SPATIO-TEMPORAL ANALYSIS OF LANDUSE/LANDCOVER CHANGE IN TENGA RIVER BASIN, WEST KAMENG DISTRICT USING GEO-SPATIAL TECHNIQUES

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ABSTRACT

This study analyzes the spatio-temporal changes pertaining to Land use/Land cover (LULC) using Geo-spatial techniques in Tenga River Basin, West Kameng District, Arunachal Pradesh. The basin covers an area of 957.94 square km. The present study uses multi-temporal remote sensing data acquired by the Landsat-5 TM and Landsat-8 OLI satellite sensors of 30m spatial resolution to estimate LULC changes between 1997 to 2008 and 2008 to 2018. A total of 6 LULC categories were identified: Agricultural Land, Dense Forest, Barren Land, Open Forest, Shrubs and Water-bodies followed by accuracy assessment of sampled pixels using overall, producer's and user's accuracies and Kappa Coefficient derived from the error matrices for each period. The results revealed substantial changes in LULC categories with particular emphasis on loss of natural land cover in the form of forested areas and water bodies highlighting the urgent need to protect them. Therefore, present policy framework must emphasize on adopting strategies that ensure sustainable use of land resources by mitigating the adverse effects associated with LULC changes.

Keywords:*Precision cluster, LULC, Kappa Coefficient, Agriculture, Tenga River, West Kameng*

Introduction

Land is a basic natural resource that can hardly be expanded. The proper utilization of land is the economic backbone of a region and the use of land is determined by the geographical conditions, socio-economic conditions and Land use pattern of that particular region (Kumar and Sharma, 2016). The knowledge of Land Use/Land Cover (LULC) is important for many planning and management strategies. Concepts concerning land cover and land use activity are closely related and in many cases, have been used interchangeably (Anderson et al., 1976). The term "land use" refers to the human activity or economic function associated with a piece of land for immediate actions of modifying or converting the land cover. It includes such broad categories like human settlements, protected areas and agricultural land. Within those broad categories there are more refined categories such as urban and rural settlements, irrigated land and rainfed fields, national parks and forest reserves, and transportation and other infrastructure (Sherbinin, 2002). Landover, on the other hand, relates to the type of feature that is present on the earth surface. It describes the vegetation and artificial constructions covering the land surface (Burley, 1961). These are generally a reflection of the local climate and landforms, though they too can be altered by human actions.It is now possible to assess and monitor LULC changes at multiple spatial and temporal scales due to recent advancement in Remote Sensing (RS) Technology, Geographic Information System (GIS) and advance computer technology. For example, the National Land Cover Database (NLCD) 2011 is an integrated database encompassing land cover and land cover change products at various thematic, spatial and temporal resolutions (Giri, 2012). Since, field-based mapping is practically difficult, Remote Sensing Technology coupled with Geographical Information System is principally appropriate for mapping environmental phenomena such as LULC with continuous monitoring across varied spatial and temporal scales.The combined use of satellite RS and GIS has proved to be a robust and cost-effective method for monitoring LULC changes (Hathout, 2002). Thus, detection of LULC changes is one of the most important factors for management and planning issues (Jomaa and Kheir, 2003).Besides these, analyzing the driving forces that cause LULC change is essential not only to understandthe current changes but also to forecast future alterations. Despite increasing concerns about the impactsof LULC change on global changes of the environment and sustainable

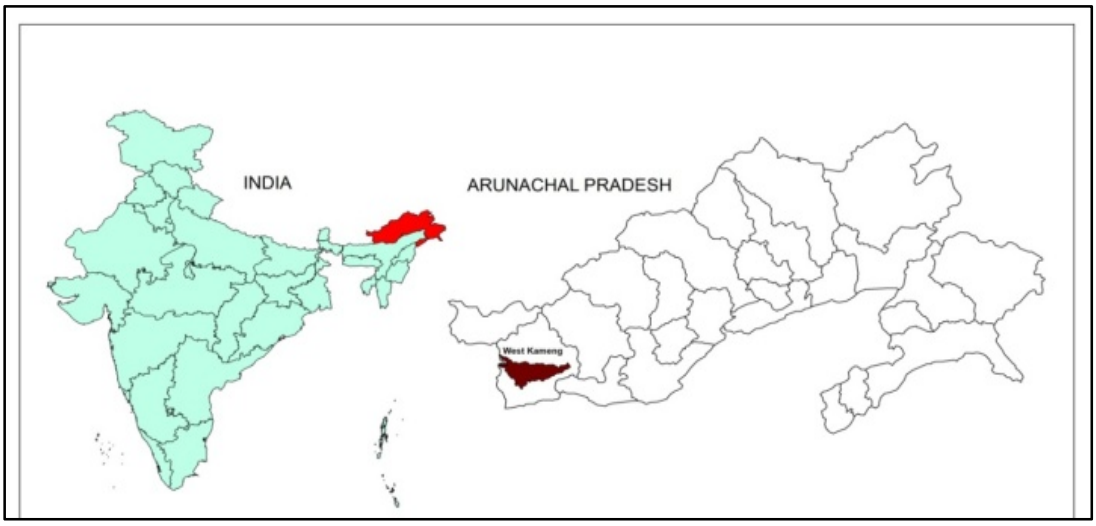
development (Wei et al., 2015) research onLULC change in Arunachal Pradesh, India is minimal. In Tenga River Basin, West Kameng District the magnitude and dynamics ofthese changes have never been studied. No information pertaining tospatio-temporal extents ofLULC change in the light of remarkableincrease in agricultural activities has been evaluated over time to improve land use planning in theTenga River Basin. Numerous studies are required to understand the aspects of changes in the human environment across space andtime(Veldkamp and Verburg, 2004). To address this, the integrated approach of RS and GISdata was used for monitoring the LULC change (Kasischke, et al., 2004) in Tenga River Basin.

Study Area

Tenga River Basin is located in the Central part of the West Kameng District of Arunachal Pradesh, India between 27º21′16′′N to 27º02′32′′N and 92º02′16”E to 92º44′48′′ E. It covers an area of about 957.94 sq. km. representing 12.84% of total area of the district. It has an elongated shape stretching from west to east.The topography of the study area is varied and exhibits altitudinal extremes of 523 meterstowards the downstream of Tenga River in the eastto4,099 meters in its upper reaches towards the west with an average elevation of 2,306 meters above mean sea level (Megeji, et al., 2020). The average rainfall in the Basin area is recorded at 1,607 mm per annum with and 0.1°C(minimum) to 31°C (maximum) temperatures (Central Ground Water Board, 2013).The Study Area spans across important villages of seven administrative Circles of the District from Dirang, Kalaktang, Shergaon, Rupa, Bomdila, Singchung and Jamiri inhabited by Monpa, Shertukpen, Bugun and Aka tribes. According to Census 2011, the study area has a total population of 35,877 with 20,375 males and 15,502 females.It is famous for the growth of agricultural crops; mainly the vegetable crops such ascabbage, tomato, potato and other horticultural crops including apple, kiwi, walnut etc.

Database and Methodology

In order to carry out spatial analysis,satellite data for three different time periods- 1997, 2008 and 2018 were downloaded from United States Geological Survey (USGS) Earth Explorer (https://earthexplorer.usgs.gov/).These satellite data include Landsat-5 (Thematic Mapper (TM)) and Landsat-8 (Operational Land Imager- Thermal Infrared Sensor (OLI-TIRS)) for Path-136 and Row-41 (Table.1). The selection of the Landsat satellite images was considered on the basis of the quality of the image especially for those with limited or no cloud cover. The images were acquired within the same yearly season to help reduce seasonal and varying sun positions effects.



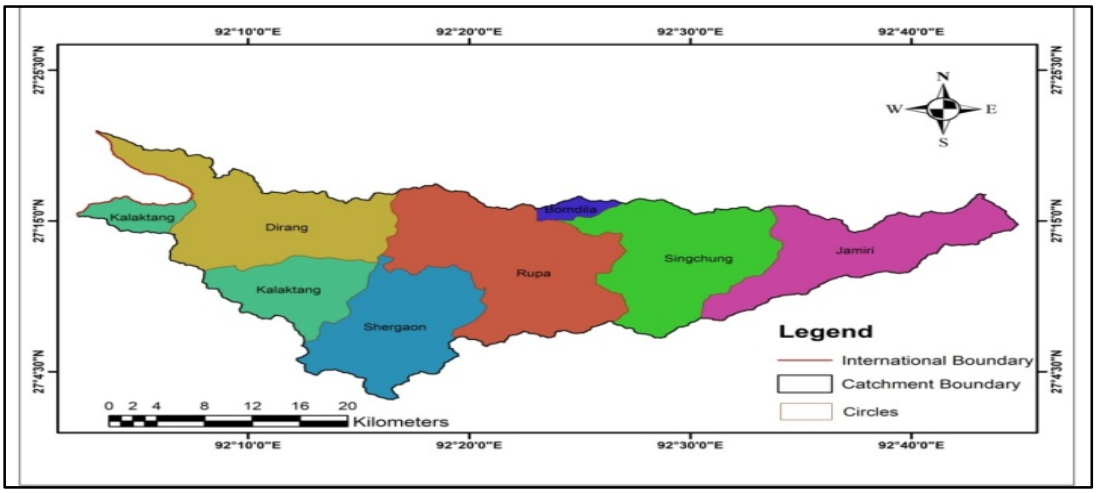


Fig.1: Location Map of the Study Area

Satellites	Sensor	Acquisition Date	Path/Row	Resolution (m)	Bands Used
Landsat-5	TM	03-01-1997	136/41	30	Bands 1 to 7
Landsat-5	TM	17-11-2008	136/41	30	Bands 1 to 7
Landsat-8	OLI & TIRS	29-11-2018	136/41	30	Bands 2 to 11

Table.1: Details of the Satellite Imageries

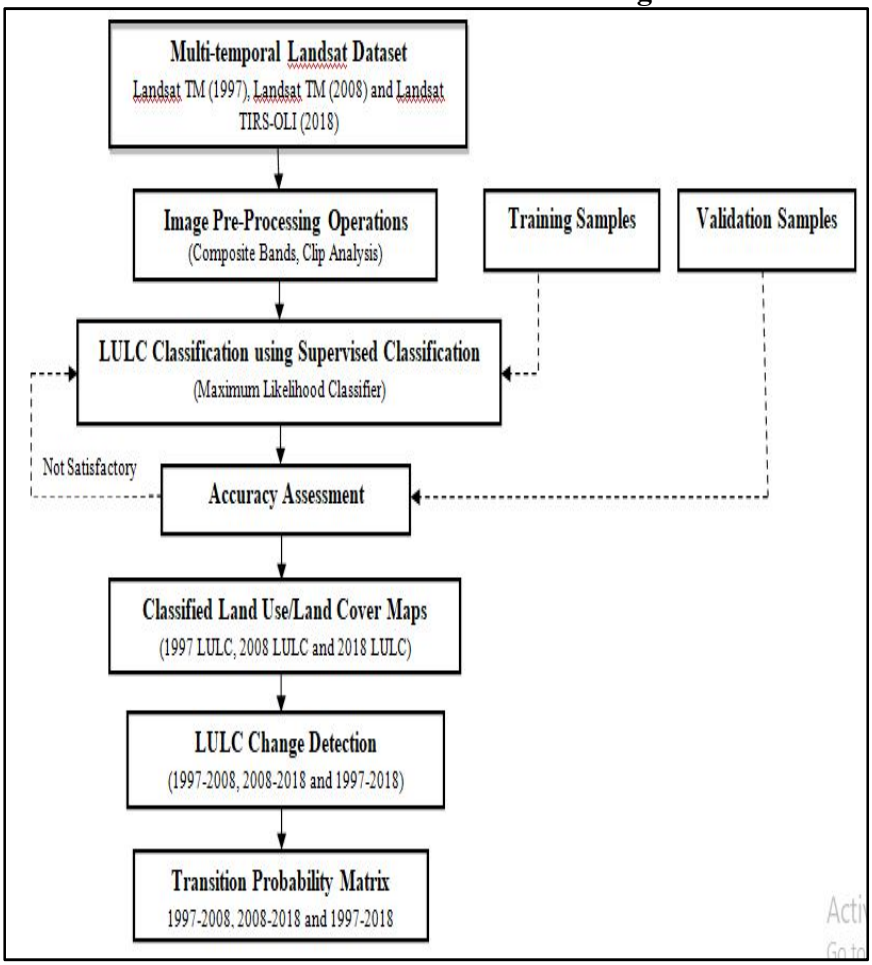


Fig. 2. Methodological Flowchart

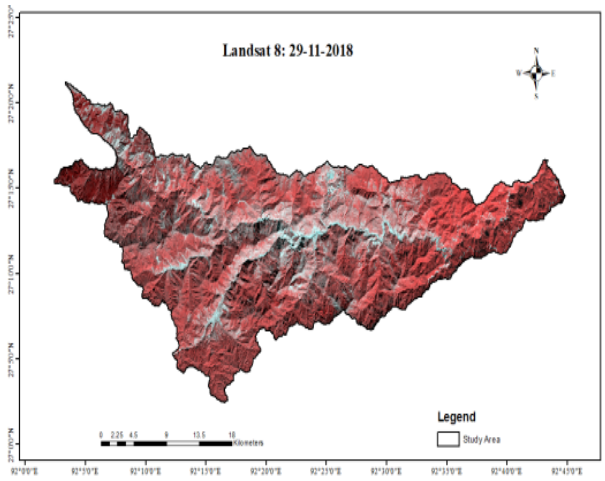


Fig. 3: Satellite Imageries of Study Area

LULC maps for the years 1997, 2008 and 2018 have been generated by clipping the Tenga catchment AoI. A normal pixel based precision cluster supervised classification of the satellite images have been performed through Maximum Likelihood Classification for generation of LULC maps. The advantage of precision cluster, a new image classification technique has been devised after running various scenarios in LULC classification. The flowchart of the methodology adopted in this study is given in Fig.2.

In the study, training samples belonging to each land-cover feature identified on the imageswere assigned with separate values due to observed differences in spectral reflectance. At this stage the LULC training pixels have been taken for core category to make the clusters sharp and unmixed. Settlement as a LULC feature was excluded at this stage as the houses with dimensions smaller than 30m x 30m are spaced widely in the study area and taking sample sites for Settlement resulted in erroneous calculation with the Barren Land Category. Hence, settlement was included in Barren Land Category. However, vector files representing Settlement areas were exported to ArcGIS from Google Earth and converted to raster formats and integrated on respective LULC maps. Various LULC features identified on the images are given in Table.2 with their description:

LULC Class	Colour	Description
Agricultural Land		This category mostly occupies the crop fields and fallow land
Dense Forest		This includes the forest areas of both high and low altitudinal zones
Barren Land		Areas with no vegetation covers, built up areas, river beds, bare surfacesare included in this area
Open Forest		Areas where very little forest covers are found are part of this category
Shrubs		Small grass land
Water Bodies		Rivers and lakes are part of this categories

Table.2: LULC Features and Description

LULC maps of each period were validated using accuracy assessment which is an important step in LULC change analysis (Munthali, Botai, Davis, & Adeola, 2019). The accuracy assessment for the LULC maps was determined using overall accuracy, producer's and user's accuracies and Kappa Coefficients derived from the error (confusion) matrix. The accuracy estimation is essential to assess reliability of the classified map (Foody, 2002).Overall classification accuracy is given by following formula (Veregin 1995):

$$p = \left(\frac{n}{N}\right) * 100$$

where 'p' is classification accuracy, 'n' is number ofpoints correctly classified on image, and 'N' is numberof points checked in the field. In addition to above matrices, Kappa coefficient can be used as a measure of agreement between model predictions and reality or to determine if the values contained in an error matrix represent a result significantly better than random (Jensen, 1996). Kappa coefficient was computed as per the equation computed as follows (Bharatkar and Patel, 2013):

$$\hat{K} = \frac{\text{Overall Accuracy} - \text{Random Accuracy}}{1 - \text{Random Accuracy}}$$

where;

Overall Accuracy is proportion of units which agree Random accuracy is proportion of units for expected chance agreement. A Kappa coefficient equal to 1 means perfect agreement whereas a value close to zero means that the agreement is no better than would be expected

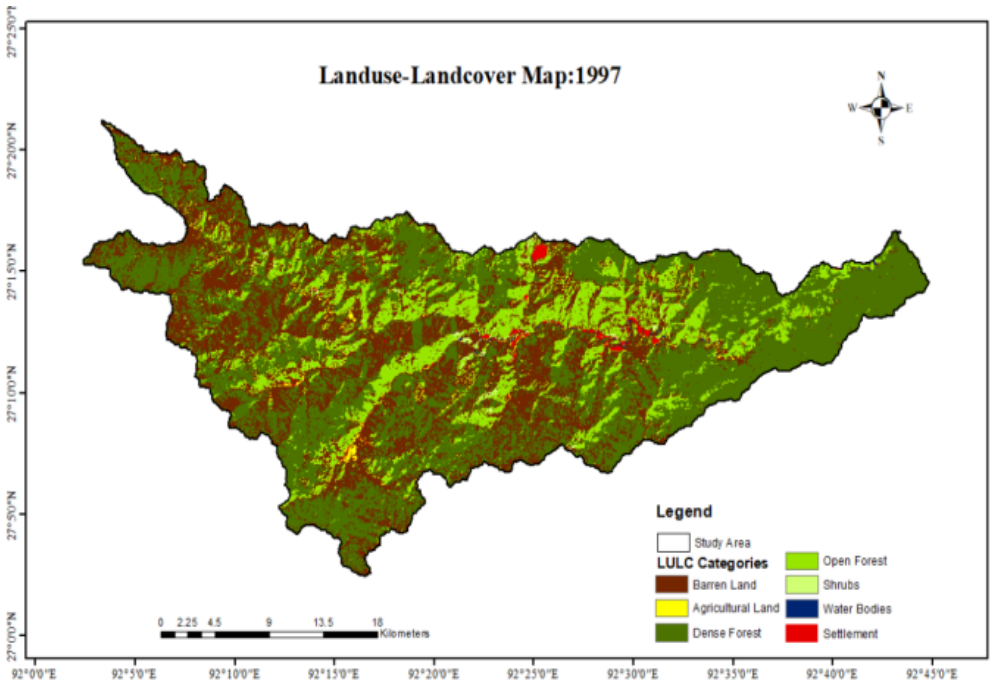
by chance (Rwanga & Ndambuki, 2017). In order to determine the changes in the LULC that have occurred over the observation period from 1997 to 2008 and 2008 to 2018 change detection analysis was performed from transitional probability matrix derived by intersecting the LULC maps of different years with each other.

Results and Discussions

The overall classification accuracy is found to be 99 percent for the classified images (LULC maps) of 1997 and 2008 while it is 86.9 percent for the classified image of 2018

Table.3: Accuracy Assessment and Kappa Co-efficient

Year	Classes	Producer's Accuracy	Use's Accuracy	Kappa Coefficient	Overall Accuracy
1997	Agricultural Land	1	1	0.835	0.991
	Barren Land	1	1		
	Dense Forest	0.9934	0.9932		
	Open Forest	0.9595	0.9595		
	Shurbs	1	1		
	Water-bodies	1	1		
2008	Agricultural Land	1	1	0.835	0.991
	Barren Land	1	1		
	Dense Forest	0.9934	0.9934		
	Open Forest	0.9595	0.9595		
	Shurbs	1	1		
	Water-bodies	1	1		
2018	Agricultural Land	1	0.33	0.713	0.869
	Barren Land	0.99	0.693		
	Dense Forest	0.996	0.982		
	Open Forest	1	0.9		
	Shurbs	0.35	1		
	Water-bodies	1	1		



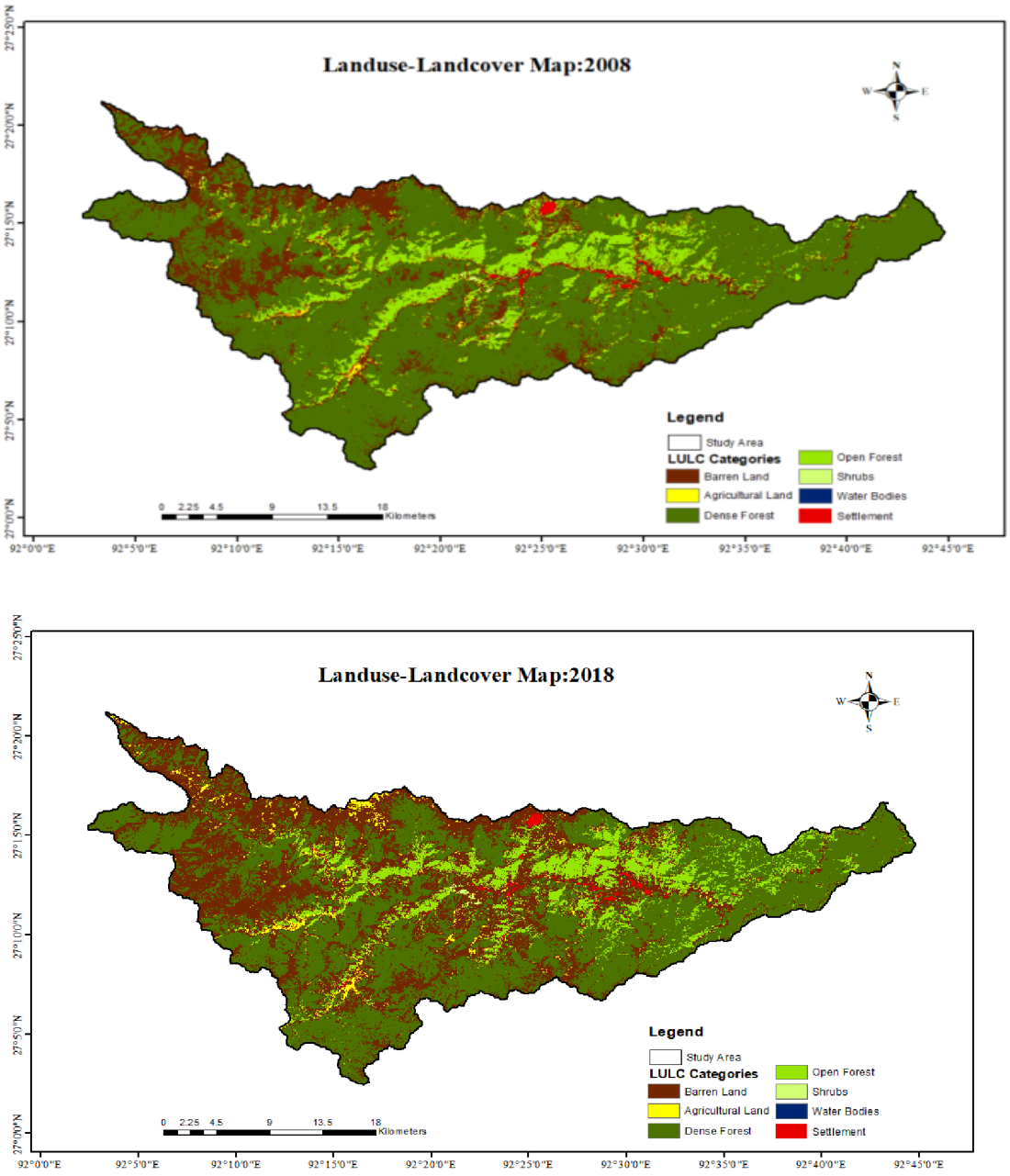


Fig. 3: Changing trend of Land Use/Land Cover of Tenga River Basin (1997, 2008 and 2018)

The Kappa coefficients have been calculated to be 83.5 percent, 83.5 percent and 71.3 percent (Table.3) for 1997, 2008 and 2018 respectively. The Kappa coefficients for the year 1997 and 2008 are found to be almost perfect while it is substantial for the year 2018.

