respondents' investment objectives are for minimising tax liability. After that respondents are giving priority for their future safety and security. 35 percent of respondents' basic objective behind investment is future safety and security. In an uncertain life they want to secure their future by investing in safety investment avenues.

### 6.3 Most Preferred form of Investment

**Table No. Most Preferred form of Investment**

| No. | Option | Percentage |
|-----|--------|------------|
| 1 | Post office / Bank deposits | 13 |
| 2 | Insurance Schemes | 28 |
| 3 | Pension Schemes | 7 |
| 4 | Real Estate | 5 |
| 5 | Mutual Fund | 10 |
| 6 | Gold and silver | 8 |
| 7 | Others | 4 |

Above table shows the most preferred form of investment. Still people are selecting traditional ways of investment. Individuals pay a premium in insurance schemes and get relatively death benefit which is the best choice of investment avenues for employees. Here 28 percent preferred to invest in Insurance schemes and 13 percent respondents chose post or Bank deposits which carry a safe and secured form of investment. Young population are selecting Mutual Fund investment, expecting more return from Mutual Fund. 10 percent respondents preferred Mutual Fund, 8percent Gold and silver and 7 percent respondent preferred pension schemes investments.

### 6.4 Technical factors influenced while selection investment avenues

**Table No. 6.4 Technical factors influenced while selection investment avenues**

| No. | Factors | Percentage |
|-----|---------|------------|
| 1 | Safety and Security | 45 |
| 2 | Tax savings | 25 |
| 3 | Liquidity | 12 |
| 4 | Simplicity | 5 |
| 5 | High return | 12 |
| 6 | other | 1 |

Above table shows the technical factors influenced while selecting investment avenues. Employees selected for research study are influenced by safety and security because 45 percent employees are influenced by safety and security factors, 25 percent tax savings, 12 percent liquidity and high return each.

## 7. Findings and Suggestions

First priority for investment is tax benefits. Maximum investments are taking place at the end of the year. Where hasty investment decisions caused market risk. Employees earn regular income where they need to do proper investment and tax planning and avail the right form of investment for safety, security with good returns. Many times Hasty decisions cannot fulfil investment objectives. Updated investment knowledge helpful for taking investment decisions. As there are various investment options available with their different features. With the available funds, employees can choose the best investment option. Nowadays a variety of sources of information and knowledge are available in the market. Investors should think positive and negative features with respective investment options before investing the money in particular avenues. Investors should collect all possible information before making an investment. While investment is a high amount in particular investment avenue individuals should concern with expertise advice for valuable return. Instead of investing money in a single avenue, individuals should invest the money in a diversified way for securing the future and better results. Amount should be diversified according to its safety, security, profit and liquidity features. Long term investments give maximum return as compared to short term investment. Employees should inculcate a habit of savings because small savings will grow into a bigger capital base. Still investors prefer safe types of investment like bank deposits and insurance etc. Instead of that it is needed for the developing economy to invest the money in the capital market or increase the circulation flow of money in the capital or stock market.

Investors need to do periodical reviews or check of the invested investment for their high returns. Though the respondents have knowledge about investment avenues, financial market or economic conditions, they lack the edge above the others as this area is very unpredictable and vast. So for a large amount of investment they must be backed up by a financial planner.

## 8. Conclusions

The main focus of the study was to understand the investment pattern of employees working in the public sector where public sector employees enjoy the safety and security of their job and income. The study analysis showed that employees have different views like perception of investment avenues, objectives of investment, factors which influence the investment decision, frequency of investment etc. Employees are selecting safety and secured forms of investment like bank deposits and insurance schemes. They are not ready to take risks. But between the age of 25years to 40 years employees are investing in stock market, capital market or mutual funds due to high return. High risk gives high return. Lower age groups are not ready to invest in bank and post office deposits. Above 40 to 50 years age criteria not ready to take risk while selecting investment avenues and giving preference to pensions schemes. Tax benefit is also one of the priorities for investors while investing the money. Due to technology employees are becoming very smart for their self-investment. They are updating their knowledge, related to market conditions and changes implemented in every budget.