Categories	1997		2008		2018		Annual Change Rate %[b]	
	Area (Hec)	%[a]	Area (Hec)	%[a]	Area (Hec)	%[a]	1997-2008	2008-2018
Barren Land	31058.64	32.42	17907.03	18.69	34640.51	36.16	-3.85	9.34
Agricultural Land	791.46	0.83	605.79	0.63	1617.93	1.69	-2.13	16.71
Dense Forest	46644.30	48.69	65965.32	68.86	48667.90	50.80	3.77	-2.62
Open Forest	16574.67	17.30	11169.72	11.66	10736.46	11.21	-2.96	-0.39
Shrubs	522.36	0.55	127.71	0.13	120.42	0.13	-6.87	-0.57
Water Bodies	203.13	0.21	18.90	0.02	11.25	0.01	-8.25	-4.05
Total	**95794.50**	**100**	**95794.5**	**100**	**95794.50**	**100**		

Note: %[a] percentage of each class out of total area; %[b] annual change rate in the class

Table.4: Result of the changing trend of LULC (1997, 2008 and 2018)

In terms of change detection analysis, the results reveal of significant LULC changes occurred during the study period 1997-2018 (Table.4 and Fig.3). The LULC maps (Fig.3), Changing trend of LULC class sizes in hectare (Table.4),Net change for LULC classes (Fig.4), LULC transition matrix (Table.5 and 6) demonstrate some interesting and important spatio-temporal patterns. It can be seen that the Forest Cover i.e. Dense Forest and Open Forest combined together witnessed an expansion from 65.99 percent to 80.52 percent from 1997 to 2008.Between 1997 and 2008, the dense forest experienced total gain (net change) of 19,321.11 hectares with total addition of 22,446.34 hectares from barren land (17,693.55 hectares), agricultural land (35.73 hectares), open forest (4,629.24 hectares), shrubs (24.84 hectares) and water bodies (82.98 hectares) while losing 3,145.23 hectares to barren land (2,838.69 hectares), agricultural land (6.39 hectares), open forest (297.81 hectares), shrubs (0.18 hectares) and water bodies (2.16 hectares) from its total area. Ban imposed on logging and timber business subsequent upon historic judgement passed by the Supreme Court of India on December 12, 1996 with respect to extensive deforestation in the Northeast states of India could have contributed to the improved trend in forest cover during the period. Increasing trend of area under forest cover can be linked with reduction in area under cultivation as native communities realized the prospects of commercial agriculture and switched over from traditional shifting cultivation practices to settled agriculture during this period. In the subsequent decade between the years 2008 to 2018, the forest cover has significantly declined from 80.52 percent to 62.01 percent in the study area.

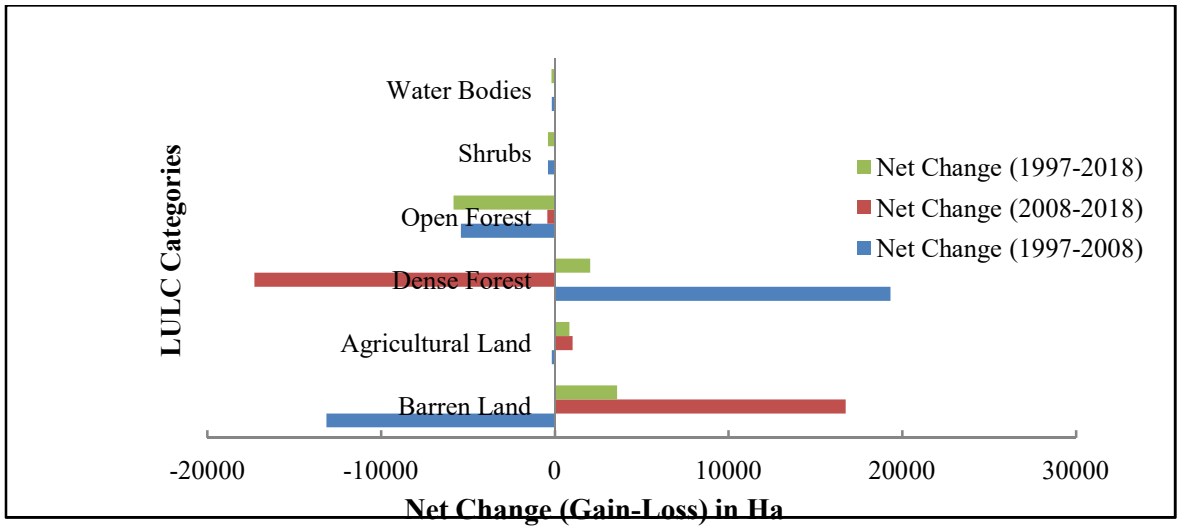


Fig.4: Net Change for each LULC Class for Study Period

The increase in the barren land from 18.16 percent to 35.59 percent during the same period is an indication that there was increased deforestation and forest degradation in the study area as there was substantial net loss of 14,042 ha of dense forest and 3,463.65 ha of open forest to barren land. The driving factors for declining forest cover coupled with increase in barren land can be attributed to rampant tree felling for fuel-wood, timber for local use, developmental projects such as road construction and mining and extraction of gravel from the hillslopes and river banks.Higher incidence of forest fires during winter season also caused decline in forest cover as 25.2 percent of fire incidence in the state during 2008 to 2016 were reported from Kameng Districts (West Kameng and East Kameng) as per India State of Forest Report (2015). Thus, the barren land category at present constitutes 36.16 percent as against 18.69 percent and 32.42 percent in 2008 and 1997 respectively of the study area.

The spatial extent of agricultural lands initially showed a decreasing trend from total area of 791.46 ha in 1997 to 605.79 ha in 2008. In contrast to its decrease in the period from 1997 to 2008, agricultural land showed progressive

expansion in its area with net gain of 1,012.14 ha during 2008 to 2018 with gain from barren land (1146.6 ha), dense forest (45.18 ha), open forest (177.75 ha) and shrubs (27.63 ha). During the same period (2008-2018), the agricultural land had lost 362.97 ha, 0.63 ha, 18.45 ha, 3.33 ha and 0.45 ha to barren land, dense forest, open forest, shrubs and water bodies respectively. Currently, the agricultural land has an area of1,617.93 ha representing 1.69 percent of total area. Increase in the spatial extent of agricultural land is indicative of high dependence of local communities upon farming for their livelihood. New pockets of agricultural land are emerging as considerable area of forests has been converted to agricultural lands. The key drivers of this identified trend are population growth and a loss in soil fertility of the customary lands where agricultural activities used to be concentrated initially. The increasing demand for agricultural produce in the nearby markets also motivates the people to take up cultivation in marginal lands such as hill slopes and along the stream and river banks by clearing forests. This indicates that there is increased agricultural activity consequent upon its commercialization during the study period. There is also marked reduction in spatial extent of water bodies in the study area from 1997 to 2008 and 2008 to 2018. The key drivers identified for this trend is significant increase in activities pertaining to the construction of roads, hydropower projects, cultivation and mining and extraction of sand and gravels near river banks leading to the drying of river bed. This reduction in spatial extent of water bodies can also be due to the consequence of climate change though more studies are required to validate this point.

Land use/Land Cover 1997 (in Hectare)	Land use/Land cover 2008 (in Hectare)						
Categories	**Barren Land**	**Agricult-ural Land**	**Dense Forest**	**Open Forest**	**Shrubs**	**Water Bodies**	**Total**
Barren Land	**10650.51**	325.98	17693.55	2352.06	28.8	7.74	**31058.64**
Agricultural Land	470.25	**159.30**	35.73	124.56	0	1.62	**791.46**
Dense Forest	2838.69	6.39	**43499.07**	297.81	0.18	2.16	**46644.3**
Open Forest	3623.49	94.95	4629.24	**8210.34**	16.38	0.27	**16574.67**
Shrubs	230.13	6.30	24.84	179.19	**81.81**	0.09	**522.36**
Water Bodies	93.96	12.87	82.98	5.76	0.54	**7.02**	**203.13**
Total	**17907.03**	**605.79**	**65965.41**	**11169.72**	**127.71**	**18.90**	**95794.56**

Table.5: General LULC change transition matrix for comparing

Land use/Landcover 2008 (in Hectare)	Land use/ Landcover 2018 (in Hectare)						
Categories	**Barren Land**	**Agricult-ural Land**	**Dense Forest**	**Open Forest**	**Shrubs**	**Water Bodies**	**Total**
Barren Land	**13446**	1146.6	1857.87	1409.49	43.02	4.05	**17907.03**
Agricultural Land	362.97	**219.96**	0.63	18.45	3.33	0.45	**605.79**
Dense Forest	15899	45.18	**46512.4**	3504.06	0	4.68	**65965.32**
Open Forest	4873.14	177.75	296.64	**5802.3**	19.89	0	**11169.72**
Shrubs	43.56	27.63	0.18	2.16	**54.18**	0	**127.71**
Water Bodies	15.84	0.81	0.18	0	0	**2.07**	**18.9**
Total	**34640.51**	**1617.93**	**48667.9**	**10736.46**	**120.42**	**11.25**	**95794.47**

Table.6: General LULC change transition matrix for comparing

Conclusion

The study has revealed that LULC conversions are taking place in the Tenga River Basin as a result of intensive anthropogenic activities for various developmental activities like construction of roads, mining of construction materials viz. sand and gravels, agricultural activities etc. It is noticed that forest land followed by agriculture, barren land classes are the major land use/land cover categories in the Tenga River Basin. An important observation from the analysis is the loss of natural land cover in the form of forested areas (2.62 percent annually) and water bodies(4.05 percent annually) highlighting the urgent need to protect them.On the other hand, expansion in barren land (9.34 percent annually) and agricultural lands (16.71 percent annually) were observed during 2008 to 2018. The results from this study demands existing policy framework to adopt strategies that mitigate the adverse effects associated with LULC changes and ensure sustainable use of land resources.

References

1. Hardy, E. E., & Anderson, J. R. (1973, October). A land use classification system for use with remote-sensor data. In LARS Symposia (p. 2).
2. Burley, T. M. (1961). Land use or land utilization?. The Professional Geographer, 13(6), 18-20.
3. Bharatkar, P. S., & Patel, R. (2013). Approach to accuracy assessment tor RS image classification techniques. International Journal of Scientific & Engineering Research, 4(12), 79-86.
4. Ray, P. A., Yang, Y. C. E., Wi, S., Khalil, A., Chatikavanij, V., & Brown, C. (2015). Room for improvement: Hydroclimatic challenges to poverty-reducing development of the Brahmaputra River basin. Environmental Science & Policy, 54, 64-80.
5. de Sherbinin, A., Balk, D., Yager, K., Jaiteh, M., Pozzi, F., Giri, C., & Wannebo, A. (2002). A CIESIN thematic guide to social science applications of remote sensing. New York: Center for In
6. Foody, G. M. (2002). Status of land cover classification accuracy assessment. Remote sensing of environment, 80(1), 185-201.
7. Giri, C. P. (Ed.). (2012). Remote sensing of land use and land cover: principles and applications. CRC press.
8. Hathout, S. (2002). The use of GIS for monitoring and predicting urban growth in East and West St Paul, Winnipeg, Manitoba, Canada. Journal of Environmental management, 66(3), 229-238.
9. Jensen, J. R. (2005). Introductory digital image processinga remote sensing perspective (No. 621.3678 J4/2005).
10. Jensen, J. R. (2005). Introductory digital image processinga remote sensing perspective (No. 621.3678 J4/2005).
11. Kasischke, E. S., Goetz, S., Hansen, M. C., Ozdogan, M., Rogan, J., Ustin, S., & Woodcock, C. E. (2004). Temperate and Boreal Forests. Manual of Remote Sensing. Vol. 4: Remote Sensing for Natural Resource Management and Environmental Monitoring.
12. Kumar, Ashutosh and Sharma, P.R. (2016). Spatial Pattern of Agricultural Development in Raghopur Block, District-Supaul: A Study based on Standard Score Method. Annals of the National Association of Geographers, India, Volume-XXXVI (No.2): 123-140.
13. Megeji, T.D., Patnaik, S.K., and Gogoi, P. (2020). Assessment of Terrain Parameters for Agricultural Development: A Case Study of Tenga River Catchment, West Kameng District, Arunachal Pradesh. Proceedings of 31st Annual Conference of the Indian Institute of Geomorphologists (IGI) and National Seminar on 'GEOSPATIAL TECHNOLOGY IN GEOMORPHOLOGY AND ENVIRONMENT',pp.295-306.
14. Avelar, S., & Tokarczyk, P. (2014). Analysis of land use and land cover change in a coastal area of Rio de Janeiro using high-resolution remotely sensed

data. Journal of Applied Remote Sensing, 8(1), 083631.

15. Rwanga, S. S., & Ndambuki, J. M. (2017). Accuracy assessment of land use/land cover classification using remote sensing and GIS. International Journal of Geosciences, 8(04), 611.
16. Veldkamp, A., & Verburg, P. H. (2004). Modelling land use change and environmental impact.
17. Veregin, H. (1995). Developing and testing of an error propagation model for GIS overlay operations. International Journal of Geographical Information Systems, 9(6), 595-619.
18. Zheng, H. W., Shen, G. Q., Wang, H., & Hong, J. (2015). Simulating land use change in urban renewal areas: A case study in Hong Kong. Habitat International, 46, 23-34.

DETERMINING FACTORS IN RURAL BANKING ADOPTION: AN INDIAN PERSPECTIVE

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ABSTRACT

In order to distinguish the determinants of the acceptance of banking administrations in India's provincial space, a review of the factors was undertaken which organize the major determinants influencing the acceptance of banking administrations. A controlled overflight was deferred to collect critical information by means of an improbable and beneficial inspection technique. Responses were obtained using a five-point Likert scale of 309 respondents that could be used. The result shows that the "financial literacy/education/awareness" provided by banks is the most important determining factor. These are considered by the customers followed by the 'operation of the banks', 'Saw Easy of Use' finally, 'revolution of the banks'. The convenience of financial balance has a more important effect on the recognition rate.

Keywords: *Banking Service, Rural India, Financial Literacy, Easy Usage Perception, Jan Dhan, DBT.*

Introduction

India has a populace of over 1.3 billion, containing around 600,000 towns and 640 regions, conveyed across 29 states and 9 association domains. In excess of 850 million, or 65%, of the populace lives in rustic India. A considerable extent of this segment is excluded from helpful admittance to monetary administrations. A principle impetus for improving monetary consideration in the nation is the availability to monetary administrations at sensible rates.

The bank is a cash managing monetary organization that assumes an extremely dynamic part in the country's financial development. Likewise with clean drinking water or grade school, admittance to fund in created countries has been viewed as a need (Beck and de la Torre 2006, Leeladhar 2005). The 20% of the number of inhabitants in created nations approaches organized monetary administrations (World Savings Banks Institute 2004). By examination, monetary establishments involve almost the majority of the number of inhabitants in non-industrial nations (Peachy and Roe 2004).

The more extensive objective of monetary consideration is to guarantee a more profound entrance, under reasonable agreements, of banking administrations across the world, including advantaged and denied people. Likewise, by growing new physical branches, expanding the compass of business journalists and adding new ATMs/WLAs at all levels, the RBI has persistently animated the financial business to widen the financial organization. Various advances, for example, opening Jan Dhan accounts without any laces zero equilibrium, DBT plans, RuPay card issuance, Kisan Credit Card issuance, Aadhaar-empowered plans and brought together installment interface have effectively been presented by the Government.

India's colossal topographical base and enormous populace make it unreasonably trying for banks and other monetary organizations to contact anybody. There are likewise three fundamental difficulties: first, the arrangement of admittance to fundamental financial offices. Besides, to keep any resident in the monetary framework by making them a functioning member by effectively captivating in exchanges. Third, absence of monetary education: The worth of various monetary items and administrations is obscure to countless individuals in India. Monetary education causes individuals to become independent so monetary freedom can be accomplished. The absence of fundamental monetary mindfulness, then again, brings about weakened speculations and monetary choices.

As a critical element of development, admittance to monetary assets has been perceived and more spotlight is generally put on growing monetary administrations to low-pay families. Most of business banks exist just in metropolitan business locale, and these banks set up branches in beneficial regions.

Hence, admittance to monetary administrations is hard for individuals living in far off regions.
In 2005, the RBI encouraged banks to turn out low-revenue clients without any ornaments records to have an investment account and stretch out banking to the more extensive populace bunch. Banks were permitted later in 2006 to utilize NGOs, MFIs and SHGs to extend banking offices as business reporters (BCs) and business facilitators (BFs). In 2011, the Swabhimaan Scheme was started by the public authority, with banking offices serving in excess of 74,000 towns with a populace of more than 2000. As an outcome, between 2011-13, the quantity of financial balances rose by around 100 million. In 2014, determined to interface every family with banking offices, the astounding changing PMJDY was dispatched. Stage II of the PMJDY was dispatched in 2015 to empower monetary incorporation, following the enormous achievement of PMJDY in 2014.

Need For the Study

In spite of the fact that fully intend to further expand the dissemination framework of public authority.DBT (Direct Benefit Transfer) was deployed in 2013 by redesigning the existing government support framework instrument to improve and accelerate data sharing. Reserves and extortions that require a sound financial framework and restricted reception by beneficiaries. There are still some factors that influence the reception of banking administrations in the areas of countries of India. According to the World Bank report, half of India's financial balances are used up (World Bank 2017).This review is an effort to acknowledge the determinants of the acceptance of banking administrations in rustic India.This will help the creator of the fiscal strategy and the government to undo the disincentives in the proper functioning of banks in India's country spaces.

Research Questions

The current investigation is centered around to recognize the appropriate response of the two key inquiries which are as per the following.

1. Does monetary proficiency support the acknowledgment of banking administrations?
2. Why individuals in rustic regions don't utilize banking administrations so habitually?

Literature Review

Various people with admittance to ledgers normally figure the main part of monetary administrations in a nation (Beck and de la Torre, 2006, Littlefield et al., 2006). It is reasonable that ledgers permit people to lead fundamental monetary capacities, for example, admittance to reserve funds plans, credit access, advance taking, protection, cash move, and so on Passage to certain other monetary administrations is along these lines constantly chose by financial balances (Mohan, 2006).
Admittance to banking administrations, particularly in low-pay nations, is viewed as a center determinant of financial prosperity for families. Reserve funds and credit merchandise make it feasible for families to coordinate with pay and investing patterns over energy, to guarantee themselves against shocks in pay and use, and to make human or actual capital speculations. A Beck and Brown (2011) research demonstrates a wide distinction in the utilization of banking offices. Complete PMJDY accounts starting at 19 Aug'20: 40.35 Crore; Rural PMJDY accounts: 63.6%, PMJDY ladies accounts: 55.2% .The complete setup for the store is Rs. 1.31 lakh crore under PMJDY Accounts, For an ascent in equilibriums of 2.3 occasions (Aug'20/Aug'15), stores have ascended by around 5.7 occasions. The normal store is Rs. 32399 for every record. (pib.gov.in, 2020).
The 2017 Global Findex Database of the World Bank uncovers that at the hour of the investigation, very nearly 80% of Indians had a financial balance, up from 53% in 2014. This rapid change was driven by the strategy of Prime Minister Narendra Modi, leader Jan Dhan, "the wealth of individuals" which opened in excess of 355 million records in Indian state and private area banks in five years (World Bank, 2017). As of September 30, 2019 (as detailed by SLBCs the country over), banking administrations were given to 4, 87,496 (99.2%) out of 4, 91,490 towns recorded the nation over with a populace of under 2,000. Of the 8,687 towns with a populace of more than 5,000 recorded, 8,200

(94.4%) were furnished with banking administrations (RBI, 2020). The gathering probably going to be eliminated from the financial framework in low-pay nations is the country poor (Paulson and McAndrew's 1999). Access to bank credit at the public level has been decisively and generously influenced by age, gender, family size, educational attainment, per capita family spending and race (Kavanamur 1994, Okurut 2006, Diagne et al. 2000, Diagneand Zeller 2001). The capacity to acquire would likewise limit the need to gather holds that act exclusively as preparatory ventures, producing low or negative returns (Deaton 1991).

To research how the utilization of monetary administrations is associated with family includes and the construction of the financial framework, Beck and Brown (2011) examine review results for 29,000 families from 29 change economies. The exploration shows that, with wages, success and schooling, the utilization of banking administrations fills in many nations. It is consequently almost certain for metropolitan families and families with more noteworthy social support to have a ledger. A crosscountry correlation uncovers that the idea of the monetary business enormously impacts the cosmetics of the financial local area. In nations with a more prominent inclusion of worldwide banks, higher store protection, further developed installment measures and expanded security of lenders, Wealthy, accomplished and officially working families are bound to utilize banks (Beck and Brown 2011).

Writing audit embraces that individual and family qualities like age, sexual orientation, family size, level of instruction, race and family abundance profile (consumption per capita) considerably affect the entrance of a family to endorsed credit (Mohamed 2006, Okurut 2006). Besides, as a determinant of family admittance to endorsed credit, the plan of family resources is observed to be considerably more huge than the general valuation of family resources or landholding size. The higher portion of land and animals in the general valuation of family properties is connected well with admittance to endorsed credit. It likewise uncovers that South Africa's admittance to semi-formal credit is decidedly and seriously impacted by family size, per capita spending, and common position and shading, though male, country, poor and white are negative and fundamental variables (Okurut 2006).

Really astounding, 39% of the total populace, for the most part in arising nations, might not have a ledger (World Bank 2015). It is widespread that 3 in 4 adults do not have registries in the created and central payment nations (Jake et al. 2009). Pretty much 10% of the 2.5 billion people getting by on under $2 a day approach a ledger (Chaia et al. 2009). According to World Bank Global Findex results, about 52% of metropolitan grown-ups and 37% of country grown-ups in created nations have ledgers. For creating states, the extent is 89 and 87, individually (World Bank 2012).

World Bank information 2014 uncovers that 73% of the populace (matured 15+) has ledgers in big league salary nations, while around 53% of the populace (matured 15+) has financial balances in medium-and center pay nations. Only 41% of grown-ups in India don't approach banking offices. Monetary administrations inclusion as far as ledgers is 39% for country regions and 60% for metropolitan regions (Bhandari 2009), however of an aggregate of 388 million Pradhan Mantri Jan-DhanYojana beneficiaries as of May 2020, roughly 245 million beneficiaries came from rustic/semi-metropolitan branches in India (statista.com, 2020).

Conceptual basis for the analysis

There are generally three models of conduct; judicious activity hypothesis (Fishbein and Ajzen 1975), anticipated conduct hypothesis (Ajzen 1985) and self-guideline hypothesis (Bagozzi 1992), which have been reached out to various conditions to clarify and foresee a specific conduct. Leone, et al. (1999) were concentrated in the varieties of the three styles.Abstract standards and practices shape the intention that influences activities in how healthy activity is thought.The wait takes place between practices, standards, and then again, towards one side of the drive.An additional factor called apparent driving control (PBC) was guessed assuming that actions should influence purpose and driving.It is considered

as a self-financing factor (Bandura 1977, 1982).In the hypothesis of self-orientation, the strength of the individual was estimated as a "desire" rather than a PBC.Mentality and inspiration were related, movement was made to influence desire.To influence the purpose and, consequently, behavior, inclination and abstract hypotheses were proposed.