Female employees are still dependent on their husband for taking investment decisions. They are not ready to take risky investment avenues and prefer to invest in gold and silver.

In that way this study identified the employees investment pattern is based on the various factors which are related to the respective investment avenues. Demographic factors like age, gender, level of income , level of knowledge etc. affect employees investment decisions.

## References

1. Balakrishnan V. and Shanmugsundaram V. (2011). "Investment Decisions- Influence of Behavioural Factors" Indian Journal of Finance. Sept.,Vol.5,No.9, PP 25-34.
2. Mehta Sushil Kumar and Aggarwal Neha (2011). "The Effect of Demographics on Investment Choice: An Empirical Study of Investor in Jammu" Indian Journal of Finance. Oct., Vol.5,No.10,PP 43-55
3. Pande Priyanka (2014). "A Study of Saving and Investment Pattern of Investors" (Special reference of Haridwar Distirict. Indian Streams Research Journal. ISSN 2230-7850. Vol.4(issue-4) May.
4. Sonali patil, (2014) 'A study on preferred investment avenues among salaried people with reference to pune, India', Journal of Economics and finance, ISSN 2321-5933, vol. 5, Issue 2, pp 9-17.
5. Virani Varsha "Saving and Investment Pattern of School Teachers – A Study with Reference to Rajkot City, Gujarat". ISSN 2277-1166. Vol.2, ISSUE NO.4
6. www.google.com

# EFFECT OF VARIOUS COPING STRATEGIES ON STUDENTS HAVING AGE GROUP OF 15 TO 24 YEAR IN GOVERNMENT UNIVERSITY IN GUJARAT REGION

## A. Vaja[1] and A. Nasit[2]

[1]RK University, Rajkot, Gujarat
[2]School of Management, RK University, Rajkot, Gujarat
[1]Aratisolanki860@gmail.com

_____

## ABSTRACT

*This study focused on different age groups on coping strategies among government university students in the Gujarat region. Twenty-one males and seventy-nine females in the age group of 15 to 24 years completed the coping strategy inventory. Above 17 years students use positive thinking as their coping strategies of stress. Above 20 years students were more likely to use problem-solving and coping strategies. The different age group of students was positively correlated with coping strategies of stress. Chi-square was used in this study to masseur the difference in age group and their coping strategies. This study was based on primary and secondary data, primary data was collected from a structured questionnaire via an online survey tool (Google form).*

_____

## Introduction

Stress is affecting every human in their life and it is part of this life. In which people tackle that stressful condition depends on their situation and how they tackle this condition. Stress is one of the most important factors that affect individuals and their health also (Aydin, 2017). Several studies reported university environment, financial issues, psychosocial challenges were experienced by university students (Eisenberg et al. 2007; Talib and Rehman, 2012; Verger, Guagliardo, Gilbert, and Masfety, 2009). Stress affects a large number of students also their performance level, grade and academic stress is big cause across the world. Stress is different for individuals because of their situation and their coping strategies. Female students are more stressed than male students because of their emotional character in the environment (Sulaiman. 2009). Financial problems and academic stress are major causes among female students (Mazumdar, 2012). Test, assignment, fear of failure, financial problem, projects, fear of future there are several reasons of students life and its unavoidable phenomenon in every student's life (Mazumdar, Gogoi, Buragohain, and Haloi, 2012). Stress is not negative for everyone. Research emphasizes that mistakes and failure are opportunities to learn and build resources for coping with future negative events (Aldwin, Sutton, and Lachman, 1996). Chronic stress may lead to positive affect and

individuals can adopt the stress (Folkman and Mokowitz, 2000). Many research reported that acute stress and chronic stress produce different outcomes (Cohen et al., 1999). A stressful life can impact students' and young people's lives. Students face stressors such as time management, financial problem, social conflict, relationship, and their academic performance (Womble, 2003). More common stressors during the adolescents period and affect their behavior and health condition (Tessner, Mittal, and Walker, 2011). The physical and psychological impact of stress can also disrupt an individual developing identity (Sutin, Costa, Wethington, and Eaton, 2010). According to Kendall and Hammen "When individual demand is increasing and they have no ability to coup their particular situation than occur stress. The majority of students are not able to coup a particular situation because of the heavy syllabus of university, language barrier, rules and regulation of university highly parental expectations for a good grade and they lead them to mental health issues and suicide (Yashwant Kumar Nagle and Usha Sharma, 2018).

## Stress and Students

The transition from school education to university education is a very stressful period for students, additional stress comes to the student's life (Lakshmi, 2009). Stress is continued throughout the university tenure

because of other expectations of university and parents side and pressures emerge such as good grad, employment (Ross et al., 1999). Students' life stressors like, difficulty with roommate those students who are living in a hostel because they are not staying in a hostel before, adjustment to college, death of close family members (Towbes and Cohen, 1996). Earlier research on student stress using the students stress survey found the most common source of students stress was increased workload, responsibility, financial issues (Ross et al., 1999). Students transition from school life to university life include pressures of the university as well home and challenges can be both positive and negative (Clark, 2005). Stress means a physical and emotional factor that causes health and mental disorders (Archana Kumari and Jagrati Jani, 2014). Students stress factors such as gender, year of study, social background, and ethnicity (West and Russo, 2000). Graduate students are more stressed than undergraduate students because graduate students fear about they feature and employment. (Darcy A. Keady, 1999). In terms of academic achievement, female students are more stressed than their counterparts students (Asaduzzaman, Mohiuddin, Ahmned, and Bhyiyan, 2019). According to Busari, 2012 in their report they suggested that several researchers reported in their study high rates of stress and depression among university students worldwide. First-year students reported more chronic stressors than other students because new students present unique challenges and their coping capabilities, other research has shown that first-year college students experience more mental and physical symptoms associated with stress and lower self-efficacy than other students (Wang and Castaneda-Sound, 2008). The majority of stress among university students is students and faculty perception and relationship (Misra et al. 2000).

## Coping Strategies of Stress Concerning Age

According to Gutmann in 1974, they suggested in their report that when people grow older they go from an active coping strategy to passive strategies they have the aggressive and controlling capability, and they coup every situation. Older students easily coup their stressful condition than younger students they are more aggressive (Diehl, Coyle, and Labouvie-vief, 1996). Coping strategies of stress is more effective and realistic according to age, younger students have immature psychological processes than an older one. There is wider use of a sense of humor as well (Vaillant and Pfeiffer, 1997). According to Mc Crae in 1982 in their report they suggested that younger and older students have different coping strategies are primarily differences in the type of problems that they face. Coping strategies vary depending on the change in the stressors (Lazarus and Delongis, 1983). According to Arnett, 2001 reported that confident power is experienced as more prominent in middle age than in early adulthood. Students are developing with their age such as stressful coping strategies, control emotion, adaptability of stressful conditions (Aldwin and Levenson, 2001). When responsibility is increasing stress is also increase.

## Method
## Design

This present study is based on both primary and secondary data, for this study purpose descriptive research design method was use and this study was based on qualitative research methods.

## Participants

The coping strategies were administered to 100 participants of both male and female, divided into 4 groups aged 15 to 16 (1 participant), 17 to 20 (43 participants), 21 to 22 (44 participants), and above 2 (12 participants). They were students in the government university of the Gujarat region.

## Instrument

Primary data was collected from structured questionnaires via online survey tools. Cronbach's Alpha is applying to check the reliability of instruments. With the help of the SPSS 25 version, reliability is performing on Likert Scale items. The information collected with the help of the questionnaire was analyzed by using a statistical measure like Chi-Square Analysis.