In country India, admittance to essential financial offices stays restricted and still lingers behind different spaces of the unique created world. Such confined admittance may hypothetically have genuine ramifications for the existences of individuals. On the off chance that it makes it more hard for people to contribute in the event that they do not have an organized bank account, they would not be able to have enough contributed to manage unanticipated emergencies like family sickness. Absence of admittance to banking may likewise make it unthinkable for people to save large sums or get kudos for knotty exchanges like beginning up costs for a venture, horticultural supplies, and so on An examination is required, as per the above writing, to recognize the impact of financial and social elements on admittance to banking administrations. The current examination means to investigate the genuine family access circumstance for banking administrations, as existing writing doesn't uncover any investigation of banking conduct that distinguish the determinants of reception of banking administrations in country regions.

Research Methodology

The survey is graphically similar.Evaluations were carried out and the information accumulated using an implausible review method useful to address the study of the reasons for the use of banking administrations.We used a survey to gather suitable responses.The components of the estimate were adjusted from the 5-point size of Likert by Alain Y-Loong C, et.al (2010). Changing from 1-emphatically differ to 5-unequivocally concur on the issues to show a level of arrangement or conflict on every one of a succession of explanations identifying with the improvements objects. Sent 400 surveys to selected rustic respondents in Varanasi and Rae Bareli Indian Region.Of the 350 responses, only 309 were considered as part of the investigation. This investigation depends on analyzing the conveyance of reactions according to frequencies and rates. At long last different relapse investigations were led utilizing SPSS 21.00.

Analyzing and Interpreting The Data

Table 1: Stakeholder Profile.

Demography		**Frequency**	**Percent**
Age	Eighteen and twenty.	6	1.9
	Twenty-one to twenty-five.	38	12.3
	Twenty-six to Thirty	59	19.1
	Thirty-one to thirty-five.	40	12.9
	Thirty-six to forty.	78	25.2
	Forty-one to forty-five.	45	14.6
	Forty-six to fifty.	15	4.9
	Fifty-one to fifty-five.	22	7.1
	Higher than 55 Y.	6	1.9
	Total	309	100.0
Gender	Male	240	77.7
	Female	69	22.3
	Total	309	100.0
Education	Post Graduate	6	1.9
	Graduate	84	27.2
	Intermediate	81	26.2
	High School	37	12.0
	Class Fifth to Ninth Class	68	22.0
	Below Fifth Class	19	6.1
	Uneducated	14	4.5
	Total	309	100.0
Marital Status	Unmarried	82	26.5

	Married	221	71.5
	Widow	6	1.9
	Total	309	100.0
Annual Family Income	Below 25K	9	2.9
	25,000 – 50,000.	74	23.9
	50K through 1 Lakh.	187	60.5
	1L to 2 Lakh	26	8.4
	Above 10,00,000	13	4.2
	Total	309	100.0

Table 1 presents the sectoral profile of respondents, which includes gender, marital status, age, level of education and annual family compensation.Out of a total of 309 completed surveys, the prevalence of male respondents is (77.7%).A greater proportion of respondents are aged 36 to 40 (25.2%), married (71.5%).27.2% of respondents are intermediate grads followed by 26.2%, high school 12.0%, fifth to ninth grade 22.0% and no education level 4.5% individually.Most respondents (60.5%) remain Rs-to-Rs. 50000 to Rs. 100000 Annual family earnings.

Table 2: Test of Reliability

Table 2: Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.891	.897	63

The value of Cronbach's alpha is 0.897 on the scale used (Table 2). This confirms that the scale is reliable.

Test of Validity

Table 3: KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of appropriateness of sampling.		.780
Bartlett's Test of Sphericity	Approx. Chi-Square	15812.992
	df	1953
	Sig.	.000

The information provided by KMO (0.780) is extremely valuable (0.5) (Table 3). The KMO measurement is used to determine the amplitude of the sample for the factorial study. The KMO measure is 0.780, which is significant in applying the factorial survey. The side effects of studying the segments of the head are given in the chart. The invalid theory that the populace connecting grid is a character frame is rejected by Bartlett's trial of sphericality. The Approx. Chi-Square insights is 15812.992 with the 1953 opportunity level, which is critical in degree 0.05 of the analysis."

Table 4: Communalities

	Initial	Extraction
I'm aware that I can open a bank account.	1.000	.808
I know we ought to deposit our savings with the bank.	1.000	.863
An individual can take his or her savings out of the bank.	1.000	.814
Banks charge interest on deposits.	1.000	.811
People can send the money to their families through the banks.	1.000	.723
An individual can apply for a loan from a bank.	1.000	.711
An individual may enter into an insurance policy to cover the risk.	1.000	.725
An individual can take money out of ATMs.	1.000	.713
I want one of those bank accounts.	1.000	.632
I want to put my savings in a bank.	1.000	.746
If I wanted money, I'd borrow money from a bank.	1.000	.736

I wish I could get an insurance policy.	1.000	.501
I want to use an vending machine.	1.000	.632
I would suggest to others that they use the services of the banks.	1.000	.679
My earnings are irregular.	1.000	.585
I don't need to save any money.	1.000	.533
l don't know how the bank works.	1.000	.575
Impolite or pointless Bank staff.	1.000	.761
In my opinion, there is no advantage to having an account in the bank.	1.000	.702
Impolite or pointless Bank staff.	1.000	.699
There is too much paperwork in the relationship with the banks.	1.000	.441
Extraction method: Analysis of primary components.		

Under the "Networks," segment "Starting," (table 4) it very well may be shown that commonness is 1 for every factor. The combined change of the information is remembered for the principle part investigation which is utilized where the essential thought is to survey the negligible number of factors that can represent the general fluctuation of the outcomes.

Table 5: Total Variance Explained

Compo-nent	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.649	31.663	31.663	6.649	31.663	31.663	6.149	29.283	29.283
2	3.552	16.913	48.577	3.552	16.913	48.577	3.616	17.217	46.500
3	2.839	13.519	62.096	2.839	13.519	62.096	2.828	13.465	59.965
4	1.349	6.425	68.521	1.349	6.425	68.521	1.797	8.556	68.521
5	.964	4.588	73.110						
6	.881	4.196	77.305						
7	.654	3.113	80.418						
8	.600	2.857	83.275						
9	.543	2.584	85.859						
10	.503	2.396	88.255						
11	.445	2.120	90.375						
12	.382	1.820	92.194						
13	.304	1.447	93.642						
14	.281	1.340	94.982						
15	.267	1.270	96.252						
16	.180	.856	97.108						
17	.166	.789	97.897						
18	.148	.703	98.600						
19	.114	.541	99.141						
20	.102	.484	99.625						
21	.079	.375	100.000						
Extraction Method: Principal Component Analysis.									

Table 5 marked "Starting Eigen esteems" shows Eigen esteems.The Eigen estimate for the factor are, true to form and in a significant measure.The Eigen an incentive for a factor shows all the fluctuations attributed to these components and is worth more prominent than 1 is considered. 1 segment is showing Initial Eigen esteems 6.649 for example difference in % 31.663, 2 part is showing Initial Eigen esteems 3.552 for example difference in % 16.913, 3 part showing Initial Eigen esteems 2.839 for example difference in % 13.519, and 4 segment showing Initial Eigen esteems 1.349 for example change in % 6.425, and all out fluctuation for all over four segments represent 68.521% of all out difference.

Table 6: Component Matrix

	Component			
	1	2	3	4
I know we would have to put our savings into the bank.	.888			
Banks make interest payments on deposits.	.874			

I know I can sign up for a bank account.	.873			
An individual can take his or her savings out of the bank.	.860			
An individual can withdraw cash from ATMs.	.809			
An individual can send the money to the family via the banks.	.802			
People can take out an insurance policy to cover the risk.	.786	.322		
An individual is able to get a loan from a bank.	.779	.316		
I want to put my savings in a bank.	.375	-.606	.453	
I want a banker's account.	.436	-.594		
If I wanted money, I'd borrow money from a bank.	.318	-.589	.513	
I would recommend that others use the services provided by the banks.	.361	-.546	.473	
In my opinion, there is no advantage to having an account in the bank.		.538	.531	
I'd like to use the vending machine.	.312	-.487	.458	
I'm looking for an insurance policy.	.333	-.410	.405	
Bank personnel rude or useless.	-.313	.500	.619	
I don't need to save any money.		.372	.481	.392
There is too much paperwork in the relationship with the banks.		.368	.428	-.338
I have uneven revenues.			.357	.645
I don't understand how the bank works.		.383	.417	.490
Extraction method: Analysis of primary components.				
a. 4 components extracted.				

According to table 6, we can see this variable; I realize we should store our investment funds in the bank. The banks provide revenue in stores, I realize that I can open the financial balance. Someone can take the investment funds out of the bank. Someone can take money out of ATMs. and a person can send the money to the family via the banks are more related to Segment 1.A person may take a protective strategy to cover the danger and A person may take credit from a bank are decidedly annexed to Part 2. I might you want to store my saving in bank, I need to have a ledger, If I need cash I would get cash from a bank, I would exhort other to utilize the administrations offered by banks, I think there is no benefit to having financial balance, I might want to utilize ATM, I might want to have protection strategy, and Bank staff impolite or pointless for part 3. Variable like; I have no money to save, I have unpredictable pay, and I don't have the slightest idea how the bank works are resolutely related to component 4.

Table 7: Rotated Component Matrix

	Component			
	1	2	3	4
I know we would have to put our savings into the bank.	.920			
An individual can take his or her savings out of the bank.	.896			
Banks make interest payments on deposits.	.885			
I'm aware that I can open a bank account.	.885			
An individual may enter into an insurance policy to cover the risk.	.851			
An individual can send the money to the family via the banks.	.848			
An individual is able to get a loan from a bank.	.841			
An individual can withdraw cash from ATMs.	.831			
If I needed money, I could borrow money from a bank.		.828		
Please deposit my savings with the bank.		.821		
I would recommend that others use the services provided by the banks.		.812		
I'd like to use the vending machine.		.754		
I want one of those bank accounts.		.688	-.360	
It would be nice to have an insurance policy.		.671		
Bank personnel rude or useless.			.821	
I don't see any advantage in having a bank account.			.802	
There is too much paperwork in the relationship with the banks.			.663	
I have uneven revenues.				.760
I don't understand how the bank works.				.708
I don't need to save any money.			.338	.647
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				

a. Rotation converged in 5 iterations.

According to Table 7, the Varimax segment grid is rotated with the frame one turn. For instance the segment network we can perceive how to rotate accomplished effortlessness. For instance, I realize that we should keep our contingency funds at the bank. An individual may withdraw contingency funds from the bank. Banks donate in-store revenue. I know I can open it up. Someone can adopt a protection strategy to cover the danger. A person can send the money to his or her family via the banks. Someone can get a loan from a bank. A person can withdraw cash from ATMs with Componen-1 (Table 8) in the grid not included. By coincidence, if I needed money, I would get money from a bank. May be you'd like to keep my savings at the bank. I urge everyone else to use the administrations provided by the banks. I should use a distributor. I need a ledger, and I could want to have a protection strategy with component two. The staff of the Bank lacks courtesy or is useless, I think there is no advantage to having a financial balance, and there is excess office work engaged in the management of custodial money with component 3.I have unpredictable remuneration, I have no idea how the bank operates and I have no money to save with component 4.

Table 8: Component Transformation Matrix

Component	1	2	3	4
1	.916	.340	-.197	-.081
2	.397	-.696	.542	.253
3	-.056	.628	.648	.428
4	-.003	-.075	-.498	.864

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Findings and Discussion

The factor survey found that there are four important parts that affect the recognition of banking administrations among hardy occupiers in India. The main factor is "monetary literacy/education/awareness" that integrates determinants such as information about investment funds in banks. The person can withdraw the contingency funds from a particular ledger. The banks provide revenue on the stores, the opening of the financial balance. Bank also gives protection strategy to cover the risk, Sending money to the family is conceivable by banks, Bank give advance, and ATM can be used to extract the money. Second factor can be named as Intention to Use bank which incorporates the determinants like, credit office, store of saving, great administrations and recommendable to other, ATM office, saving record, and protection strategy. The third factor can be called the abhorrion of banking administrations that incorporates determinants such as impolite and unnecessary staff, unnecessary financial balance and documentation burdens. The fourth factor can be called 'Justification Do not have financial balance' which incorporates determinants like sporadic remuneration, new on banking tasks, and no money to save.

Conclusion

Among the rustic inhabitants of India, there are many elements that influence the reception of banking administrations. The review determines the four core items as follows.

The most important factor taken into account by customers is monetary literacy, bank education and awareness. It is followed by 'the usefulness of banks', 'Saw Ease of Use' could be a direct outcome of Jan Dhan's strategy of "abundance of individuals". Finally, 'the abhorrion of the banking administrations' because of the rudeness and uselessness of the staff, the useless register and the bundles of documents to open a file. The value of financial balance strongly affects the pace of banking administrations in India's provincial spaces may be due to the conspire DBT performed by the Government of India.

References

1. Ajzen, I. (1985). From Intentions to Actions: A Theory of Planned Behavior. IN Action Control from Cognition to Behavior, J. Kuhl and J. Beckmann, ed.
2. Chong, A. Y. L., Ooi, K. B., Lin, B., & Tan, B. I. (2010). Online banking adoption: an empirical analysis. International Journal of bank marketing.

3. Armstrong Soule, C. A., & Reich, B. J. (2015). Less is more: is a green demarketing strategy sustainable?. Journal of Marketing Management, 31(13-14), 1403-1427.
4. Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. Psychological review, 84(2), 191.
5. Heffernan, C. J. (1988). Social foundations of thought and action: A social cognitive theory, Albert Bandura Englewood Cliffs, New Jersey: Prentice Hall, 1986, xiii+ 617 pp. Hardback. US $39.50. Behaviour Change, 5(1), 37-38.
6. Beck, T., & De la Torre, A. (2006). The basic analytics of access to financial services (Vol. 4026). World Bank Publications.
7. Beck, T., & Brown, M. (2011). Which households use banks? Evidence from the transition economies.
8. Bhandari, A. K. (2009). Access to banking services and poverty reduction: a state-wise assessment in India.
9. Chaia, A., Dalal, A., Goland, T., Gonzalez, M. J., Morduch, J., & Schiff, R. (2009). Half the world is unbanked: Financial access initiative framing note. McKinsey & Company.
10. Deaton, A. (1989). Saving and liquidity constraints.
11. Diagne, A., Zeller, M., & Sharma, M. P. (2000). EMPIRICAL MEASUREMENTS OF HOUSEHOLDS'ACCESS TO CREDIT AND CREDIT CONSTRAINTS IN DEVELOPING COUNTRIES: METHODOLOGICAL ISSUES AND EVIDENCE (No. 583-2016-39550).
12. Diagne, A., & Zeller, M. (2001). Access to credit and its impact on welfare in Malawi (Vol. 116). Intl Food Policy Res Inst.
13. Fishbein, M., & Ajzen, I. (1975). Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research, Reading, Mass: Addision-Wesley. Fransson, N., and Garling, 369-382.
14. https://datacatalog.worldbank.org/search?search_api_views_fulltext_op=AND&query=2017&nid=&sort_by=search_api_relevance&sort_order=DESC, 2017
15. https://globalfindex.worldbank.org, 2017
16. https://m.rbi.org.in/scripts/Pr_DataRelease.aspx?SectionID=358&DateFilter=Year, 2020
17. Dwivedi, L. K., Rai, B., Shukla, A., Dey, T., Ram, U., Shekhar, C., ... & Unisa, S. (2020). Assessing the impact of complete lockdown on COVID-19 Infections in India and its burden on public health facilities. International Institute for Population Sciences, Mumbai, 25.
18. https://www.statista.com/statistics/981216/rural-and-urban-pmjdy-recipients-by-sector-india/
19. Kendall, J., Mylenko, N., & Ponce, A. (2010). Measuring financial access around the world. World Bank Policy Research Working Paper, (5253).
20. Kavanamur, D., Okole, H., Manning, M., Levantis, T., & Moresby, P. (2004). Understanding reform in Papua New Guinea: an analytical evaluation. A study commissioned by the Global Development Network (Washington DC) and the Foundation for Development Cooperation (Brisbane). Retrieved April, 3, 2010.
21. Leeladhar, V. (2006). Taking banking services to the common man-financial inclusion. Reserve Bank of India Bulletin, 60(1), 73-77.
22. Leone, L., Perugini, M., & Ercolani, A. P. (1999). A comparison of three models of attitude–behavior relationships in the studying behavior domain. European Journal of Social Psychology, 29(2-3), 161-189.
23. Littlefield, E., Porteous, D., & Helms, B. (2006). Financial inclusion 2015: Four scenarios for the future of microfinance.
24. Mohan, R. (2006). Agricultural credit in India: Status, issues and future agenda. Economic and Political Weekly, 1013-1023.
25. Mohan, R. (2006). Agricultural credit in India: Status, issues and future agenda. Economic and Political Weekly, 1013-1023.
26. Peachey, S., & Roe, A. (2004). Access to finance. A study for the World Savings Banks Institute.
27. World Bank. Information, Communication Technologies, & infoDev (Program).

(2012). Information and communications for development 2012: Maximizing mobile. World Bank Publications.

28. World Bank. (2015). Global Financial Development Report 2015/2016: Long-Term Finance. The World Bank.
29. Bhandari, A. K. (2009). Access to banking services and poverty reduction: a state-wise assessment in India

IMPACT OF WORK LIFE BALANCE ON JOB SATISFACTION

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ABSTRACT

The core purpose of the study is to explore the IT employees work life balance and its impact on their Job satisfaction. The researcher conducted this study in Tiruchirappalli district. The data collected for 130 sample respondents using convenience sampling technique and the data evaluated using SPSS IBM Statistical package. The correlation and multiple regression statistical tests were gone through with the collected data. The research findings would assist the IT sector top management, to improve their policies and laws towards the employee job satisfaction. Further, the finding also benefits for the organization for their sustainable development.

Keywords: *Employees, Impact, Job Satisfaction, IT, Work Life Balance*

Introduction

In the current era the organization more focused on their employee satisfaction on their work to obtain good productivity. The organization give more importance to the workers work satisfaction factors like working hours, working time, flexibility, supports from high officials, work load, remuneration, good environment, rewards and recognition etc. Certainly, the worker gets work satisfaction if they can highly able to balance their work life and personal life. The work life balance is not only important to the employee, it also significant to the organization for their development, growth and productivity. Thus this study focused the impact of work life balance and the job satisfaction of the IT employee.

Literature Review

Sarwar&Aftab (2011) examined the research on relationship between the work life balance and job satisfaction. The research results revealed that the 64.80% of impact of family imbalance due to the heavy work stress. The research explored that the organization gives more pressure to their worker and thus it cause stress among the employees. Hence its obviously impact on their family life.

Muhammad and Kashif (2015) did research on impact of work life balance and job satisfaction of employees in health care center, Pakistan. The researcher found that the 50% of the employees were not satisfied with their jobs dues to working hours. The employees were couldn't find good time to spend with their families. The researcher suggested that if the organization reduces the working hours then the employees were highly satisfied with their jobs

Ward (2004) examined the research about the work life balance and job satisfaction among faculty members. The researcher revealed that the women faculty were not satisfied with their jobs due to heavy work pressure especially women faculty who had young children's. The researcher suggested that the institution can remodel their reform and policies that should be convenient to the women faculty.

Guest (2002) analyzed the impact of work life balance and job satisfaction of faculties. The research result revealed that the institution provide good support to the employees, on working hours, work load, flexibility of time etc. Hence the research is positively revealed that the employees were highly satisfied with their jobs and can able to balance their work life and family life.

Methodology

Research Design

The research is empirical study, the data gathered on the basis of observation and via structured questionnaire (5 point Likert Scale). The research adopted the primary and secondary data. The primary data obtained from 130 IT employees as sample respondents at Tiruchirappalli district. The secondary data gathered from journals, e-books, web sites etc. The data collected from whole Tiruchirappalli district hence the research followed the convenience sampling techniques from Non Probability sampling method.

Objectives

- To determine the relationship between the Work life balance and Job Satisfaction among IT employees.
- Flexibility and freedom on working hours
- Adequate work assigned every day
- Gets Support from superior
- Sufficient Holidays
- Adequate training provided for Work life Balances

Hypothesis Statement

- There is no relationship between Flexibility and freedom on working hours and Job satisfaction
- There is no relationship between Adequate work assigned every day and Job satisfaction
- There is no relationship between Gets Support from superiorand Job satisfaction
- There is no relationship between Sufficient Holidaysand Job satisfaction
- There is no relationship between Adequate training provided for Work life Balancesand Job satisfaction
- There is no impact between Flexibility and freedom on working hours and Job satisfaction
- To measure the impact ofWork life balance and Job Satisfaction among IT employees.
- There is no impact between Adequate work assigned every day and Job satisfaction
- There is no impact between Gets Support from superior and Job satisfaction
- There is no impactbetween Sufficient Holidays and Job satisfaction
- There is no impactbetween Adequate training provided for Work life Balances and Job satisfaction

Statistical Tools

Research used Correlation and Multiple Regression analysis to identify the relationship and impact among Dependent, Independent variables

Variables

1. Dependent Variables - Job Satisfaction
2. Independent Variables – Work Life Balance

Findings and Discussion

Table 4.1Correlation of work life balance and job satisfaction.

Variables	Pearson Correlation	P-Value
Flexibility and freedom on working hours	0.574*	0.041
Adequate work assigned every day	0.671*	0.027
Gets Support from superior	0.512**	0.000
Sufficient Holidays	0.729**	0.000
Adequate training provided for Work life Balances	0.487**	0.003

The above table 4.1 shows the relation between dependent (Job satisfaction) and independent variables (Work life balance). The correlation matrix table has shown that the value of job satisfaction and Flexibility and freedom on working hours is estimated to be 0.574 at the significance level of 0.041 with very strong positive correlation among variables. The value of Job satisfaction and Adequate work assigned every day is estimated as to be 0.671at the significance level of 0.027 with very strong positive correlation among variables. The value of Job satisfaction and Gets Support from superior is estimated as to be 0.512 at the significance level of 0.000 with very strong positive correlation among variables. The value of Job satisfaction and Sufficient Holidays is estimated as to be 0.729 at the significance level of 0.000 with very strong positive correlation among variables and the value of Job satisfaction and Sufficient Holidays is estimated as to be 0.487 at the significance level of 0.003 with very strong positive correlation among variables. Therefore, all the dependent and independent variables were positively correlated.

Table 4.2 Model summary of Work life balance and job satisfaction.

Model Summary	
Model R	0.752
R Square	0.617
Adjusted R Square	0.608
Std. Error of the Estimate	0.821

The table 4.2 indicates the model summary of regression analysis in which adjusted R Square explain the impact of work life balance on job satisfaction among IT Employees. The adjusted R Square value is (0.608) showed that 75.2% work life balance impact the job satisfaction among IT employees.

Table 4.3Anova of Work life balance and job satisfaction.