**Statistics**
**Frequency Analysis**

| Age of respondents | | |
|---|---|---|
| N | Valid | 100 |
| | Missing | 0 |

| Age of respondents | | | | | |
|---|---|---|---|---|---|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | 15-16 | 1 | 1.0 | 1.0 | 1.0 |
| | 17-20 | 43 | 43.0 | 43.0 | 44.0 |
| | 21-23 | 44 | 44.0 | 44.0 | 88.0 |
| | Above 23 | 12 | 12.0 | 12.0 | 100.0 |
| | Total | 100 | 100.0 | 100.0 | |



Age of respondents
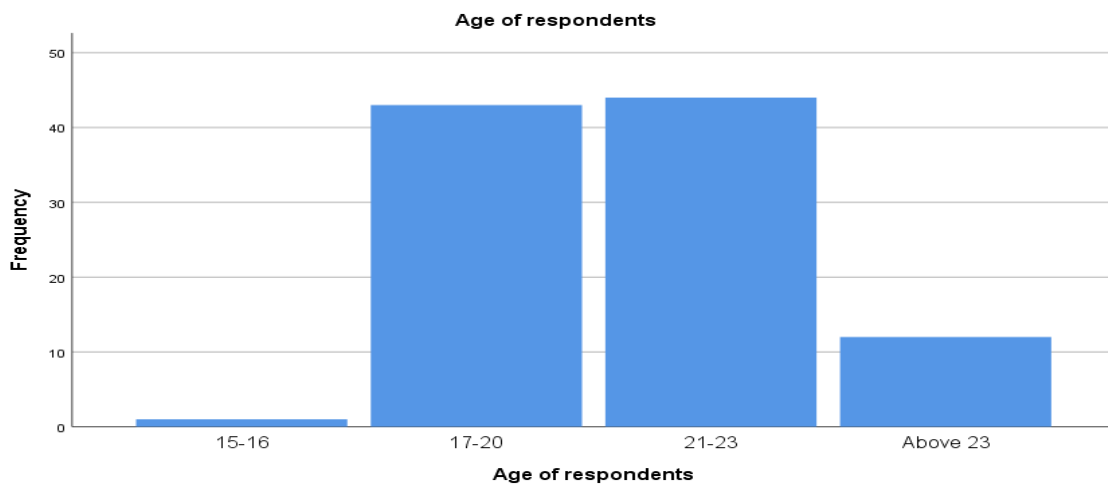
The above graph shows that 1.0% of the students come under the age group of 15-16 years of age, 43.0% of the students come under the age group of 17-20 years of age, 44.0% of the students come under the age group of 21-23 years of age and finally, 12.0% of the students come under the age group of above 23 years of age. It shows that the majority of the students come under the age group of 21-23 years (44.0%).

**Chi-Square Test**

**Chi-Square Test between ages with coping strategies of stress**

**Hypothesis**

H0: There is no significant association between the age group of respondents and coping strategies of stress among government university students.

H1: There is a significant association between the age group of respondents and coping strategies stress among government university students.

| Age of respondents * What techniques do you use to come out of stress? Cross tabulation | | | | | | |
|---|---|---|---|---|---|---|
| Count | | | | | | |
| | | What techniques do you use to come out of stress? | | | | Total |
| | | Yoga or exercise | Meditation | Positive thinking | Pursue hobbies and interest | |
| Age of respondents | 15-16 | 0 | 0 | 1 | 0 | 1 |
| | 17-20 | 0 | 1 | 24 | 18 | 43 |
| | 21-23 | 4 | 7 | 25 | 8 | 44 |
| | Above 23 | 2 | 5 | 3 | 2 | 12 |
| Total | | 6 | 13 | 53 | 28 | 100 |

| Chi-Square Tests | | | |
|---|---|---|---|
| | Value | df | Asymptotic Significance (2-sided) |
| Pearson Chi-Square | 25.060[a] | 9 | .003 |
| Likelihood Ratio | 26.659 | 9 | .002 |
| Linear-by-Linear Association | 16.785 | 1 | .000 |
| N of Valid Cases | 100 | | |
| a. 9 cells (56.3%) have an expected count of less than 5. The minimum expected count is .06. | | | |

The Chi-square test was applied to test the significance between the age of respondents and their coping strategies of stress among Government universities. The significant level for the test is 5% of the chi-square result shown in the above table, the Pearson chi-square value is 0.003 with a degree of freedom 9. Therefore, the null hypothesis is rejected and the alternative hypothesis is accepted. So, there is a significant association between the age of respondents and their techniques to reduce stress among Government universities. The age of respondents and their coping strategies of stress among Government universities are dependent on each other and these variables are significantly associated with each other.