ANOVA					
Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig**
Regression	161.121	8	21.783	29.678	0.000
Residual	189.243	151	0.718		
Total	341.786	157			

The above ANOVA table 4.3 explains with the significance (<0.05) F = 29.678 that the predictors independent variables (work life balance) has strong prediction over the dependent variable (Job Satisfaction)

Table 4.4 Coefficient of Work life balance and job satisfaction.

		Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
Model		**B**	**Std.Error**	**Beta**		
1	(Constant)	0.315	0.527		0.553	0.549
	Flexibility and freedom on working hours	0.274	0.419	0.068	6.718	0.000
	Adequate work assigned every day	1.514	0.114	0.741	2.175	0.019
	Gets Support from superior	1.876	0.274	1.19	4.764	0.047
	Sufficient Holidays	0.072	0.268	0.071	0.754	0.024
	Adequate training provided for Work life Balances	0.319	0.117	0.394	0.516	0.012

$Y=\beta0+ \beta1x1+\beta2x2+\beta3x3+ \beta4x4+ \beta5x5$

JobSatisfaction = 0.315 + (0.274) Flexibility and freedom on working hours+ (1.514) Adequate work assigned every day+ (1.876) Gets Support from superior + (0.072) Sufficient Holidays + (0.319)Adequate training provided for Work life Balances.

Regression equation shows that the impactson work life balance and the job satisfaction. From the above table 4.4 reveals that the Flexibility and freedom on working hours is highly significant with the P-Value 0.000 along with t-value (6.718), followed by Gets Support from superioris significant with the P-Value 0.047 along with t-value (4.764),Adequate work assigned every dayis significant with the P-Value 0.019 along with t-value (2.175), Sufficient Holidaysis significant with the P-Value 0.024 along with t-value (0.754) and Adequate training provided for Work life Balancesis significant with the P-Value 0.012 along with t-value (0.516)

Conclusion

The researcher found the prominent work life balance factor that impacts the job satisfaction of the IT employees. The research focused on the positive impact on work life balance and job satisfaction. The correlation and regression test were used to measure the impact the work life balance. The correlation results proves that there is relationship between the work life balance such as Flexibility and freedom on working hours, Adequate work assigned every day, Gets Support from superior, Sufficient Holidays, Adequate training provided for Work life Balances and employee job satisfaction were highly correlated. Furthermore, the regression results explore that work life balance had high impact on job satisfaction, especially Flexibility and freedom on working hours had impact for employee job satisfaction in IT industry.

Reference

1. Bao, X. J., Guo, S. Q., Zhang, H. F., & Li, J. Q. (2017). Theoretical predictions for the decay chain of the nuclei Og 293, 295–297. Physical Review C, 95(3), 034323.
2. Bao, X. J., Guo, S. Q., Zhang, H. F., & Li, J. Q. (2017). Theoretical predictions for the decay chain of the nuclei Og 293, 295–297. Physical Review C, 95(3), 034323.
3. Noor, K. M. (2011). Work-life balance and intention to leave among academics in Malaysian public higher education institutions. International journal of business and social science, 2(11).
4. Rao, T. S., & Indla, V. (2010). Work, family or personal life: Why not all three?. Indian journal of psychiatry, 52(4), 295.
5. Rao, T. S., & Indla, V. (2010). Work, family or personal life: Why not all three?. Indian journal of psychiatry, 52(4), 295.
6. Fatima, N., & Sahibzada, S. A. (2012). An empirical analysis of factors affecting work life balance among university teachers: the case of Pakistan. Journal of International Academic Research, 12(1), 16-29.
7. Ahmed, J., Saleem, N., & Fatima, K. (2019). Factors Influencing Work Life Balance of Women Entrepreneurs: A Case of Quetta (Pakistan). Dialogue (Pakistan), 14(3).
8. Ward, K., & Wolf-Wendel, L. (2004). Academic motherhood: Managing complex roles in research universities. The Review of Higher Education, 27(2), 233-257.
9. Shadab, M., & Arif, K. (2015). Impact of work-life balance on job satisfaction a case of health care services in Pakistan. Developing Country Studies, 5(9), 132-138.
10. Ain, Q., Khattak, M. A., & Iqbal, N. (2013). Impact of role conflict on job satisfaction, mediating role of job stress in private banking sector. Interdisciplinary Journal of Contemporary Research in Business, 4(12), 711-722.
11. Rani, S. V., & Mariappan, S. (2011). Work/life balance reflections on employee satisfaction. Serbian Journal of Management, 6(1), 85-96.
12. Rao, T. S., & Indla, V. (2010). Work, family or personal life: Why not all three?. Indian journal of psychiatry, 52(4), 295.
13. Rao, T. S., & Indla, V. (2010). Work, family or personal life: Why not all three?. Indian journal of psychiatry, 52(4), 295.
14. Sarwar, A., & Aftab, H. (2011). Work stress & family imbalance in service sector of Pakistan. International Journal of Business and Social Science, 2(13).
15. Fatima, N., & Sahibzada, S. A. (2012). An empirical analysis of factors affecting work life balance among university teachers: the case of Pakistan. Journal of International Academic Research, 12(1), 16-29.
16. Fatima, N., & Sahibzada, S. A. (2012). An empirical analysis of factors affecting work life balance among university teachers: the case of Pakistan. Journal of International Academic Research, 12(1), 16-29.

CYBER-RISK AUDITING USING GAMIFICATION IN PRIVATE AND PUBLIC SECTORS

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ABSTRACT

The reliability of information technology in the private and public sector have been debated over for a long period of time. The security of such information technology has been deduced equally crucial for both these sectors. The main agenda of this paper was to evaluate what are the various factors that affect cyber security in both the private and public sector of India. The paper utilises a good combination of a diagnostic research design and descriptive research design. The target population for this study was mainly comprised of cyber auditors and IT managers of various industries in both Public and Private sector. This data for this paper was collected through primary data sources with the help of a very detailed and structured questionnaire. This study divides the various factors that affect cyber security into two sub-heads: key external motivation and internal organisational vulnerability. The management of these organisation need to pay attention to the negative impact of cyber breaches mainly since they involve sensitive and confidential data and the reputation maintenance is contingent upon the occurrence of such events. There is also a rising need to answer the ethical aspect of those who work in these industries with respect to their active participation in sabotage of systems of an organisation and the exploitation of these systems for monetary gains.

Keywords: *Cyber security, external motivation, organisational vulnerability, ethics*

Introduction

Background of the Study

In the recent past, cyber-security has grown into an extremely important risk management issue that almost every type of organisation faces. In the years 2016 to 2018, India has been declared as the second most cyber attacked country according to a new DSCI report. The increasing vulnerability caused due to cyber-attack has resulted into many companies going with the strategy of adopting cyber insurance policy to reduce the cyber breach risk. In June 2020, India's ranking fell to the third place, becoming a prey to 23 high profile cyber-attack. A key realisation of cyber security in the past few years is that although many attacks can be checked and hindered, preventing all attacks is just not possible. When evaluating the possibility of an attack, the famous saying among cyber security professionals is, "It is not a matter of if, it is a matter of when".

One of the basic, essential, and primary steps that an internal audit must undertake in the creation of a cyber security audit plan is to understand the cyber security framework that an organisation lays down and utilises thoroughly. Various specialised frameworks have been tailormade to cater to certain industry and controlled environment. When analysing and selecting which framework to use, the auditing committee must consider specific industry standards and any legal obligation put on them by the authorities in the organisation's jurisdiction. Some of these used in the organisation could be:CIS Top 20, HIPAA and HITECT, ISO/IEC 27001, NIST CSF and NIST SP 800-53, PCI DSS.

In order to find new skill set required the important question is 'how will the internal audit find and train the technical talent that it requires? Equally significant is what can be done to ensure that this skilled individual remain onboard after such training. The two factors that over complicate the solutions to these questions are:

1. The increasing high demand for these special skills
2. The varied career motivation that induced many cyber professionals to want challenging work and diverse projects.

The solution to this can be given through a gamification approach. The central idea of gamification is to utilise natural motivators to arose individuals, and since entertainment, fun and play are an attractive motivator, this could be considered as the starting point for gamification. Therefore, the organisational investment in the sector of gamification will focus not just on a technological approach but also to enhance competitiveness in the international business environment. In gamification though 'game' is only an

instrument required to meet specific targets in a sector which is usually not game oriented. Internal audits should consider five major cyber risk issues to protect company's assets and try to reduce the potential of data breaches occurring:Emerging threats, Technology change, Regulatory change, Business change, third party risk.

Objective

The main aim of this study is to establish the factors that affect the cyber-security in public and private sectors in India.

Secondary Objectives:

1)To establish comparison of the external motivation of cyberattacks in public and private sectors in India.
2)To understand the internal organisational factors that may contribute to cyber-security vulnerabilities in India.
3)Identification of common sources of attack in both the sectors and simultaneously, producing a framework to solve cyber attacks using Gamification.

Problem Statement

The main aim of e-government system is to continuously and conveniently offer public services amongst distributed networks. The reliability of such information is crucial for both Public and Private sectors. Operations in the private sector is different from that in public sector. This study focuses on finding those main cyber security factors that affect the cyber security in India. The various papers studied during the course of formulating this paper indicate that there is not enough emphasis or resources to prevent cyber crime attacks and efficiently manage the same. The employees of such sectors lack experience and expertise in managing such crime. The information that was identified during the course of this study is significant to policy makers since it would aid them in the creation of by-laws, policies and strategies affecting the users. This study provides a gamification approach that would determine how to use and treat cyber security deficiency.

Research Design

This study employs a diagnostic research design. In such a research design, the aim is to evaluate the main reason or underlying cause of a specific event or phenomenon. This would help us gain in depth knowledge about the factors that give rise to troublesome situations. This paper also has features of a descriptive research design since it aims to maximise reliability and reduce prejudice. Thus, giving a bird's-eye view of all the elements under the study.

Population and Sampling

A population comprises of the entire group of elements that the researcher wants to draw conclusions on. The target population of this paper are the employees of public and private sector.

SAMPLE:A sample is a particular group that the researcher will collect data from. The size of the sample is always less than the population size. Since the target respondents had to be specifically skilled in certain aspects all those who responded were considered as sample. Thereby, the sample of the study is 118 respondents.

Data Collection

The preferred source of research data is primary data. This data was collected with the help of Structured Questionnaire that the researchers developed. The questionnaire contains mostly close-ended and well-defined questions to uphold the quality of the received research data and effective analysis of such data. The questionnaire includes the relevant variables and utilises the five-point LIKERT SCALE to help respondents rate each of our study variables.

Procedure for Data Analysis

When the questionnaires were returned, they were analysed for clarity, consistency and were then evaluated using the Statistical Package for Social Sciences (SPSS).The descriptive statistics were compared using frequency and standard deviation that were obtained from the SPSS software.

Variable Analysis

The dependant variable of the study is cyber security. There are four basic principles that govern cyber security. These are Confidentiality, Integrity, Availability, and Accountability. Since they are bi-products of cyber security, they too will become a dependent variable.

Independent variable can be classified into two: External motivation and Internal vulnerability. These are independent variables since they stand alone and are not modified by the dependent variable that the researchers aim to measure. Here, the researcher understands that these independent variables could cause a modification, alteration or even negation of the dependent variable that is cyber security. The many components of external motivation and internal vulnerability as sub heads are understood in detail while doing the data analysis.

Analysis & Interpretation

Response Rate: The questionnaires were distributed to a pool of 160 people out of which (54+64) 118 people responded. This implied a response rate 73.75%. According to Mugenda and Mugenda (2003) stated that a sample response rate higher than 60% is good. Hence, the researchers meet the required sample criteria.

Demographic Information: This paper aims to establish the general information of various respondents as a way of holistically understanding the suitability in undertaking the study.

Cluster Of Public And Private Sector: The Respondents Were Asked To indicate whether they worked in a private or a public sector. They were also expected to point out the industry in which they operated.

Table 4.1: Cluster for Public Sector-

INDUSTRY	FREQUENCY	PERCENTAGE (in %)
Healthcare	4	7.40
Auditing	6	11.12
Education	3	5.55
I T Industry	14	25.93
Agriculture	4	7.40
Railways	2	3.70
Manufacturing	2	3.70
Software Engineering	2	3.70
Tax	3	5.55
Horticulture	1	1.85
Business services	2	3.70
Automobiles	1	1.85
FinTech	1	1.85
Financial Services	1	1.85
Geographic Meteor Study	1	1.85
Real Estate	2	3.70
Aviation and Forwarding	2	3.70
Gifting	1	1.85
Business Services	2	3.70
TOTAL	**54**	**100**

Table 4.2: Cluster for Private Sector-

INDUSTRY	FREQUENCY	PERCENTAGE (in %)
Education	13	20.31
Healthcare	9	14.06
Services	8	12.5
I T Industry	9	14.06
Agriculture	4	6.25
Railways	4	6.25
Automobiles	3	4.69
Aviation and Forwarding	2	3.13
MNC	1	1.56
Real Estate	2	3.13
Auditing	2	3.13
Manufacturing	1	1.56
FinTech	1	1.56
Banking	2	3.13
Software	1	1.56
Chartered Accountant	1	1.56
Logistics	1	1.56
Total	**64**	**100**

This analysis leads to believing that all clusters and industries of the Public and Private servicewere actively involved and thus, were relevant and reliable for the paper.

Highest Level of Education: The respondents were asked to mark their highest level of education. The findings below depict the level of education of the respondents of Private Sector and Public Sector combined.From the response, 0.86% of respondents indicated that they obtained a Diploma level of education, 30.51% had an Under-graduate degree, 29.66% had a Post-graduate degree, and 38.98% were in possession of a Professional Degree. This indicates that majority of the respondents had a relevant understanding on Cyber-security Policies in Public and Private sectors in India and thereby reducing the chances of not understanding the question.

External Motivation of Cyber Attacks

A LIKERT Scale was created for the purpose. From the observation and data collected, a

mean was calculated for easy interpretation and analysis of such data.

Key Motivators and External Drivers of Cyber Attacks

Factors Of Cyber Attacks	Variable Number	Mean (Private)	Mean (Public)
Serious and organised crime for financial gain	018	4.22	3.91
Serious and organised crime for patent property theft	019	3.31	3.35
People try out hacking skills for challenge	020	3.33	3.48
Due to employees agitated by their dismissal	021	3.45	2.96
Organised crime aiming at system sabotage	022	3.45	3.48
System Attack due to ideological differences	023	3.22	3.15

The mean values of our study for the Private sector range from 3.22 -4.22, which shows that those who responded had a mixed reaction to the statements of cyber security. It can be understood that information security is caused not just by technological upgradation but also by various other factors such as Legal, Political, Cultural, and Ethical behaviour valued by the society.The most prominent and accepted external motivation driver for cyber-attack is the serious and organised crime for financial gain. It is also found that the mean values of the Public sector are also the highest for the same factor (3.91). Thus, it is understood that both the Private and the Public sector are very prone to factors that lead to the financial gain of external individuals.

Internal Organisational Factors Affecting Cyber Security

From the observation and data collected a mean was calculated for the easy interpretation and analysis of such data.

Internal Factors That May Contribute To Cyber Security Vulnerabilty

Factors Of Cyber Attacks	Variable Number	Mean (Private)	Mean (Public
Unintentional employee's action but leading to system attack.	024	3.73	3.41
Poor implementation and adherence of cyber security strategy and standards by involved management.	025	4.16	3.63
Weak information infrastructural system.	026	4.14	3.76
Employees non-adherence to cyber security standards and strategy.	027	4.02	3.57
Poor cyber security responsiveness to cyber threats.	028	4.03	3.61
Lack of audit review of organisational cyber security capacity.	029	4.06	3.61
Lack of legislative penalty for cyber attack implication.	030	4.17	3.72
Lack of market/ environment pressure to sustain the high level of cyber security.	031	3.36	3.31

The mean values range between 3.36- 4.17 for the Private sector. This is an indication that it is consistent with the Alfawaz Finding who states that these are the key factors that affect the security of e-governance since they affect staff and management security, security culture, top management support, management style and privacy regulations.In the private sector, it is found that there is a very high chance of occurrence of almost all factors.The mean is very close amongst all the factors. The public sector mean ranges from 3.31- 3.76. It states that equally high importance and occurrence is awarded by the respondents of the public sector which is very similar to the private sector.Although the private and public sectors display similar features, it can be seen that the private sector is more afraid of its own internal controls and change management as compared to the public sector.

Detailed Analysis of Responses

The industries that were covered in the public sector were almost equal to the number of sectors covered in the private sector (example-healthcare and IT). Thus, it is safe to say that the dispersion of such data is useful to the researcher while conducting their analysis. It would bring about a common parameter in

terms of analysis. It is observed that around 30% of the respondents were females giving ample representation (based on India's population) to both the genders.

Gamification itself is not a very common term that is used in the business world. The researchers find that 43% of the target population is not aware of this term and on the contrary, 43% of the respondents are aware of gamification. Still, it is not found in active usage in business models. Many respondents although aware of what gamification entails, believes that it was more of a distraction in the work culture than adding any positive values to the organisation. It also could be identified that respondents believe that the integration of gamification in business strategy would be adopting a more personalised approach than being all pervasive in the organisation. 14% of the total respondents had previously heard of this concept but none of them could exactly place how it would benefit the firm and individual's growth. The overall perspective gathered on interaction with the responses help the researchers figure out that more awareness and knowledge need to be passed on with respect to the massive advantages and benefits that the adaptation of gamification would bring.

Observation 1: respondents felt that the sector in which they work is always more prone to cyberattacks as compared to the sector that they do not operate in. 72.22% of respondents who operate in Private sector feel that they are more susceptible to cyber-crimes and similarly 53.13% of people who work in the Private sector feel that the private sector is more prone to such cyber incidents. This is a clear example of "the grass is greener on the other side" affect.

Discussioons Of Findings Using Gamification

This study was about evaluating factors that affect cyber security in both the public and private sectors in India.

1-The first objective of the study was identifying the **external motivation** of cyberattacks. The literature review when done indicated various key motivation drivers for such cyberattacks.

The analysis of data for **external motivation** shows that serious and organised crime was a significant aspect both in the public and the private sector. When analysed using the gamification approach, the researchers suggest that the organisation could come up with a strategy of rewards and points for those who identify and prevent such cyberattack. It could be majorly focused on the employees operating in the finance department of the organisation. This is since they would be in the possession of various financial documents that depict the company's financial transactions. These points and rewards could eventually be cash backed by employees to upgrade paid holidays, bonuses, and any other incentive that the organisation deems fit.

2-The second objective of this study was to evaluate **various internal organisational factors** that affects the organisation. This study has deduced the most significant factors in both public and private firms.

The factors in both the private and public sectors are different and thus, we need to evaluate them separately. The aspect of legislative penalty for cyberattack and the poor implementation and adherence of cyber security strategy are both significant factors for the private sector. In order to reduce legislative penalty impact on the organisation, the researchers suggest that the organisation makes use of the concept of life. Every time any cyberattacks occurs in any department of the organisation; a life can be reduced. When such a department loses all its three lives, they can be forced to bear a proportion of the legislative penalty borne by the organisation.

The implantation of security standards has to be witnessed not just in the lower levels of organisations but also by the top management. The Board of Directors could individually lead a group of employees and the director who efficiently leads his empire to the top can be awarded with additional points.

3-In order to reduce the probability of cyber threats escaping audit review, the internal audit department can be held responsible and should be complete the concept of quest and tasks to sufficiently satisfy the criterion for efficient cyber security management. Each quest so completed will be reward.

Conclusion

The various factors were principally divided into external motivation and internal

vulnerability while factors such as ideological differences and systems abotage were previously expected to be the root cause. Factors such as agitated employees and attaining commercial game using illegal competitive strategies also surfaced. It is unexpected that ordinary government entities that work with the objective of public welfare is also involved in competing using its commercial product using the price wall.

The internal organisation factor was dispersed but accepted amongst the public and private sector entities. No one factor emerged as the most prominent one since all were equally important and prone in the organisation. The private sector is more likely to fall prey to its own internal vulnerabilities as compared to the public sector. The public sector although prone to internal vulnerabilities is more likely to face breaches due to external motivation. The efforts taken by ministries and industries for e-governance should be sustainable and active initiatives by the management should be taken to include the task of cyber security in an employee day to day work. The cyber security issues need to be focused upon and championed to the management so as to influence outflow of funds for this aspect. There should a drive and eagerness among employees to actively take part in reducing cyber breaches. The management can take the help of various gamification strategies that were developed and explained in the previous chapter.

There is a rising need to understand the ethical values of those working with the information systems with respect to their role in system sabotage and relying on hacking of systems for monetary gains. The management should arrange for system and processes that indicate the various repercussions for exploiting systems. This ensures that the employees would not wish to be a party to any such scandal or breaches.

APPENDIX 1: QUESTIONNAIRE

We, Komal Swami and P Vibha, are conducting this study to understand cyber-security policy in Public and Private sectors and are aiming to formulate a solution using a gamification approach. This study is a part of the partial fulfilment of the requirement of my Bachelors in Commerce degree at Christ (Deemed to be University), Bangalore.

Your participation in the survey is voluntary and you may withdraw at any point if you feel the need to. We request you to answer these questions as you deem fit. All data obtained in this study will be kept confidential and used strictly for the purpose of this research.

For further queries, please feel free to contact:

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Section A: GENERAL INFORMATION

Name:

Gender: MALE () FEMALE () OTHERS()

Highest level of education: DIPLOMA () UNDERGRADUATE () POSTGRADUATION () PROFESSIONAL

Work experience: UPTO 5 YEARS () 5-10 YEARS () 10-15 YEARS () 15-20 YEARS () OVER 20 YEARS Industry referred to:

Which do you feel is more vulnerable to cyber-attack: PUBLIC SECTOR () PRIVATE SECTOR()

Are you aware of the concept of gamification:

yes () maybe () no ()

Section B: Key motivators, drivers of cyber attacks

Use scale of 1-5 where 1= No extent, 2= Little extent, 3= Moderate extent, 4= Large extent, 5= Very large extent

KEY MOTIVATORS	1	2	3	4	5
Serious and organized crime for financial gain					
Serious and organized crime for patent property theft					
People try out their hacking skills for challenge and peer status					
Due to employees agitated by their dismissal					
Organized crime aiming at system sabotaged					
System attacks due to ideological difference					

Section C: Factors that may contribute to cyber security vulnerabilities

Use scale of 1-5 where 1= No extent, 2= Little extent, 3= Moderate extent, 4= Large extent, 5= Very large extent

INTERNAL VULNERABILITIES	1	2	3	4	5
Unintentional employees' action but leading to system attack					
Poor implementation and adherence of cyber security strategy and standards by involved management					
Weak information infrastructural system (eg. failure to update systems)					
Employees non-adherence to cyber security strategy and standards					
Poor cyber security responsiveness to cyber threats					
Lack of audit review of organizational cyber security capacity					
Lack of legislative penalty for cyber-attacks implication					
Is lack of market/ environment pressure to sustain a high level of cyber security					

References

1. Knowledge Arcade. "The Ultimate Definition Of Gamification (With 6 Real World Examples " www.growthengineering.co.uk/definition-of-gamification/, 2021. Accessed 27 February 2021.
2. RSI Security. "How Do HITRUST and NIST Work Together in Data Protection?" blog.rsisecurity.com/how-do-hitrust-and-nist-work-together-in-data-protection/, 2020. Accessed 2 March 2021.
3. Kshetri, N. (2015). India's cybersecurity Landscape: The roles of the private sector and public-private partnership. IEEE Security & Privacy, 13(3), 16-23.
4. https://cybergateit.com/cyber-security/
5. P. B. (2020, May 14). Population vssample : what's the difference? . Retrieved from https://www.scribbr.com/methodology/population-vs-sample/

ACCREDITATION: IS IT NEUTRAL AND APOLITICAL?

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ABSTARCT

After decades of effort and increased attention towards accreditation, there seems to be a new facet to this process. This paper attempts to summarize HEIs and the Indian framework of accreditation. The paper discusses the popular belief that the core of accreditation is to induce quality and the process itself ensures competence of an organization.It tries to present the frailty of this 'myth' and argues that accreditation is not as benign and apolitical as it seems to be. The paper draws on literature that extensively discusses benefits and challenges of accreditation.

Keywords: *Accreditation, Higher education Institutions, Quality education*

The concept of Accreditation

Accreditation can be defined as a voluntary process employed among colleges and universities and HEIs (higher education institutions) to assess, assure, and improve quality of education. It is a process that recognizes and validates that an institution or programin an institution (for example, engineering or business) fulfils a set of predefined standards and encourages a commitment to ongoing performance. Accreditation has eventually evolved as presentation of a certificate of competence, authority, or trustworthiness. It ensures quality by granting credit for some clearly visible and measurable academic activities and institutional objectives that are known to be openly sought and efficiently executed using currently available resources with a promise for improvement.

HEIs hire services of 'agencies' known as accreditation agencies or join their membership programs to get certified .These agencies create standards and criteria for what constitutes 'excellent' higher education in collaboration with their member universities or programs.Accreditation is widely believed to help form and steer the continuous quality improvement of institutions and academic programs. Accreditation's unique, external peer-review holds a great potential for insight, criticism, and recommendations on objectives, vision, policies, and helpsacademics realize their missions and improve academic excellence. Accreditation thus assists institutions in making decisions.

Accreditation has various subtle differences or nuances. Accreditation is the label that institutions or programs are likely to acquire as a result of the accreditation procedures. Accreditation is an "abstract notion of a formal authorizing power" (Haakstad, 2001, p. 77) that is enacted through official recognition decisions (the accreditation process). Accreditation's legitimacy is based on this grounding abstraction. Surprisingly, this abstraction, which is taken for granted, is not a conventional part of accreditation. 'The process of accreditation was intended for academy itself,' as Jones (2002, p. 1) points out. The approach did not emerge in reaction to external audiences.

Why Accreditation?

It is certain that the education provided by accredited institutes is far superior to that provided by unaccredited institutes. Accreditation of HEIs, colleges and universities serves various purposes.The process of accreditation aids in the fulfillment of local, state, national, and international requirements. When these standards are met, the institution naturally develops a culture of research and learning. Pursuing a doctoral degree or carrying out research may not be possible in unaccredited institutions prompting doctoral students and scholars to look out only for accredited institutions. Students can only receive financial aid if the institution they are attending has been accredited by government-recognized organizations such as the AICTE and NBA. Most companies prefer to hire job seekers who have completed a recognized college or university education. HEIs claim that accreditation define and guide the continuous quality improvement of their

academic programs. Accreditation's unique, external peer-review process does, in fact, provide insight, feedback, and recommendations on goals, policies, and plans for achieving educational missions and improving academic quality.Accreditation can be a guiding force to institutions in accepting academic credit from other colleges or universities.

The Scenario of Indian Higher Education

At all levels of education, several structural and systematic improvements have taken place since independence. A few decades ago, Higher education institutions (HEIs), primarily focused to provide students from rural and urban sectors with opportunities to graduate and pursue employment. Over the years, students enrolling in graduate and postgraduate programs, along with the number of institutions and colleges have shot up dramatically. There are currently 1044 universities in India, clustered into more than 50 Central universities, about 400 State universities, about 90 and above Institutes of National Importance, Deemed to be Universities around 127, and about 350 Private universities. According to current trends, India will have the greatest enrollment in higher education institutions by 2027. Although the rise in HEIs has opened up a plethora of opportunities to a huge number of students, it has also resulted in several issues. According to Ministry of HRD or MHRD, the need for HEIs is drastically expanding with each passing day, and in order to meet this demand more universities and colleges are to be set up. A paradigm shift has been noticed from social sciences to science education, and vice versa, from science to technical education. This tremendous raise has paved way to a variety of problems and challenges like teacher-student ratio, infrastructure, information and communication technology (ICT), quality, placement opportunities etc. While some elite institutions, such as Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs) have distinguished infrastructure and technological resources for effective execution of curriculum, several higher education institutions are in short of basic amenities and resources, making it quite arduous to provide quality education.

Even the research programs in our system are primarily concerned with the dissemination and creation of knowledge. Whereas research must be prioritized to explore new dimensions of existing body of knowledge that further enhance and aid human progress. We still are clueless on the exact number of scientific journals, but many estimates suggest that approximately 30,000 exist, generating about two million articles annually, (Altbach and Wit, 2018). Yet, the Indian research doesn't add much value; one of the reasons could be lack of academic writing skills in faculty and students. The book named 'The Future of Indian Universities: Comparative and International Perspectives quotes, "Unfortunately, our higher education system does not stand in the global competition anymore, (Kumar, 2018). The fact that few Indian higher education institutions appear in annual world university rankings such as the Times Higher Education World University Rankings or the QS World University Rankings exemplifies this point." Despite the fact that some of India's higher education institutions are credited with contributing a part of international top talent, the HEIs are still unsuccessful in drawing students from other developing nations. In terms of student enrollment, India accounts for about 36.6 million students, making it the world's third largest behind China and the United States. The 2016 India Skills Report claims that India produces roughly 2.6 million STEM graduates compared to 4.7 million in China; yet, it is disappointing that only 47% of available talent is employable (Wheebox, 2019). This speaks that Universities must proactively take up the responsibility to increase the employability skills of students who stand at the threshold of graduation. Though Several schools have incorporated employability skills like communication, problem solving, aptitude and design thinking into the curriculum it is required that proper collaboration with industry is made to meet up to the requirements.

It is somehow certain that higher education has not receivednecessary attention in terms of quality and suitability for its intended function. The system has been plagued with various flaws, such as talent voids, research gaps, and relevance issues, which further gave way to

problems like access, quality, and utility in terms of employment. In an attempt to address these concerns, the system underwent various changes and went through several stages of transition.And still they remain unsolved to a great extent.

It wouldn't be an overstatement to point that the primary flaw in the Indian higher education system is the callousness with which successive committees and commissions design from time to time implement their recommendations. If all of the recommendations had been followed to the letter, the system would have emerged as world-class. Implementing significant recommendations made by these education commissions and committees that are established often, would be particularly valuable to improve the current state.The HEIs need to inculcate a positive outlook and buckle up to adopt to new education policy's proposals. Institutions that overlook quality assurance and set parameters for institutions, such as the National Assessment and Accreditation Council (NAAC) and the National Board of Accreditation (NBA), must be enhanced.

Committees& Commissions

The committees and commissions have come up with several recommendations that are reviewed from time to time,that seems to be a rigorous effort to improve the quality of higher education.While defining the goals of the University Education Commission (1948-49), the following points were highlighted:

- Studentsare to be acquainted with the social philosophy that governs institutions.
- They should be trained for democracy and self-development.
- Developvalue oriented education that instills strength, conscience, and integrity.
- They need to be familiarized with cultural heritage in order to preserve it.
- Enable them to realize that education is an ongoing process.
- Up skilland develop in them knowledge of both the present and the past.

Higher education curriculum is to be established and implemented in higher education institutions based on these. However, many of these goals are not taken into account while building curricula.The recommendations made in the Kothari Report (1964) and the National Policy on Schooling (NPE) of 1986 still make sense today and provide opportunities to make amendments at various stages of education. Some higher education institutions that have strived to this attain this cause of education have been quite successful.

Role of NAAC

The National Assessment and Accreditation Council (NAAC) has a considerable impact on many quality metrics of Indian higher education institutions, it has led to major modifications in Indian higher education.NAAC suggests parameters and key indicators concerned with quality assessment and accreditation, Evaluation Process and Reforms; Student Performance as well as Teaching Learning criteria; Enhancing Research facilities; and Resource allocation for Research. NAAC directs and drives institutions to resolve many of their crucial issues.

Faculty oriented approach, financial management and optimum resource utilization, internal quality assurance system (IQAS), institutional values and social responsibilities, establishing good organizational culture, industry collaboration, library resources, IT Infrastructure are some of the areas of focus of NAAC.NAAC works towards gathering evidence of these above mentioned provisions which help in assessing the caliber of higher education institutions. Nonetheless, HEIs that have received an A++ rating are performing well both nationally and internationally.

In 2017, NAAC changed its Assessment and Accreditation Framework in light of changing circumstances and requirements. The updated Assessment and Accreditation Framework's significant changes include:

- Data-based quantitative indicator evaluation has been implemented instead of qualitative peer judgmentto enhanced impartiality and openness.
- Recommended widespread ICT use, demonstrating scalability and reliability

- Simplification of accreditation process, such as reduction of number of questions, size of the report, number of visits
- Benchmarking as a technique for quality enhancement by comparing NAAC metrics to several international QA frameworks;
- Introduction of pre-qualifier of peer committee visit, as 30% of system generated score(reduced to 25%, in Jan2020)
- Introduction of System Generated Scores (SGS), which are based on a combination of online evaluation (roughly 70%) and peer judgement (roughly 30%)
- Introduction of the element of data validation by a third party
- Universities, Autonomous colleges, and affiliated/constituent institutions with relevant variances in criteria, weightages, and benchmarks
- Amending many metrics to increase student and alumni engagement in the assessment process Optional metrics, percentage or the size of students to be defined for Student Support Services, and minimum percentage for attaining qualification in the quantitative metrics in Data Validation and Verification (DVV) processes were all modified in January 2020.
- Continuous feedback from stakeholders in assisting NAAC and in fine-tuning the evaluation and accreditation process in order to make it more institutional friendly while also raising educational institution quality.

Shortcomings of Accreditation

The conflict mostly arises in three areas: program content, program delivery, and administrative essentials. The challenges surrounding delivery is mostly about contested control and innovation.

From Academicians point of view:

The source of worry for academicians appears to be the perception of practitioners intruding into the academic domain, such as mandating particular course content, making demands in terms of teaching learning methodologies, and even disputing assessment decisions. Externals/practitioners, according to academics, simply need to identify what is necessary core that would enable a student to accommodate himself to the industry requirements, and then leave it to the academy to construct a coherent educational program presented in a pedagogically sound structure.

The academics also reflect that the element of innovation is hampered by structural constraints and the composition of visiting panels. These panels are viewed mostly as a hoop to jump through or a threshold to hold.

Bureaucracy and workload:

The general assumption is that consistency in course structure is vital and desirable; hence all similar courses 'cover' the same material.The HEIs try to include the same sort of syllabus or mostly imitate from the Universities they are affiliated to. They simply compare the framed curricula to that of other HEIs that are deemed to be better such as IITs or Institutions of national importance. The reason behind this assumption is that covering the same course content leads to consistency in learning and comprehension of the subject, but this somehowmakes the work repetitive and burdensome for academics. The amount of work involved in some of the accreditation programs is simply monotonous. However, if the process is justified to be worthwhile, the tedious documentation is the cost paid.

It can be suggested that the accreditations institutions and universities agree once and for all, the format in whichall the institution related data should be kept and presented for inspections and assessments. This might bring a little relief to seemingly endless documentation and paperwork during inspections. Each accreditation has its own structure and rubric for evaluation and inspection.This lack of synchronization and conflicting documentation reflects various agencies' desire to maintain control over their respective aspects of the quality and standards monitoring process.

Accreditation…..has a political agenda?

The government firmly believes in accreditation for quality assurance. The government has come up with several benefit programs, like financial grants, loans and schemes for students who wish to pursue higher education. The government sought a

stable mechanism or a system to assure the quality of institutions.

To realize this objective, the government seems to have endorsed an existing system – accreditation – to delegate the role of quality assurance and ensure that the funds are being spent at credible, recognized and quality institutions.

Accreditation and HEIs.

There is still an undeniable element of alliance between accreditation and academics. The accrediting agencies provide a medium of articulation to higher education institutions during discussions or negotiations. They are allied to these professional bodies knowing the power of accreditation on the market.(Maniulonela, 2019) in his paper discussed various factors that impact selection of a university. The author suggests reputation of institution, financial factors, advertisements, placement opportunities, social factors and family/ peer pressure along with accreditation and affiliation of institutions.

But, one of the unfortunate consequences of accreditation is expenditure and consumption of abundant resources. Accreditation is best appreciated by those who are closely associated with it(the marginal), and by those who utilize it ingeniously to perform innovative self-assessments, or by aggressive founders who argue they are vital to keep accreditation. Accreditation, thus play a crucial function as a barrier against changing political winds of fortune for institutions. The accreditation bodies appear before the education ministry or government led committees to lend an ear to the criticismsregarding HEIs and attempt to blunt it as efficiently as they can. This alliance between accreditation bodies and HEIs is crucial and they become a barricade for colleges and universities and a hope for academicswhile dealing with the government.

Accreditation and quality

All these insights show that accreditation is an experts' game, that it does not include most of the employees or exercise students to a considerable amount. Accreditation ensures just the kitemark instead of the process or ensuring room for improvement. Accreditation is a power conflict, not a benign process. It does not involve all the participants. It is not a mere process to define the minimum criteria for joining the club (and to continue meeting them). In addition to evaluation, audit and various forms of standards, accreditation should act as an additional layer. It can be concluded that accreditation cannot guarantee quality. And the debate of quality has been ongoing for decades now. However, the quality debate in higher education has tried to address, in practice, the apparent incompatibility of the external monitoring of quality and the desired improvemental roles (Vroeijenstijn, 1995; Middlehurst & Woodhouse, 1995). And there doesn't seem to be any improvement soon.

Graham, Trow, & Lyman (1995) state in their study that the process of accreditation in itself is flawed. The process is meant to provide certification and assurance of quality in institutions and their practices. Whereas, in practicality they do not bring upon any phenomenal improvement in an institution's performance, the reason being that they are not based on continuous assessment and evaluation of merits and demerits.Thus, the entire accreditation process has emerged as a futile effort to impress or a means of producing a public relations document which exaggerates the strengths of the organisation and masks its faults. This is exactly the opposite of what is intended of accreditation.

There has been a surge in number of 'agencies' and mediating bodies that assist or aid in accreditation, this is yet another evidenceof an organization's lack of trust on their own academic decision making. This shall eventually lead to deskilling and depletion of autonomy. This also reduces the freedom to make pedagogical decisions ultimately leading to less quality control, manipulation and dilution of the process (Barrow, 1999).

Conclusion

While academics may be unaware of the problems of superficial accreditation, they are equally ignorant if they do not learn the genuine process of accreditation. If academics are not updated or unaware of the principles of discipline or field they teach: it is most uncertain that these professionals have a good understanding of pedagogical principles, irrespective of institutions or grading of accredited institutions. The problem is

not whether accreditation genuinely protects public interest or acts as a process of supporting the accrediting agency's self-interest. Nor, that they are bureaucratic or restricted processes that limit innovation. It is important to note that it is suggestive towards a more ingrained problem of an ideological presumption. As John Haakstad (2001) quotes accreditation as an 'abstract notion of a formal authorizing power'.

Even someone who strongly believesin the virtues of accreditation shall agree that one or two day intensive inspection of curriculum, amenities, faculties and staff is unlikely to provide a proper insight into underlying symptoms of the system.

Accreditation is essentially a change in power from academics to directors and managers. It emphasizes the trends in 'delegated accountability' already visible in organizations (Harvey & Knight, 1996). To understand the true essence of accreditation, a holistic approach is required. An approach that positions the control functions of higher education accreditation as a public good within a broader context. The processes of power and the ideology that legitimize the control role of certification must be overlooked by the legitimacy of Indian unity and consumer propaganda. This is the only way we can openly and critically approach accreditation.

Reference

1. Altbach, P. G., & de Wit, H. (2019). Too much academic research is being published. International Higher Education, (96), 2-3.
2. Barrow, M. (1999). Quality-management systems and dramaturgical compliance. Quality in Higher Education, 5(1), 27-36.
3. Majid, I., & Kouser, S. (2021). Indian Higher Education from the Lens of National Policy of Education (1986) and National Policy on Education (2016): A Comparative Study.
4. Harvey, L., & Knight, P. T. (1996). Transforming Higher Education. Open University Press, Taylor & Francis, 1900 Frost Road, Suite 101, Bristol, PA 19007-1598.
5. Harvey, L., Mason, S., & Ward, R. (1995). The role of professional bodies in higher education quality monitoring. Birmingham: QHE.
6. Harvey, L. (2005). Quality assurance in higher education: some international trends. Calidad, eficiencia y evaluación de la educación superior, La Coruña, Netbiblo, 183-204.
7. Harvey, L. (2002). Quality evaluation: some international trends paper presented at the Norwegian Higher Education Conference, 22–23 January.
8. https://info.hqaa.org/hqaa-blog/marketing-accreditation-why-does-it-matter
9. Haakstad, J. (2001). Accreditation: the new quality assurance formula? Some reflections as Norway is about to reform its quality assurance system. Quality in higher education, 7(1), 77-82.
10. Kothari, D. S. (1970). Kothari Commission-Educational and National Development: Report of the Education Commission 1964-1966. National Council of Educational Research and Training.
11. Kumar, C. R. (Ed.). (2018). The future of Indian universities: Comparative and international perspectives. Oxford University Press.
12. Maniu, I., & Maniu, G. C. (2014). Educational Marketing: Factors Influencing the Selection of a University. SEA: Practical Application of Science, 2(3).
13. Singai, C. (2021). 2 Equity And Higher Education Policies In India: Perspectives On National Education Policy 2020. Empowering Marginalized Communities in India: The Impact of Higher Education.
14. Williams, J. (2016). Quality assurance and quality enhancement: is there a relationship?.
15. NANDI, E. (2013). Engineering Education in India: Re-visiting the Ideas of Radhakrishnan and the Recommendations of University Education

Commission. Indian Journal of Higher Education, 4(2).
16. Sharma, S. Inducing Quality And Relevance In Indian Higher Education Institutions: Some Thoughts. Reimagining Indian Universities, 55.
17. Vroeijenstijn, A. I. (1995). Improvement and Accountability: Navigating between Scylla and Charybdis. Guide for External Quality Assessment in Higher Education. Higher Education Policy Series 30. Taylor and Francis, 1900 Frost Rd., Suite 101, Bristol, PA 19007-1598.
18. Westerheijden, D. F. (2001). Ex oriente lux?: national and multiple accreditation in Europe after the fall of the Wall and after Bologna. Quality in Higher Education, 7(1), 65-75.

ROLE OF ELECTRIC BASED VEHICLES IN ENVIRONMENTAL SUSTAINABILITY – AN INNOVATION IN AUTOMOBILE SECTOR

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ABSTRACT

This study aims to throw light on importance of electric vehicle for environment sustainability in context of India which is one of the emerging market around the world. Invention in the field of automobile in form of electric vehicle (EVs) helps to save environment and provide pace in economic development. Use of EVs saves energy by consumption of renewable energy. Adoption of EVs become challenge for the industry. For the purpose of study extensive review of existing literature has been done. Findings of the study indicated that development of new technology in automobile industry raised issue regarding the factors influencing consumer to adopt EVs in Indian context. Environment sustainability helps in impoving weather condition useful to farmers and farming. Study also revealed that major problem behind adoption of EVs is availability of charging station which must solved to increase the adoption in India.

Keywords: *Electric Vehicles, Environment, Automobile, Sustainability*

Introduction

Last few decades experienced new inventions in the field of automobile. Societies across the all level felt the need of environment protection through use of eco-friendly products (Chen and Chai, 2010). Consumers are now felt the need to protect the environment by decreasing the carbon emission. Pollution in environment is result of increasing population and wide use of technological product responsible for carbon emission (Gandhi and Sheorey, 2019). Over the last decade, people are more interest for electric based vehicle with eco-friendly technology. Electric based vehicle is the popular vehicle as uses renewable energy. These products are technology based product and used battery system (Prakash and Mohanty, 2017; Zhuge et al., 2019; Tu and Yang, 2019). EVs are one of the most important alternative for the transportation mode to use which has no negative impact over the environment and also saves the available fuel (Eccarius and Lu, 2020). Indian economy is one of the emerging market around the world. Most of the fuel requirement of India is fulfilled through import of crude oil from the various countries. For reduction of dependency over other countries for fuel can also be reduced by the use of EVs. Use of EVs can also reduce environmental hazards which arises due to the rise in automobile industry and harm the health of citizens (Virmani et al., 2021).Consumer are searching for alternative regarding the eco-friendly products. This habit of consumers for eco-friendly product has considerable effect on the industry and corporates (Manaktola and Jauhari, 2006: Bennett and Vijaygopal, 2018). Various corporate and government has started to take initiative for becoming green by the use of eco-friendly technology and vehicle for transportation (Rahman et al., 2017). Oil based vehicles are primarily used as mode of transportation in India (Agarwal, 2019). India account 51% pollution only because of fossil fuel based vehicle which may rise up to 80% in big cities (Balakrishnan, 2019).

Indian transportation sector is third largest sector for greenhouse gas emission(Singh et al., 2019). Over 300 vehicles are running in country and adding almost 10% annually (Kale et al., 2015). Such increasing rate of fuel based vehicle and rising pollution due to that has big problem for government. GOI has taken several steps to reduce the air pollution government is promoting the sale and manufacturing of electric based vehicle. Government also made plan to have only EVs on the road by the end of 2030. Government pledge to have complete supply chain of EVs

under Make in India scheme. Government has planned backed by the intention of moderating GHG and dependency on import from other countries. In spite of progress in the sector of EVs, adoption rate of EVs is very slow in India. Due to slow growth government changed the plan and strategy. GOI reduced target of 100% to 30% by the end of 2030. Also government plan to invest huge money in this sector for the promotion of EVS in country. Present changing attitude of consumer and need for green environment gave rise to the EVs industry (Cleveland et al., 2005). Many of the research are conducted to investigate the trend regarding the green marketing of EVs (Kim and Choi, 2005).Consumer preference for the eco-friendly products increase the effectiveness of innovation and development of green products in any country (Wolff and Madlener, 2019). Adoption of new product only depended on the consumer perception regarding the use of new product will not create any problem to them. They are concerned about the vehicle insurance, availability of charging station and cost in maintenance. Companies around the world have realized that sooner or later all will implement the policy related with EVs. They are taking initiatives for the production of EVs, so as to companies need to understand the requirement of infrastructure.It is very important to understand the behaviour of consumer regarding the adoption of EVs. Increase in adoption of EVs may decrease the negative impact of fossil fuel based vehicle on environment. This study aims to highlight the importance of EVs in environment sustainability and to explore various ways to implement strategies. The study also indicates below questions of research:

RQ: What are obstacles in adoption of EVs in context of India.

RQ: How to prepare roadmap and facilitate the charging infrastructure for EVs.

Review of Literature

Objective of study is to investigate the role of EVs in environmental sustainability in context of India. Various studies were conducted to examine the consumer adoption process of EVs. A brief review of existing literature is as follow.