**Conclusion**

The finding of this study concludes that age group of 17 to 20 and 21 to 23 years students positive thinking adopt as their coping strategies i.e. 24 participants and 25 participants students respectively. Stress is very common among government university students due to several factors i.e. academic workload, parental high expectation, financial issue, language barrier, poor performance, rules and regulation of university, university environment issues. In this stressful situation, the majority of students adopt positive thinking as their coping strategies in the government university of Gujarat region. Then adopt hobbies and interests as their coping strategies. Only 6% of students adopt yoga or exercise, and 13% of students adopt meditation and relax in their stressful condition.

**Reference**

1. Aldwin, C. M., & Levenson, M. R. (2001). Stress, coping, and health at mid-life. The handbook of midlife development, 188-214.
2. Aldwin, C. M., Sutton, K. J., & Lachman, M. (1996). The development of coping resources in adulthood. Journal of personality, 64(4), 837-871.
3. Aldwin, C. M., Sutton, K. J., Chiara, G., & Spiro, A. (1996). Age differences in stress, coping, and appraisal: Findings from the Normative Aging Study. The Journals of Gerontology: Series B, 51(4), P179-P188.
4. Arnett, J. J. (2001). Conceptions of the transition to adulthood: Perspectives from adolescence through midlife. Journal of adult development, 8(2), 133-143.
5. Clark, M. R. (2005). Negotiating the freshman year: Challenges and strategies among first-year college students. Journal of College Student Development, 46(3), 296-316.
6. Diehl, M., Coyle, N., & Labouvie-Vief, G. (1996). Age and sex differences in strategies of coping and defense across the life span. Psychology and Aging, 11(1), 127.
7. Folkman, S. (1984). Personal control and stress and coping processes: a theoretical analysis. Journal of personality and social psychology, 46(4), 839.
8. Folkman, Susan, and Richard S. Lazarus. "Coping as a mediator of emotion." Journal of personality and social psychology 54, no. 3 (1988): 466.
9. Gutmann, D. L. (1974). The country of old men: Cross-cultural studies in the psychology of later life. Culture and personality: Contemporary readings, 95-121.
10. Labouvie-Vief, G., DeVoe, M., & Bulka, D. (1989). Speaking about feelings: Conceptions of emotion across the life span. Psychology and Aging, 4(4), 425.

11. Labouvie-Vief, G., Hakim-Larson, J., DeVoe, M., & Schoeberlein, S. (1989). Emotions and self-regulation: A life span view. Human development, 32(5), 279-299.

12. Lakshmi, V. N. (2009). Identifying stressors among university students. Health psychology and counseling, 164-172.

13. Mazumdar, H., Gogoi, D., Buragohain, L., & Haloi, N. (2012). "A comparative study on stress and its contributing factors among the graduate and post-graduate students". Advances in Applied Science Research, 3(1), 399-406. Nagle, Y. K., & Sharma, U. (2018). "Academic stress and coping mechanism among students: An Indian perspective". Journal of Child Adolescence Psychology, 2(1), 6-8.

14. McCrae, R. R. (1982). Age differences in the use of coping mechanisms. Journal of Gerontology, 37(4), 454-460.

15. Misra, R., McKean, M., West, S., & Russo, T. (2000). Academic stress of college students: Comparison of student and faculty perceptions. College Student Journal, 34(2).

16. Towbes, L. C., & Cohen, L. H. (1996). Chronic stress in the lives of college students: Scale development and prospective prediction of distress. Journal of youth and adolescence, 25(2), 199-217.