Krause et al., (2013) conducted survey study for 21 cities of USA and found that two third of participants have misunderstanding about the features of EVs and most of them are not aware about the benefits of EVs. Connectivity of EVs in India account for 0.02% only (TERI, 2019). Study of Larson et al., (2014) concluded that EVs are new automobile product and possession of EVs among the consumers is very low. Singh et al., (2020) suggested that authorities must understand possible barriers and drivers for the adoption of EVs. Robinson et al. (2014) conducted study based on review of literature and recommended that facilities of charging must be combined with physical facilities. Muller (2019) suggested through his survey based study that ease of use related with purchase of EVs has strong influence on purchasing intention of consumer. Brown et al. (2010) carried out research for the examination of charging standards and qualities focused on its significance of consumer adoption. Results of his study revealed that proper standards play vital role in new technology acceptance and indicated need of comfortability of charging system and technology. Consumer acceptance for the EVs depends upon various factors, charging grid stability and its integration with renewable energy (Will and Schuller 2016). Reduction in pollution is required for environment sustainability (Dwivedi et al., 2019). Ayre, (2016) said most of the nations around the world are focused on implementation of alternative fuel based automobile for transportation. Studies also conducted to examine the dispersal of technology related to EVs in terms of government strategy, benefits and consumer adoption and motivation to adopt in context of Japan (Ahman, 2006). Other studies also conducted to know the factors influencing purchase of EVs i.e. price, charging facilities, cost and cost of switching. Among all countries around the world China had rapid pace to adopt the technology related with EVs. China implemented a pilot strategy for the EVs adoption in ten cities of country (Du and Ouyang, 2013). Study of (Truman 2015) investigated the environment of China for the adoption of EVs and requirement of capital investment. He recommended that adoption of new technology depends upon the price,

infrastructure, charging time. Javid and Nejat (2017) concluded that adoption of EVs plays significant role in environment protection and adoption of EVs depends on various factors such financial soundness and level of education of buyer. Buying also depends on charging infrastructure and existing price of fossil oil used in vehicles. Bucker et al. (2009) concluded that electric vehicles have effect on various aspects of USA like, economy and trade balance. It also decreases oil imports and exchange shortfall. Current scenario in USA also reported fall in sales of EVs. Author recommended that fall in price, standards in production and benefits provided by the government plays important role in adoption of EVs.

Market of EVs in India

Indian automobile industry is an emerging industry for the electric based vehicle. First electric based vehicle was introduced by Mahindra in 2010 and again company came with new vehicle with some changes in 2019 (Thakkar, 2018). Sales of electric vehicle have not realized growth. At present, 5 lakhs two wheelers and only few thousands of electric cars running on road in India. (SMEV, 2020).Measurement in automobile industry depends upon the benefits provided by the government and adoption of EVs in India can be examined by the proper knowledge regarding the challenges faced during the adoption of EVs. Major obstacles in target of EVs by 2030 are innovation and improvement in technology used for EVs (Verma (2017). India has large population of 1.3 billion and almost 2% do not have access to electricity. Country also faces the problem of charging infrastructure as compared to petrol and diesel stations which are in large quantity. Government claimed that country do have sufficient power but distribution is major problem causing deficit of power. CEA has enough storage of power and highest shortage reported in 2017-18 of 0.7%. reports of CEA shown India as power excessive country.

Hurdles in adoption of EVs

One of the major challenge in adoption of electric based vehicle is the high cost of purchase because per capital income and disposal income of India is very low. As Indians are price sensitive, almost 65% vehicles were sold of below seven lakh price tag (Adepetu and Keshav, 2017). An EV has average cost of fifteen lakhs which is much higher than average of five lakhs for tradition fuel based car. EVs are high price premium vehicle segment. Lending institutions are also feel hesitation for the vehicle do not have certain resale value. List of major hurdles or challenges are as follow.

a. **Purchase cost.** Prices of EVs are almost double from the basic fuel car which is major hurdle in adoption of EVs with low per capita income.
b. **Travel range.** It is also matter of consideration. Average range of battery based vehicle is from 175 Km. to 452 Km.
c. **Charging infrastructure.** EVs require large no. of charging station whereas, India has very less ratio of charging station for EVs.
d. **Maintenance cost.** Cost of maintenance is very high and accessories availability is in emerging stage this will be improved once market will develop.
e. **Capabilities and technology for battery production.** Less no. of companies is now producing batteries in India but many companies around the world have eyes on Indian market regarding battery business. It also important to cut down the cost of production by using good technology.

Research methods

Primary objective of this study is to investigate factors influencing adoption of EVs in India. This study also examines the impact of electric based vehicle on environment sustainability. Government aims to implement policy regarding EVs of 30% by 2030. Secondary data has been collected through various reports of government agencies, available literature regarding EV and records of authorities.couple of experts have been asked about EVs. Experts are from EVs business, academicians and industry consultant.

Study have used the opinion of focus group experts. Opinion of experts can provide significant information regarding electric vehicle (Khanna et al.,2018). Experts of different field were asked about their opinion regarding electric vehicle. During first step

respondent were introduced about the topic and concept later on question regarding current scenario and challenges asked.

Major challenges recognised based on expert's opinion

a. Cost involved in production. Experts stated that cost in production of battery and accessories is almost 65% of total cost which can be reduced by allowing private manufacturer in this field. Cost can also be minimizing through the entry of localize players.
b. Cost to buy. Corporate experts suggested that cost to buy an EV is much higher than basic transport vehicle. Electric vehicle cost is two/three times more than other basic vehicles. Other experts suggested that production at local level can reduce overall cost of EVs.
c. Infrastructure challenges. Availability of charging station in India is major problem. It will also increase the demand of power and supply will be effected due to increased demand. Experts also suggested that government must put more investment for infrastructure in the field.
d. Cost incurred after purchase. Experts also gave opinion regarding the cost incurred after the purchase of electric vehicle. They said that cost of maintenance of electric vehicle is much higher than the cost of basic vehicle. Government should provide incentive on the production of accessories and components related with electric vehicles.

Action to be taken to promote adoption of EVs in India

In India huge investment is required for the implementation of policies regarding EVs. As the industry of electric vehicle is in rising phase. Government of India must have focused on distribution of power to all around the country. A large no. of population still does not have access to power. Country aims to adopt EVs culture but clear strategy and implementation of same needed. Corporates can also help by providing solution regarding the problems.

Shared economy as a tool for mitigation of hurdles

Adoption at initial level, implementation of decisions and final adoption are three phases recognized by different researcher for technological acceptance (Thong, 2001). Resistance and acceptance of new technology are the important factors in adoption of new technologies. Various experiments of GOI and other corporate can play important role for changes in environment and cost. Government has also decreased the tax levied on such products. Sharing platforms are also emerging as sharing transportation in daily life.

Discussion and findings

Major aim of the study is to investigate the factors influencing adoption of EVs and current scenario of EVs in India. Country has intention to achieve target of 30% electric car by 2030. Study also revealed the various policies and strategies implemented by other countries around the world. Study indicated that electrification of India require extra efforts in terms of investment and incentives. Study indicated several obstacles in implementation of electrification such as, lack of infrastructure, high cost, insufficient supply of power, poor technology. Developed countries have provided various incentives, investment in infrastructure. Various stakeholders can also play important role. In Indian context various measures are as follow. A. finance facility B. development of charging station C. good technology for battery production D. promotion of EVs E. power management E. tax incentives for EV user etc.

Conclusion

This study examined various parameters regarding the adoption of EVs in India. Study indicated various obstacles in adoption of EVs recognized by review of existing literature and some them are realized by the opinion of experts. Major problems in adoption of EVs in India are cost of electric vehicle, available infrastructure and power system in country for EVs. Government also taking various steps to promote adoption of EVs by providing incentives and educating the peopleregarding electric vehicle and environment sustainability. Players in market has the understanding about environment sustainability, CSR and other responsibility towards the nation. Stakeholder

must focus upon the need of investment and infrastructure for the electric based vehicle to promote adoption of new technology for environment sustainability.

References

1. Adepetu, A., & Keshav, S. (2017). The relative importance of price and driving range on electric vehicle adoption: Los Angeles case study. Transportation, 44(2), 353-373.
2. Agarwal, O. P. (2019). Compulsion to choice: how can public transport in India Be transformed. Economic and Political Weekly, 54(4), 23.
3. Åhman, M. (2006). Government policy and the development of electric vehicles in Japan. Energy Policy, 34(4), 433-443.
4. Åhman, M. (2006). Government policy and the development of electric vehicles in Japan. Energy Policy, 34(4), 433-443.
5. Balakrishnan, K., Dey, S., Gupta, T., Dhaliwal, R. S., Brauer, M., Cohen, A. J., ... & Dandona, L. (2019). The impact of air pollution on deaths, disease burden, and life expectancy across the states of India: the Global Burden of Disease Study 2017. The Lancet Planetary Health, 3(1), e26-e39.
6. Bennett, R., & Vijaygopal, R. (2018). Consumer attitudes towards electric vehicles: Effects of product user stereotypes and self-image congruence. European Journal of Marketing.
7. Brown, S., Pyke, D., & Steenhof, P. (2010). Electric vehicles: The role and importance of standards in an emerging market. Energy Policy, 38(7), 3797-3806.
8. Becker, T. A., Sidhu, I., & Tenderich, B. (2009). Electric vehicles in the United States: a new model with forecasts to 2030. Center for Entrepreneurship and Technology, University of California, Berkeley, 24.
9. Chen, T. B., & Chai, L. T. (2010). Attitude towards the environment and green products: Consumers' perspective. Management science and engineering, 4(2), 27-39.
10. Cleveland, M., Kalamas, M., & Laroche, M. (2005). Shades of green: linking environmental locus of control and pro-environmental behaviors. Journal of consumer marketing.
11. Du, J., & Ouyang, M. (2013, November). Review of electric vehicle technologies progress and development prospect in China. In 2013 World Electric Vehicle Symposium and Exhibition (EVS27) (pp. 1-8). IEEE.
12. Dwivedi, A., Agrawal, D., & Madaan, J. (2019). Sustainable manufacturing evaluation model focusing leather industries in India: a TISM approach. Journal of Science and Technology Policy Management.
13. Eccarius, T., & Lu, C. C. (2020). Powered two-wheelers for sustainable mobility: A review of consumer adoption of electric motorcycles. International journal of sustainable transportation, 14(3), 215-231.
14. Gandhi, A., & Sheorey, P. (2019). Antecedents of green consumer behaviour: a study of consumers in a developing country like India. International Journal of Public Sector Performance Management, 5(3-4), 278-292.
15. Javid, R.J., & Nejat, A. (2017). A comprehensive model of regional electric vehicle adoption and penetration. Transport Policy, 54, 30-42.
16. Khanna, A., Damodaran, A., & Khanka, S. (2018). Identifying stakeholders to implement alternative taxiing solution in IGI. SCMS Journal of Indian Management, 15(1), 23-34.
17. Kim, Y., & Choi, S. M. (2005). Antecedents of green purchase behavior: An examination of collectivism, environmental concern, and PCE. ACR North American Advances.
18. Krause, R. M., Carley, S. R., Lane, B. W., & Graham, J. D. (2013). Perception and reality: Public knowledge of plug-in electric vehicles in 21 US cities. Energy Policy, 63, 433-440.
19. Larson, P. D., Viáfara, J., Parsons, R. V., & Elias, A. (2014). Consumer attitudes about electric cars: Pricing analysis and policy

implications. Transportation Research Part A: Policy and Practice, 69, 299-314.
20. Manaktola, K., & Jauhari, V. (2007). Exploring consumer attitude and behaviour towards green practices in the lodging industry in India. International journal of contemporary hospitality management.
21. Müller, J. M. (2019). Comparing technology acceptance for autonomous vehicles, battery electric vehicles, and car sharing—A study across Europe, China, and North America. Sustainability, 11(16), 4333.
22. Prakash, A., & Mohanty, R. P. (2017). DEA and Monte Carlo simulation approach towards green car selection. Benchmarking: An International Journal.
23. Rahman, F., Rowlands, I., & Weber, O. (2017). Do green buildings capture higher market valuations and lower vacancy rates? A Canadian case study of LEED and BOMA-BEST properties. Smart and Sustainable Built Environment.
24. Robinson, J., Brase, G., Griswold, W., Jackson, C., & Erickson, L. (2014). Business models for solar powered charging stations to develop infrastructure for electric vehicles. Sustainability, 6(10), 7358-7387.
25. Singh, V., Singh, V., & Vaibhav, S. (2020). A review and simple meta-analysis of factors influencing adoption of electric vehicles. Transportation Research Part D: Transport and Environment, 86, 102436.
26. Kumar, R., Jha, A., Damodaran, A., Bangwal, D., & Dwivedi, A. (2020). Addressing the challenges to electric vehicle adoption via sharing economy: an Indian perspective. Management of Environmental Quality: An International Journal.
27. Jaiswal, D., Kant, R., Singh, P. K., & Yadav, R. (2021). Investigating the role of electric vehicle knowledge in consumer adoption: evidence from an emerging market. Benchmarking: An International Journal.
28. Thakkar, K. (2018), Carmakers Accelerating Pacts to Launch Affordable Electric Vehicles in India, available at: https://economictimes.indiatimes.com/industry/auto/news/industry/ carmakers-accelerating-pacts-to-launch-affordable-electric-vehicles-in-india/articleshow/62829729.cms
29. Kumar, R., Jha, A., Damodaran, A., Bangwal, D., & Dwivedi, A. (2020). Addressing the challenges to electric vehicle adoption via sharing economy: an Indian perspective. Management of Environmental Quality: An International Journal.
30. Tu, J. C., & Yang, C. (2019). Key factors influencing consumers' purchase of electric vehicles. Sustainability, 11(14), 3863.
31. Verma, S. (2017), Will India Be Able to Reach the Deadline of All-Electric Vehicles by 2030? Here Are the Challenges, available at: http://www.financialexpress.com/india-news/will-india-be-able-to-reachdeadline-to-convert-all-vehicles-into-evs-by-2030-here-are-the-challenges/910522/.
32. Virmani, N., Bera, S., & Kumar, R. (2020). Identification and testing of barriers to sustainable manufacturing in the automobile industry: a focus on Indian MSMEs. Benchmarking: An International Journal.
33. Vickers, N. J. (2017). Animal communication: when i'm calling you, will you answer too?. Current biology, 27(14), R713-R715.
34. Wolff, S., & Madlener, R. (2019). Driven by change: Commercial drivers' acceptance and efficiency perceptions of light-duty electric vehicle usage in Germany. Transportation research part C: emerging technologies, 105, 262-282.
35. Zhuge, C., Wei, B., Dong, C., Shao, C., & Shan, Y. (2019). Exploring the future electric vehicle market and its impacts with an agent-based spatial integrated framework: A case study of Beijing, China. Journal of Cleaner Production, 221, 710-737.

ROBINSON CRUSOE BY DANIEL DEFOE - AN EXPEDITION INTO ENIGMA

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ABSTRACT

A long voyage helps in exploring the unexplored places. People are constantly travelling to learn, unlearn some of the important lessons; lessons which would help in surviving in the best possible ways. Some go on religious pilgrimages to find a string of attachment with the almighty, as they feel the real meaning of their life and their existence could be understood with such expeditions. Robinson Crusoe by Daniel Defoe is one such book on one's journey which reveals the hidden secrets of life. This religious allegory offers the readers with some of the important elements which have different meaning and different shades in real life. This particular paper would analyse those elements which are rendered different shades. The journey that teaches the lesson of life would be interpreted and examined as well. The journey is crucial and at every stage one is offered with mysteries to be resolved with one's intelligence and astuteness. The positivity with which one has to approach the life is beautifully portrayed by the novelist, life would throw so much negativity and it is up to the traveller to understand the same and tackle the life accordingly. In the journey, one faces different situations and the ways in which one handles the problems takes you to the next level. Though there are many issues, yet one is provided with the strength to face the problems with vigour and in this paper those aspects would be scrutinized.

Keywords: *Life, Mystery, Religion, journey, Astuteness.*

Introduction of the Author

Daniel Defoe was born in the year 1660 in London. He had been a merchant, but he didn't gain name or fame out of that, and a pamphleteer of politics, which resulted in him being imprisoned for slander. It was after those failed attempts he tried writing fiction and thus, emerged his famous work, Robinson Crusoe. One of the most influential works of all time was published in the year, 1719.

Daniel Defoe, born as Daniel Foe, to a London butcherer, James Foe had changed his name to Daniel Defoe to make it sound polite. He did his graduation from an academy which was run by Reverend Charles Morton at Newington Green. He ventured into business in 1683, he spent most of the time travelling and selling wool and wine, but he was seldom out of debts. Finally, he was bankrupted in the year 1692, which made him quit from the ideas of doing business and he decided not to continue with his business plans in 1702.

Defoe was interested in politics and owing to that interest, he published a political pamphlet in the year 1683. He worked as a journalist and simultaneously continued with his political works. His famous works include *the Trueborn Englishman* and a periodical named *Review* published between 1704 to 1713. He did not succeed as a journalist and pamphleteer as well, as he was many a time imprisoned by the opponents due to his writings. Thus, that career came to an end too.

Then was the beginning of his literary career from 1719. Based on the several short essays written over the years, he came up with Robinson Crusoe in that same year, which became the masterpiece of Defoe. His other works include *Colonel Jack, Moll Flanders, Journal of the Plague Year, Captain Singleton* and the last best work *Roxana* was published in the year 1724.

Review of literature

Vandermeersche, Geert and Soetaert, Ronald (2012), have discussed of *Robinson Crusoe* as a fable narrating of cultivation, nature, creation of the self-individuality. According to them, "Robinson Crusoe and its characters, metaphors, and scenarios function in the "auto-communication of culture as enduring equipment for a living (Burke), a company reader keeps (Booth), and a cognitive tool in modern Western culture." The life of Crusoe provides an insight into the idea of the evolution of human beings. The ways of living are taught to the readers.

Owens, W. R (2013), his article "Defoe, Robinson Crusoe, and the Barbary Pirates" discuss the slave trade and how people suffered by that especially Christians. Defoe's novel

highlights those aspects which have been unknown. The conditions in which slaves were held and the operating methods of the pirates could be understood.

Life – An Enigma

A long voyage helps in exploring the unexplored. People are constantly travelling to learn, unlearn some of the important lessons; lessons which would help in surviving in the best possible ways. Some go on religious pilgrimages to find a string of attachment with the almighty, as they feel the real meaning of their life and their existence could be understood with such expeditions. Robinson Crusoe by Daniel Defoe is one such book on one's journey which reveals the hidden secrets of life.

Daniel Defoe, through his masterpiece work *Robinson Crusoe*, has revealed those autobiographical elements of life, which gave him the experiences which were deafening and superimposing. He had to face some of the worst experiences as a pamphleteer and merchant, the experiences of *Robin Crusoe* could be well related to those of Defoe too. As a merchant, Defoe was a fiasco, but the success of a merchant's life was experienced by Defoe through his creation. Crusoe did undergo treacherous experiences, yet he successfully established himself as a traveller, merchant, and an originator.

One must pursue the dreams and never stop from making them true, is highlighted by Robin Crusoe's life. He initially wished to get into sea as a voyager, but his father made him pursue law, as he thought that could make Crusoe's life secure. Crusoe was destined for something else and his future reflected through his desires of going to sea. He did pursue his wishes, and he was at great losses too, yet he continued with his dream of sailing and he lived the best adventurous life possible.

Initially, Crusoe agreed to his father's views and started with his study in law, but his dreams kept haunting him. His decision does have a different connotation, more than the desire, it was the temptation which was pushing him towards worldly desires. He, along with his friend embark upon a ship to London, and thus, begins his life as a merchant. Initially, the world has to offer only the best, Crusoe too enjoys good profit in his first venture and that persuades and lures him to continues with more of trades, thus, with the temptation, the lust for money also overtakes him.

His second voyage doesn't prove to be a successful one, as he is seized by the Moorish pirates. Crusoe gets enslaved, which is again connotative, he isn't enslaved in by the pirates in the town of North Africa named Sallee, but by the lust of money, and his inner desires. Paulo Coelho, while talking of dreams and pursuing the same says,

When we first begin fighting for our dream, we have no experience and make many mistakes. The secret of life, though, is to fall seven times and to get up eight times. (Coelho, p. 5)

Crusoe does become weak, but he doesn't give up and he successfully breaks free from the clutches of slavery and his then taken to Brazil. There a new life awaits him and he establishes himself as an owner of the plantation and again sees the lights of success. Though he gets a second chance, he misuses, and his temptations allure him into slave trading. It is quite evident when one loses control over self, one is prone to err. Over ambitiously he tries to make a profit with slave trading, and life punishes him again and his ship is wrecked, leaving him with nothing in the end in an isolated island, at the coast of Trinidad.

The sins committed by him over the course of life brings him the curses with every success he makes. Billah Muzahid says, "Crusoe commits the sin of disobedience to his father and God. He also succumbed to the sin of pride, sin of rising faster and the sin of running away from the island of imprisonment." The story though is based on the life and voyage of Crusoe, it has a more religious touch to it. The biblical aspects of sinning, repenting, forgiving, and reconciliation overtake the life of Crusoe at every step of his life's journey. With more profits in Brazil, he desires for more, and he admits,

I must go and leave the happy View I had of being a rich and thriving Man in my new Plantation, only to pursue a rash and immoderate Desire of rising faster than the Nature of the Thing admitted; and thus I cast myself down again into the deepest Gulph of human misery that ever Man fell into, or

perhaps could be consistent with Life and the State of Health in the World. (35)

Being isolated in the island, Crusoe is occupied by bizarre thoughts, he considers himself to be the king, as he had had no one with him. He becomes the master, mastering his pets and learning skills like weaving basket, making bread. His mastery continues over Friday, whom he finds in the island and treats him as a slave. His control over the things around makes him a master of his fate as well. He deviates from the spiritual realm by such subduing quality,

My island was now peopled, and I thought myself very rich in subjects; and it was a merry reflection, which I frequently made, how like a king I looked. First of all, the whole country was my mere property, Baso that I had an undoubted right of dominion. Secondly, my people were perfectly subjected. I was absolute lord and lawgiver, they allowed their lives to me, and were ready to lay down their lives, if there had been an occasion of it, for me. (198)

He begins to control his destiny and makes decisions on his own. He teaches 'master' as the first English word to Friday, before teaching him even 'yes' or 'no'.

His pride is overtaken by fear during his illness. He is warned to repent of his sins by an angel in his dream. It could be considered as a positive sign of him being helped by the Lord, despite his sins and non-religious activities. At that point, he realizes God has helped him and forgiven him for his past sins. He undergoes a religious illumination and transcends from his earthly thoughts. He finds many ways to protect himself and leads an adventurous life by finding new methodologies and discovering new techniques.

Crusoe's life offers him with many mysteriously positive and negative forces, Friday was the positive help he could find to evade his solitude and cannibals were the negative forces which threatened his survival, but he was a blessed soul and was protected by the God and his life again took him back to his family back in England. He gets back everything and finds his hard work had rendered him with more fortune and his repentance and realization had offered him a new life. His last journey is to the East Indies with a positive attitude as a trader. The journey which began with his dream ended with the attainment of it.

The need for Repentance

This religious allegory offers the readers with some of the important elements which have different meaning and different shades in real life. This particular paper would analyse those elements which are rendered different shades. The journey that teaches the lesson of life would be interpreted and examined as well. The journey is crucial and at every stage, one is offered with mysteries to be resolved with one's intelligence and astuteness. The positivity with which one has to approach the life is beautifully portrayed by the novelist, life would throw so much negativity and it is up to the traveller to understand the same and tackle the life accordingly. In the journey, one faces different situations and how one handles the problems takes you to the next level. Though there are many issues, yet one is provided with the strength to face the problems with vigour and in this paper, those aspects would be scrutinized.

According to Crusoe, disobeying his father was the greatest sin. It could be related to the sin of Adam and Eve by disobeying God's words, they invited sin into their lives. They had to suffer abundantly, and their sin has brought aggressive consequences on the entire mankind. Crusoe suffered in his life in various ways, it was the appearance of Angel which made him repent for the sins he had been committing, "Seeing all these things have not brought thee to repentance, now thou shalt die." His sin could be compared to the sin of Cain too. Crusoe had gratitude towards God for the profit he made but was that enough is the important aspect to be pondered over. If he was devoid of sins, he wouldn't have had the dream to repent.

His repentance made him realize his destiny and did not make many complaints after the realizations. He accepted his fate and the will of God and that gave him good results in the future. His Christian faith and hope in God help him survive through all the test. His life itself is a testimony and experiences are the lessons to the people.

Conclusion

Various ways in which life could be dealt with and how being spiritually and religiously strong is important is evident from the life of Crusoe. Guidance, acceptance, repentance and realization are important for understanding the blessings of God. One has to have the self-awareness to avoid getting dried of the spiritual saturation. Emotional strength and physical well-being could help one survive even in adverse conditions are portrayed by the novelist.

References

1. Caldwell, B., & Spinks, J. M. (2003). Beyond the self-managing school. Routledge.
2. Defoe, D. D. (2021). The life and strange surprizing adventures of Robinson Crusoe. Bucknell University Press.
3. Macy, A. G. (2011). The Socio-economic and Religious Aspects in Robinson Crusoe.
4. Muzahid, B. (2018, June 20). Robinson Crusoe as a Religious Allegory. Retrieved from academia.edu: https://www.academia.edu/32563832/Robinson_Crusoe_As_A_Religious_Allegory
5. Owens, W. R. (2013). Defoe, Robinson Crusoe, and the Barbary Pirates. English, 62(236), 51-66.
6. Vandermeersche, G., & Soetaert, R. (2012). Landscape, culture, and education in Defoe's Robinson crusoe. CLCWeb: Comparative Literature and Culture, 14(3), 9.

LEVEL OF ASPIRATION AND LEADERSHIP STYLE OF PROSPECTIVE TEACHERS

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ABSTRACT

'Level of Aspiration' is a psychological construct which reflects a cognitive type of motivation of the individual. Leadership is the essential factor that helps a person or a group to recognize its goals and then motivates and assists in achieving the desired goals.The purpose of this study is to find out how much Level of Aspiration influence on the Leadership Style of prospective teachers in Kancheepuram District. The sample consists of 300 student teachers from 9 colleges of education in Kancheepuram District. Twostandardized tools were used to find out the influence of Level of Aspiration on Leadership Style of prospective teachers in Kancheepuram District. Findings of the study reveal that there is significant influence of Level of Aspiration on Leadership Style of prospective teachers in Kancheepuram District. Level of Aspiration enables the prospective teachers to think about their Leadership Style. The prospective teachers who have high Level of Aspiration have high level of Leadership qualities.

Keywords: *Level of Aspiration, Leadership Style, Prospective teachers.*

Introduction

Education is processes of bringing about change an individual's behaviour, knowledge, skills, attitudes, values and aspirations. Education is a tri polar process of teacher, learner and environment. Every component has its own importance. They are equally responsible for the success and failure of the educational programme. Educationists generally agree that the "Goodness" of an educational programme is determined to a large extent by the quality of learning process. Good leadership in Educational Institutions is the practice of encouraging and enabling teaching expertise in order to achieve a strong rate of progress for all learners. This leadership can be driven by principals and executive staff in traditional leadership roles, as well as by leaders and teachers without defined leadership roles.

A recent study found that not one Educational Institution was able to improve student achievement records without effective leadership. This study shows a clear connection between skilled leadership and positive student learning outcomes. It's proof that good leadership in Educational Institution makes a direct impact on students' experience and performance.

Need and Significance Of The Study

The influence of some selected psychological factors such as Level of Aspiration, Anxiety, Emotional Intelligence, Self Esteem on Leadership Style of human being have caused many changes in the society. Leadership may be considered as the process (act) of influencing the activities of an organized group in its efforts towards goal setting and goal activeness. Leadership style plays a vital role in deciding the personality of an individual. There are many factors which influence the Leadership Style of an individual. Some are sociological factors; and some are psychological factors. This study gives more concern to the psychological factors. Among the various psychological factors, Level of Aspiration plays an important role in the Leadership Style of an individual. The prospective teachers are the pillars of a future nation. They must have the awareness about the influence of Level of Aspiration on the Leadership Style. They are in the position to influence and affect the values of leadership among the students. The knowledge of awareness is an important task of a teacher. It helps to face the challenges in job and life. So this study is selected for the development of leadership qualities for a prospective teacher. The purpose of this study is to find out the Level of Aspiration that influences on the Leadership Style of prospective teachers in Kancheepuram District.

Operational Definitions of The Key Terms

(I) Level Of Aspiration

Level of aspiration refers to where and how far individuals set their targets for achievement.

(II) Leadership Style

Leadership style refers to the manner and approach of providing direction, implementing plans, motivating and influence the behaviour of the people.

(III) Prospective Teachers

Prospective teachers refers to the students who are pursuing B.Ed. degree programmejn the colleges of education in Kancheepuram district of Tamil Nadu.

Objectives of the Study

1. To find out whether there is any significant difference in the Leadership style of Prospective teachers in Kancheepuram District with respect to the background variables.
2. To find out whether there is any significant difference in the Level of Aspiration of Prospective teachers in Kancheepuram District with respect to the background variables.
3. To find out the influence of Level of Aspiration on Leadership Style of Prospective teachers in Kancheepuram District.

Hypotheses of the Study

1. There is no significant difference in the Leadership style of prospective teachers in Kancheepuram District with respect to their Gender.
2. There is no significant difference in the Leadership style of prospective teachers in Kancheepuram District with respect to their Marital Status.
3. There is no significant difference in the Leadership style of prospective teachers in Kancheepuram District with respect to their Residence.
4. There is no significant difference in the Leadership style of prospective teachers in Kancheepuram District with respect to their Locality of Institution.
5. There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Gender.
6. There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Marital Status.
7. There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Residence.
8. There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Locality of Institution.
9. There is no significant influence of Level of Aspiration on leadership style of prospective teachers in Kancheepuram District.

Method of The Study

To inestigate and to determine the status of a present phenomenon the survey method is the best. Survey describes and interprets what exists at present. Therefore the method adopted for the present study isnormative survey method.

Population for The Study

The total population includes the B.Ed., students studying in colleges of Education in Kancheepuram District of Tamil Nadu.

Sample of The Study

The investigator has used **simple random sampling technique** for selecting the sample from the population. The sample consists of 300 student teachers from 9 colleges of Education in Kancheepuram District.

Analysis And Intrepretation Of Data

Difference In The Leadership Style Of Prospective Teachers In Kancheepuram District

Hypothesis 1

There is no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Gender.

Table 1: Difference In The Leadership Style Of Prospective Teachers In Kancheepuram District With Respect To Their Gender

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Male	21	105.71	15.975	0.611	1.96	NS
Female	279	107.88	11.125			

NS - Not - Significant

Interpretation:

From the above table, it is inferred that the calculated t- value (0.611) is less than the table value (1.96) at 5% level of significance. Hence, the Null Hypothesis is accepted, it is concluded that there is no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Gender.

Hypothesis 2

There is no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Marital Status.

Table 2: Difference In The Leadership Style Of Prospective Teachers In Kancheepuram District With Respect To Their Marital Status

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Married	177	107.94	11.113	0.369	1.96	NS
Unmarried	123	107.43	12.097			

NS - Not Significant

Interpretation:

From the above table, it is inferred that the calculated t-value (0.369) is less than the table value (1.96) at 5% level of Significance. Hence, the Null Hypothesis is accepted, it is concluded that there is no significant difference in the Leadership Style of prospective teachers in Kancheepuram district with respect to their Marital Status.

Hypothesis 3

There is no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Residence.

Table 3: Difference In The Leadership Style Of Prospective Teachers In Kancheepuram District With Respect To Their Residence

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Hosteler	9	100.56	23.120	0.956	1.96	NS
Day scholar	291	107.95	10.963			

NS - Not Significant

Interpretation:

From the above table, it is inferred that the calculated t-value (0.956) is less than the table value (1.96) at 5% level of Significance. Hence, the Null Hypothesis is accepted, it is concluded that there is no significant difference in the Leadership Style of prospective teachers in Kancheepuram district with respect to their Residence.

Hypothesis 4

There is no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Locality of the Institution.

Table 4: Difference In The Leadership Style Of Prospective Teachers In Kancheepuram District With Respect To Their Locality Of The Institution

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Rural	144	107.40	12.783	0.478	1.96	NS
Urban	156	108.04	10.226			

NS - Not Significant

Interpretation:

From the above table, it is inferred that the calculated t-value (0.478) is less than the table value (1.96) at 5% level of Significance. Hence, the Null Hypothesis is accepted, it is concluded that there is no significant difference

in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Locality of the Institution.

Hypothesis 5

There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Gender.

Table 5: Difference In The Level Of Aspiration Of Prospective Teachers In Kancheepuram District With Respect To Their Gender

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Male	21	111.62	13.644	2.124	1.96	S
Female	279	118.14	12.547			

S - Significant

Interpretation:

From the above table, it is inferred that the calculated t-value (2.124) is greater than the table value (1.96) at 5% level of Significance. Hence, the Null Hypothesis is rejected, it is concluded that there is a significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Gender. Female mean score is greater than Male mean score in the Level of Aspiration of Prospective teachers with respect to their Gender.

Hypothesis 6

There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram with respect to their Marital Status.

Table 6 : Difference In The Level Of Aspiration Of Prospective Teachers In Kancheepuram District With Respect To Their Marital Status

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Married	177	118.71	12.240	1.653	1.96	NS
Unmarried	123	116.21	13.275			

NS - Not Significant

Interpretation:

From the above table, it is inferred that the calculated t-value (1.653) is less than the table value (1.96) at 5% level of Significance. Hence, the Null Hypothesis is accepted, it is concluded that there is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Marital Status.

Hypothesis 7

There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Residence.

Table 7: Difference In The Level Of Aspiration Of Prospective Teachers In Kancheepuram District With Respect To Their Residence

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Hostler	9	107.22	14.351	2.228	1.96	S
Day scholar	291	118.01	12.547			

S - Significant

Interpretation:

From the above table, it is inferred that the calculated t-value (2.228) is greater than the table value (1.96) at 5% level of Significance. Hence, the Null Hypothesis is rejected, it is concluded that there is a significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Residence. Day scholar students mean score is greater than Hostel students in the Level of Aspiration with respect to their Residence.

Hypothesis 8

There is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Locality of the Institution.

Table 8: Difference In The Level Of Aspiration Of Prospective Teachers In Kancheepuram District With Respect To Their Locality Of The Institution

Category	Number	Mean	Standard Deviation	Calculated 't' Value	Table Value at 5% level	Remark
Rural	144	117.27	12.557	0.540	1.96	NS
Urban	156	118.06	12.882			

NS - Not Significant

Interpretation:

From the above table, it is inferred that the calculated t-value (0.540) is less than the table value (1.96) at 5% level of significance. Hence, the Null Hypothesis is accepted, it is concluded that there is no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Locality of the Institution.

Hypothesis 9

There is no significant relationship between Level of Aspiration and Leadership Style of prospective teachers in Kancheepuram District.

Table 9: Relationship Between Level Of Aspiration And Leadership Style Of Prospective Teachers In Kancheepuram District

Variables	N	df	Calculated r-value	Remarks
Level of Aspiration and Leadership Style	300	298	0.249	Significant

(At 5% level of significance the table value is 0.113)

Interpretation

From the above table it is inferred that there is a significant positive correlation between Level of Aspiration and Leadership Style of prospective teachers in Kancheepuram District.

Findings

1. There exists no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Gender.
2. There exists no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Marital Status.
3. There exists no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Residence
4. There exists no significant difference in the Leadership Style of prospective teachers in Kancheepuram District with respect to their Locality of the Institution.
5. There existsa significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Gender. Female mean score is greater than Male mean score in the Level of Aspiration of Prospective teachers with respect to their Gender.
6. There existsno significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Marital Status.
7. There exists a significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Residence. Day scholar students mean score is greater than Hostel students in the Level of Aspiration with respect to their Residence**.**
8. There exists no significant difference in the Level of Aspiration of prospective teachers in Kancheepuram District with respect to their Locality of the Institution.
9. There exists a significant positive correlation between Level of Aspiration and Leadership Style of prospective teachers in Kancheepuram District.

Interpretations

Prospective Teachers who are Day scholar are having high mean score value than Prospective teachers staying at Hostel in terms of Level of Aspiration. Usually, the prospective teachers who are Day Scholar are having a lot of time to spend outside the classroom. They are having a lot of exposures for their development. So they have ample opportunities to exhibit their talents and abilities, to discuss their views in order to get social recognition and acceptance from their friends. The Female prospective teachers are having more mean score than Male prospective teachers in terms of Level of Aspiration. This is because of the fact that Female prospective teachers are having lot of responsibilities in home as well as in other places than male prospective teachers. There is significant influence of Level of Aspiration on Leadership Style of prospective teachers in Kancheepuram District. Level of Aspiration enables the prospective the teachers to think about their Leadership Style. The prospective teachers who have high Level of Aspiration have high level of Leadership qualities. From the above discussion it is clear that the Level of Aspiration and Leadership Style of prospective teachers in Kancheepuram District are closely interrelated. This may be the reason for the significant influence of Level of Aspiration on Leadership Style of prospective teachers in Kancheepuram District.

Conclusion

The result of the present study reveals that there is significant influence of Level of Aspiration on Leadership Style of prospective teachers in Kancheepuram District. Assisting students to improve their Level of Aspiration is increasingly recognized as an important goal of education. Hence, all the authorities concerned should take positive measures to enhance the Leadership Style of prospective teachers, so that they will become excellent and effective teachers in near future.

References

1. Aggarwal, S., & Jca, O. (2009). Principles, Methods & Techniques Of Teac. Vikas Publishing House.Hons, B. A. UNIT-I.
2. Davies, B., & Brighouse, T. (Eds.). (2008). Passionate leadership in education. Sage.
3. Singh, M. H. Ph. D. COURSE WORK (2010-11) PAPER-II ADVANCED EDUCATIONAL PSYCHOLOGY.
4. Smith, A. Semester-1 Paper No: 101.
5. Hemphill, J. K. (1949). The leader and his group. Educational Research Bulletin, 225-246.

IMPLEMENTATION OF NEURAL NETWORKS FOR REDUCING PRIMARY USER EMULATION ATTACKS IN COGNITIVE RADIO NETWORKS

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ABSTRACT

As wireless communication has an open medium, there are various technologies that have developed for it, and a recurring issue in this field is the question of security. For whatever reason, there are limited frequencies available, and thus frequency allocation has become a major problem in wireless communication. When accessing wireless channels through the CR network, the primary (licensed) user priorities are secondary (unlicensed) users. Thus, if a wicked secondary customer takes advantage of spectrum usage by imitating the spectral characteristics of prime customer, it may get precedence over other secondary users for access to a wireless channel. Primary user emulation is a serious attack in which a wicked customer imitates signal distinctiveness of a legitimate primary customer in order to either avoid other legal secondary customer from using the unused channel or cause intrusion to the legitimate prime customers. To identify the primary user emulation attackers, a number of different approaches have been proposed and tested. While the majority of such methods work when the primary customer's position is permanent, they are ineffective when the primary user is on the move, as evidenced by their reliance on the fixed location assumption. The energy detection approach is used to find open customers on the incidence band to locate them. The characteristics of the customer signal are represented using cyclostationary calculations, which act as a input to classification artificial neural network to generate a categorization decision.

Keywords: *cognitive radio,Cognitive Radio Network, primary user emulation attacks, localization*

Introduction

Because of the scarcity of available spectrum, spectrum allocation has become a limited resource as a consequence of rapid development in the number of wireless appliances being developed. It has been estimated that 70% of all spectrum is never used [6], according to the Federal Communications Commission. The usage of allocated band must therefore be enhanced in order to convene the growing demand for band. Traditional band management strategies allocate band in a static manner, and only licensed users are permitted to utilize the band in question. As a result of current bandallotment policies, spectrum has been eternally assigned to customers (Static Spectrum Allocation). Customers who have been granted access to the system are referred to as licensed (primary) users. Licensed users do not always make use of the radio spectrum for communiqué purposes. At that instance, the band is inactive, allowing for the most efficient use of the available bandwidth. To improve spectrum utilization, the FCC has adopted a new policy that allows unlicensed users to use the approved band lacking interfering with licensed users. Active Spectrum Allocation was the name given to this new approach to spectrum allocation.

The technology of cognitive radio (CR) is a feasible clarification for the current spectrum scarcity problem [1]. Using it, secondary users can detect and adjust their transmission parameters in real time, and they can also access idle frequency channels (spectrum holes) without interfering with primary users [2]Because wireless communication is not intrinsically reliable, a number of cyber attacks that could degrade their performance are exposed to cognitive radio networks[3]. There are several types of attacks, including asynchronous sensing [4], Attacks on primary user emulation (PUE) [5,6], spectrum sensing data falsification (SSDF) attacks [7], & jamming attacks [8,9] are all examples of cybercrime.

Cognitive Radios (CR) are a type of technology that uses the DSA concept. From Software Defined Radio, Joseph Mitola introduced Cognitive Radio at DARPA (SDR). Multiple air interfaces and software-configurable transceiver parameters are supported by SDR. On the software radio platform, cognitive radio is built. Cognitive radios take in information from their surroundings and adapt dynamically to their surroundings. Cognitive radio, unlike static spectrum allocation, can identify vacant

spectrum and reconfigure transceiver parameters.

CRN nodes are equipped with CR functionality, which allows them to communicate with other nodes. The identification of vacant spectrum in cognitive radio networks is accomplished through continuous spectrum sensing, which is shared with other nodes in the network. However, it is not advisable to make assumptions about the primary users. Non-licensed users can, therefore, use licenced spectrum bands in the absence of licensees. Every time a licensed user wants to use the band, the unlicensed users must leave it. As a result, additional spectrum is required for CRN nodes (spectrum handoff). It is now possible to have new security implications from CRN features such as be trained, cooperative band intelligence, &band movement. Because cognitive radio learns from its previous experiences as well as its current environment, it is possible to customize its transmission parameters. A malicious user can send false signals to cognitive radio during spectrum sensing, causing the system to malfunction (internal or external). Due to this, nodes in the CRN may be forced to perform spectrum handoffs, which can cause disruptions to normal communication.

Our research revealed several security issues with cognitive radios. In that cognitive radio networks are wireless in nature, they are vulnerable to the same types of attacks as other wireless networks. It has exclusive characteristics, for example spectrum intelligence& the ability to reconfigure transceiver parameters.CRN is also susceptible to new types of assaults. The following are the security risks associated with the usage of CRN's. Despite the fact that this paper did not cover common wireless network security threats &assault, the topic of cognitive radio security threats and attacks was the only one discussed.

Literature Survey

Attacks on the physical and MAC layers of the CR network are particularly dangerous. One of the most dangerous is the PUE attack, which involves a wicked customer imitating broadcast distinctiveness and behavior of the PU in order to deceive legitimate secondary users. [5,6] This type of attack can cause detrimental intrusion to the PU while simultaneously preventing SU from accessing the vacant band occurrence channel. [10] We have02 types of primary user emulation(PUE)aggressors: those who are self-centered and malicious. The selfish aggressor will likely utilize a vacant recurrence channel without offering it to some other authentic optional clients, to acquire advantage over them. By keeping optional clients from getting to accessible recurrence diverts in intellectual radio organizations, the pernicious aggressor, then again, desires to cause a forswearing of administration in the organization.

There have been a number of different approaches projected to deal with PUE attacks . Examples of energy-based detection approaches include those proposed by the authors of Reference [11[26], which can be used to determine whether a signal was produced by a legal customer or aggressor, as well as to discover the cause of signal. Each secondary user employs a method that compares the control stage of the conventional signal to the power level of a legitimate primary user Referencing [12], the authors planned a faith broad cast structure supportby a Markov arbitrary field in order to sense the PUE aggressor, and this framework was implemented. The energy detection technique is used in each secondary user to determine whether or not the signal is approaching from a genuine customer or not, calculate their belief, and then exchange their beliefs with the beliefs of the other secondary users. A malicious user generates the signal if the average credential values are less than a predefined threshold; or else, it was generated by a legal customer. Energy detection methods, on the other hand, have a high rate of false alarm and are ineffective at distinguishing between noise and signal [13,29].

Differentiating among PU & PUE aggressor signals is not characteristic dependent methods for instance autocorrelation & the coordinated strain [14,15,28]. The cyclostationary characteristic of the source sign, for example, was used by the creator of Reference [16][27] to determine the source of the incoming signal, among other things. This method, on the other hand, is unable to detect malicious users who

are capable of imitating the prime user indicator characteristics. According to the writer of Reference [17], they proposed a technique for detecting radio-frequency fingerprinting. This technique uses some exclusive radiometric element sex torted from the transmitter's analogue signals to identify it. A detection method based on wireless channel characteristics was proposed by the authors of another paper [18]. The narrow minded attacker will probably use an empty repeat channel without offering it to some other real discretionary customers, to procure advantage over them. By holding discretionary customers back from getting to open repeat redirects in scholarly radio associations, the malicious assailant, on the other hand, wants to cause a renouncing of organization in the association. who is attempting to impersonate the victim. Radio fingerprinting approaches, however, require the use of further hardware or software. Moreover, as random noise is introduced by the hardware, these techniques are ineffective to identify the main user signal.

Methodology

The following assumptions serve as a foundation for our proposed approach: (i) When only one user transmits a transmission power significantly higher than channel ambient noise; (ii) the primary user modulation scheme is dissimilar from the remaining customers; (iii) it is also known and differentiated from the other users that the malicious and primary users modulatory scheme is used;

A. Cyclostationary Feature Calculation

A cyclostationary signal has information that change on a regular basis over time. If the mean and autocorrelation of a signal x(t) are periodic, it is defined as wide-sense Cyclostationary:

$A_x(p) = A_x(p + Q_0) \rightarrow (1)$
$S_x(p, \tau) = A_x(t + Q_0, \tau) \rightarrow (2)$

Where Ax(t) is the mean value of the signal x(t), and Qx(t, τ) is the function of the signal x(t).

The intermittent character of this signal allows it to be represented by its spectral correlation function (SCF), which is defined as:

$$A_y^{\propto}(x) = \lim_{T\to\propto} \lim_{t\to\propto} y$$

$$\frac{1}{\blacksquare t} \int_{-\blacksquare\frac{x}{2}}^{\blacksquare\frac{x}{2}} \frac{1}{C} Xt(t, f + \frac{\alpha}{2}) \rightarrow (3)$$

where {α} is the arrangement of Fourier segments, and XT (t, f) is the time differing Fourier change characterized as:

$$X_T(t, f) = \int_{t-T/2}^{t+T/2} x(u) e^{j2fu}\, du \rightarrow (4)$$

A huge benefit of the SCF is its need of affectability to added substance clamor. Since the otherworldly segments of repetitive sound. are uncorrelated, it doesn't add to the subsequent SCF for any worth of $\alpha \neq 0$ particularly when the commotion power surpasses the sign force, which would make the sign imperceptible when utilizing a basic energy indicator. At $\alpha = 0$, where clamor is noticed, the SCF lessens into a PSD [19].

A. Artificial Neural Networks in Signal Detection

The function of neurons in the brain is simulated by neural artificial networks. An artificial neural network contains of a series of interconnected essentials that communicate with each other known as neurons or nodes.Each connection in an artificial neural network has a load or potency value, & the situation of system is determined by the values of these connections [20].

The exclusive characteristics of every signal to be planned& the ambient noise stage to be measured mean that a linear algorithm is difficult to create in real time to classify signals. However, an artificial neural network approach can solve this problem because of the following factors: First of all, a sample signal data can be simply provided and an artificial neural network is instructed to distinguish the uniqueness of the signal[20]. Secondly, the high noise tolerance of artificial neural networks has been demonstrated when the data being classified are not very similar[21]. Third, because the productivity activation available in [22] is so clear, neural networks usually run quickly sufficient for real time application.

Follow the following steps to usage of an ANN to categorize a signal: The signal must first be intercepted clearly. Statistics of signals must then be calculated. This work utilizes the SOF cycle frequency profile defined as:

$Profile(\propto) = \max[C_X^{\propto}(f)] \rightarrow (5)$

Where C∞ is the signal's SOF, as definite by Equation (5). This decreased the SOF data in 2 dimensions to 1 dimension, enabling concurrent processing. This information is then given input to a structure of ANN, each qualified in recognizing a particular signal and then used for taking decisions. Finally, we find the system with the highest output foundation and determine the signal uniqueness.

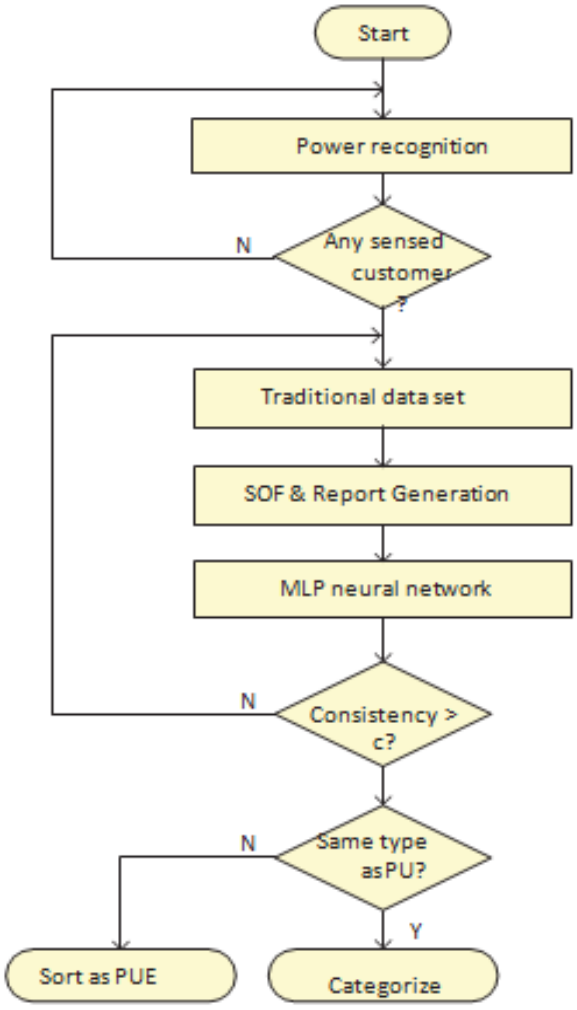


Figure 1. Proposed algorithm for PUE Detection

The consistency constraint can also be worn to find out if the artificial neural network fails or not, similar to the one discussed in [10]. This parameter defines half the difference among the major& second major output activations:

Transmission power	100W
Transmitter antenna gain	6dB
Receiver antenna again	2 dB
Frequency	1200 MHz
Pathlossex ponent	1
SNR	Range[-35,35]

$$\chi = \frac{O\text{Largest} - O\text{2ndLargest}}{2} \rightarrow (6)$$

where Largest is the biggest yield actuation's worth, and O2ndLargest is the second biggest yield initiation's worth. Along these lines, unwavering quality is 1 in the event that one fake neural organization has an initiation of 1, which demonstrates an ideal match and the rest have an enactment of - 1, which doesn't show match. If there were one activation for two artificial neural networks, consistency would be zero.If the consistency is close to zero, the artificial neural network is more likely to classify the signal incorrectly and ignore the classification than to correct it. It is possible to increase the percentage of correct classifications by eliminating suspect classifications from the system.

Experimental Results and Discussion

To assess the routine of the projected method, Matlab was used in a practical cognitive radio network to simulate a PUE attack state. Testing took place on a computer with a 3.40 GHz, 8GB of RAM and Windows 7 32-bit Intel Core(TM) i7-6700 processor. A legal primary user, a PUE aggressor, numerous secondary users and certain secure nodes are all assumed in the simulated scenario. It is assumed that secondary users are aware of the primary user's starting position. Each anchor node collects data about primary user positions and distributes it to secondary users so that the primary user's movement can be tracked. These anchor nodes are placed in specific locations to simulate a real-world network scenario, while secondary users are distributed at random. Table 1 lists the simulation parameters as well as the anchor node positions, PU initial position, and PUE attacker position used in this paper.

In Section II, it was discussed how dissimilar modulation methods result in diverse SOF illustrations, which will then be utilized to determine signal classification based on the SOF diagrams. Our proposed algorithm takes advantage of the SOF's cycle frequency profile to increase effectiveness by sinking the quantity of information that needs to be utilized. As illustrated in Figure. 3, diverse modulation systems have varying cycle occurrence reports, which are definite in

Equation (6).

Using SNR values varying from -8 to 8 decibels, the figure 4 depicts the percentage of correct detection for each channel.It is necessary to change the "Initial Seed" constraint of "Random Number Generator" obstruct for a specific SNR value in order to generate different input data. This allows us to duplicate the test multiple times &average the percentages. SNR standards above a certain threshold are associated with improved algorithm performance when it comes to correctly categorize prime& PUE signals. In addition, this graph shows the proportion of right detections with and without a consistency confirmation. The percentage of correct answers remains high even when the channel has significant noise, such as when SNR = -8 dB.

Fig. 3.The cycle frequency profile of the received signals.

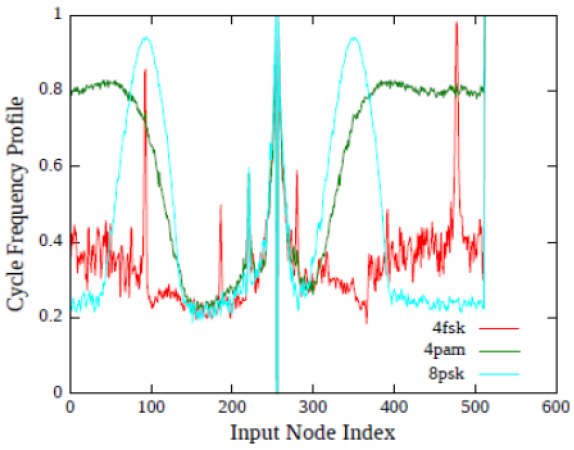
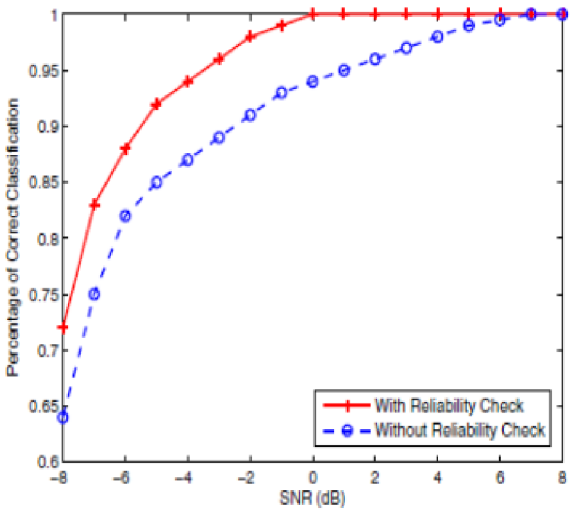


Fig.4: The detection performance with and without are liability check in computer simulations.



With a reliability check, detection can still reach 72 percent. Furthermore, we are able to correctly classify at least 95 percent of the signals when the (SNR) is greater than -4 dB.

Conclusion

Many schemes have been proposed to protect Cognitive Radio networks, but none of them is comprehensive, i.e., appropriate in every PUE attack scenarios. All of the methods use the same stage of recognition, such as physical layer discovery of the assault, & will not take into account the casing where the position of the PU is not stationary and changes rapidly, such as in VANETs. Several cyber-attacks have been launched against cognitive radio networks. The main user emulation attack is the most serious assault which will disrupt the regular operation of such networks. In this work we propose a new approach for the detection of primary user emulation attacks using the Neural Network Mechanism. Secondary users can then decide whether the broadcaster is a legitimate principal user or a hacker. The model was thoroughly tested and appraised after a series of trials

References

1. Kaabouch, N. (Ed.). (2014). Handbook of research on software-defined and cognitive radio technologies for dynamic spectrum management. IGI global.
2. Masonta, M. T., Mzyece, M., & Ntlatlapa, N. (2012). Spectrum decision in cognitive radio networks: A survey. IEEE Communications Surveys &

Tutorials, 15(3), 1088-1107.
3. Manesh, M. R., & Kaabouch, N. (2018). Security threats and countermeasures of MAC layer in cognitive radio networks. Ad Hoc Networks, 70, 85-102.
4. Bhattacharjee, S., Sengupta, S., & Chatterjee, M. (2013). Vulnerabilities in cognitive radio networks: A survey. Computer Communications, 36(13), 1387-1398.
5. Bouabdellah, M., Kaabouch, N., El Bouanani, F., & Ben-Azza, H. (2018). Network layer attacks and countermeasures in cognitive radio networks: A survey. Journal of information security and applications, 38, 40-49.
6. Chaitanya, D. L., & Chari, K. M. (2017). Performance analysis of PUEA and SSDF attacks in cognitive radio networks. In Computer Communication, Networking and Internet Security (pp. 219-225). Springer, Singapore.
7. Sharifi, A. A., & Niya, M. J. M. (2015). Defense against SSDF attack in cognitive radio networks: attack-aware collaborative spectrum sensing approach. IEEE Communications Letters, 20(1), 93-96.
8. Reyes, H. I., & Kaabouch, N. (2013). Jamming and lost link detection in wireless networks with fuzzy logic. International Journal of Scientific & Engineering Research, 4(2), 1-7.
9. Gai, K., Qiu, M., Ming, Z., Zhao, H., & Qiu, L. (2017). Spoofing-jamming attack strategy using optimal power distributions in wireless smart grid networks. IEEE Transactions on Smart Grid, 8(5), 2431-2439.
10. Nguyen-Thanh, N., Ciblat, P., Pham, A. T., & Nguyen, V. T. (2015). Surveillance strategies against primary user emulation attack in cognitive radio networks. IEEE transactions on wireless communications, 14(9), 4981-4993.
11. Jin, F., Varadharajan, V., & Tupakula, U. (2015, November). Improved detection of primary user emulation attacks in cognitive radio networks. In 2015 International Telecommunication Networks and Applications Conference (ITNAC) (pp. 274-279). IEEE.
12. Yuan, Z., Niyato, D., Li, H., Song, J. B., & Han, Z. (2012). Defeating primary user emulation attacks using belief propagation in cognitive radio networks. IEEE Journal on Selected Areas in Communications, 30(10), 1850-1860.
13. Manesh, M.R.; Apu, M.S.; Kaabouch, N.; Hu, W.-C. Performance evaluation of spectrum sensing techniques for cognitive radiosystems. In Proceedings of the 2016 IEEE 7th Annual Ubiquitous Computing, Electronics & Mobil Communication Conference, New York, NY, USA, 20–22 October 2016; pp.1–7.
14. Reyes, H., Subramaniam, S., Kaabouch, N., & Hu, W. C. (2016). A spectrum sensing technique based on autocorrelation and Euclidean distance and its comparison with energy detection for cognitive radio networks. Computers & Electrical Engineering, 52, 319-327.
15. Salahdine, F., El Ghazi, H., Kaabouch, N., & Fihri, W. F. (2015, October). Matched filter detection with dynamic threshold for cognitive radio networks. In 2015 international conference on wireless networks and mobile communications (WINCOM) (pp. 1-6). IEEE.
16. Nguyen, N. T., Zheng, R., & Han, Z. (2011). On identifying primary user emulation attacks in cognitive radio systems using nonparametric bayesian classification. IEEE Transactions on Signal Processing, 60(3), 1432-1445.
17. Rehman, S. U., Sowerby, K. W., & Coghill, C. (2014). Radio-frequency fingerprinting for mitigating primary user emulation attack in low-end cognitive radios. IET Communications, 8(8), 1274-1284.
18. Chin, W. L., Tseng, C. L., Tsai, C. S., Kao, W. C., & Kao, C. W. (2012, May). Channel-based detection of primary user emulation attacks in cognitive radios. In 2012 IEEE 75th Vehicular Technology Conference (VTC Spring) (pp. 1-5). IEEE.
19. Like, E., Chakravarthy, V., Ratazzi, P., & Wu, Z. (2009). Signal classification in fading channels using cyclic spectral analysis. EURASIP Journal on Wireless

Communications and Networking, 2009, 1-14.
20. Gurney, K. (2018). An introduction to neural networks. CRC press.
21. Matsuoka, K. (1992). Noise injection into inputs in back-propagation learning. IEEE Transactions on Systems, Man, and Cybernetics, 22(3), 436-440.
22. Fehske, A., Gaeddert, J., & Reed, J. H. (2005, November). A new approach to signal classification using spectral correlation and neural networks. In First IEEE International Symposium on New Frontiers in Dynamic Spectrum Access Networks, 2005. DySPAN 2005. (pp. 144-150). IEEE.
23. Ganesh, D., Kumar, T. P., & Kumar, M. S. (2020). A Dynamic and adaptive learning mechanism to reduce cross layer attacks in cogntive networks. Materials Today: Proceedings.
24. Balaji, K., Kiran, P. S., & Kumar, M. S. (2021). An energy efficient load balancing on cloud computing using adaptive cat swarm optimization. Materials Today: Proceedings.
25. Sushama, C., Kumar, M. S., & Neelima, P. (2021). Privacy and security issues in the future: A social media. Materials Today: Proceedings.
26. Malchi, S. K., Kallam, S., Al-Turjman, F., & Patan, R. (2021). A trust-based fuzzy neural network for smart data fusion in internet of things. Computers & Electrical Engineering, 89, 106901.
27. Ganesh, D., Kumar, T. P., & Kumar, M. S. (2021). Optimised Levenshtein centroid cross-layer defence for multi-hop cognitive radio networks. IET Communications.
28. Ganesh, D., Kumar, T. P., & Kumar, M. S. (2020). A Dynamic and adaptive learning mechanism to reduce cross layer attacks in cogntive networks. Materials Today: Proceedings.
29. Davanam, G., Kumar, T. P., & Kumar, M. S. Multiple Nash Reputation Cross Layer Classification Framework For Cognitive Networks.

CROPWISE GROWTH RELATIVE OF THE DISTRICTS IN ODISHA DURING POST LIBERALIZATION.

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ABSTRACT

Agriculture in worldwide is given priority by the governments and other bodies in order to accelerate the production and productivity. The reason behind such importance given to agriculture is to increase nutrition as well as maintaining food security as there is an increasing trend in population throughout the world.Further, agriculture can be considered as a key driver for economic development of human being. The study has examined the production of different principal crops in Odisha from the period 1993-94 to 2016-17. To study the relation between the cropwise district relative in respect to state of Odisha as a system, correlation model is used. This study deals with how each principal crops of each district as a component grew relative to that of the Odisha state as a system during this crucial period of high agriculture growth.It is concluded that ten Districts are negatively correlated with growth rate of the state with respect to sugarcane production.All districts are in tune with the growth rate of Odisha with respect to production of rice,All districts are in tune with the growth rate of Odisha with respect to production of rice. All districts did not undergo identical change in crop structure. All districts suffered serious loss of crop diversity.The study has made crop diversification to crop specialization. This study will help to the policymakers to change the mind-set while implementing a new policy or applying any investment strategies in agriculture.

Keywords: *Agricultural Products, Crop Performance, Crop Diversity, Relative Growth*

Introduction

Loss of crop diversity was also evident when we came to find out all the principal crops suffered either absolute or relative loss in respect of aggregate growth of all crops .It would be now worthwhile to probe how each principal crop of every district as a component grew relative to that of the state as system during this crucial period of high agriculture growth .This aim is to highlight the nature of crop wise regional transformation with the initiation of capital intensive reductionist growth paradigm. Crop wise response of the districts to the states growth led to regional concentration of growth through crop specialization thus unleashing a process whereby every districts identified itself with the growth of a particular set of major crops of the state rather than all of them. Higher relative growth of a district with respect to a particular crop might be construed as a greater response to paradigm shift from system growth to component growth and if this process is allowed to persist to the extreme each district will turn out to be a specialist in the production of fewer crops than it still produces as a result of the so called comparative advantage based purely on exchange rather than use value of the crops and will have a deleterious effect on the totality of the agriculture base. Marginal crops and farmers and the associated survival economy will simply disappear. It is indeed, an extreme abstraction and sounds like a doomsday prediction but the process initiated through the new paradigm tends to point towards nothing else.

This aims to highlight the nature of crop wise regional transformation. Crop wise response of the districts to the states growth led to regional concentration of growth through crop specialization. Higher relative growth of a district with respect to a particular crop might be construed as a greater response to paradigm shift from system growth to component growth and if this process is allowed to persist to the extreme each district will turn out to be a specialist in the production of fewer crops

Literature Review

In different regions of Odisha, the production of food grains differ primarily due to its climatic position as well as cultural and social conditions. The coastal regions are generally more developed than the southern and northern regions. The regional inequality and broader

gap between rich and poor are also existed across the social groups to a large extent. The seminal work (1979) of Bhalla and Alagh laid the base of district level analysis on spatio-temporal development of agricultural intensity in India. It revealed enormous disparities in productivity of crops in different districts. The analysis by Bhalla and Singh (2001) is a landmark study in this field which also indicated greater disparity among different crops and districts. Chand et al. (2009) viewed wide inequalities between different districts of agricultural yield. Thorough studies in regional and district levels in Maharashtra (Mohanty, 2009), West Bengal (Khan et al., 2011) and Andhra Pradesh (Dev, 2007; Reddy, 2011) also pointed out severe spatial disparities in development of agriculture Study by Kumar et al. (2012) relating to Haryana in three time phases i.e. up to 1990, 1990-2002 and 2002-09 had shown noticeable district wise inequalities in agricultural development. Yet, the inequalities were expanded till 1990, after that restrained during 1990 to 2002 which was however again worsened during 2002 to 2009. Raman and Kumari (2012) analyzed development of agricultural at different levels in Uttar Pradesh for two period i.e. 1990-91 and 2008-09 and revealed continuous inequalities. On the other hand, disparities were narrowed in 2008-09. The examination by Ajagekar and Masal (2011) on agriculture advancement in Kolhapur district of Maharasthra during 2003-04 revealed obvious inequalities amongst the tehsil levels and greater disparities between the villages at the bottom level. Lately several analysis on agricultural growth in Odisha have published in the journals having national and international repute. A study by Swain (2002) and another by Swain et al. (2009) constituting three standard years i.e. 1980-81, 1990-91 and 1998-99 revealed that regional inequalities have reduced in the post-reform period of 1991-1999 because of performance of backward region development programmes by the state. The outcome of the analysis by Tripathy et al. (2011) during 1980-81 to 1992-93 revealed irregular growth amongst districts with the coastal regions and Sambalpur district situated in western part showing improved growth than other districts. Pattanayak and Nayak (2004) analyzed the area wise inequalities in agricultural growth in various districts and regions of Odisha during 1980 and 2000. Latest studies concerned about agriculture in Odisha under the pre liberalization (1971-90) and post liberalization (1991-2008) years, Reddy (2013) found that noticeable area wise inequalities in agricultural development in Coastal Plain and Centre Table Land Regions exhibiting praiseworthy growth in comparison to Eastern Ghat and Northern-Plateau regions in both the time period. However, the research by Chand et al. (2009) had not shown greater differences in yield level amongst different districts of Odisha.

Statement of the Problems

After reviewing the past literature a wide scope of research opportunities is revealed that limited research has undertaken on crop wise growth relatives in the districts in Odisha during post liberalization. In particular, there is a least research has undertaken in analysing crop diversity and crop suffering in principal crops in Odisha. It would be now worthwhile to probe how each principal crops of each district as a component grew relative to that of the system state as a system during this crucial period of high agriculture growth .This aims to highlight the nature of crop wise regional transformation. and will add some values in the existing literature.

Objectives of the Study:

The proposed study has the following classified objectives:

(1) To understand the crop wise regional transformation in Odisha.

(2) To examine crop wise growth relative of the districts.

Hypotheses of the Study

Keeping in view the objective of the study, the following hypotheses have been developed.

1. H_0 – There is no change in growth of crops in district wise in Odisha in respect to the system as a whole.

Research Methodology and Data

Data and Sample

The study is based on secondary data. Odisha Economic Survey, RBI.NABARD,NSSO and other Government as well as Non-govt publications have been used widely. The Data

pertaining to the period from 1993-94 to 2016-2017for old undivided thirteen districts of Odisha has been utilized and the period from (post liberalization period respectivly. Though 1990-91 is regarded as starting point of liberalization era, the study has proposed to consider 1993-94 as starting point taking consideration of effectiveness of liberalization.

Methodology /Tools Used

This study has used appropriate statistical tools and techniques for analyzing, examining and evaluating the crop wise growth, trends and progress and interpreting the data and result. Bivariate techniques such as correlation for understanding how strong a relation is between crop wise growths of Odisha with respect to crop wise growth of the districts is used .

$$r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}}$$

Analysis of Cropwise Growth Relatives

Loss of crop diversity was also evident when we came to find out that practically all the principal crops suffered either absolute or relative loss with respect to aggregate growth of all crops. It would be now worthwhile to probe how each principal crops of each district as a component grew relative to that of the system state as a system during this crucial period of high agriculture growth .This aims to highlight the nature of crop wise regional transformation. We have a hypothesis that there is no change in growth of crops in the district wise, crop wise response of the districts to the state growth led to regional concentration of growth through crops specialization thus unleashing a process whereby every district identified itself with the growth of a particular set of major crops of the state rather than all of them.

Table 1 details of crop wise relative of different districts in respect to Odisha

Principal Crops	Balasore	Bolangir	Cuttack	Dhenkanal	Ganjam	Kalahandi	Kendujhar	Koraput	Mayurbhanj	Kandhamal	Puri	Sambalpur	Sundargarh
Rice	0.51	0.81	0.52	0.68	0.40	0.77	0.66	0.63	0.57	0.29	0.54	0.72	0.77
Maize	0.27	0.63	0.74	0.74	0.39	0.60	0.39	0.53	0.91	0.06	-0.10	0.32	0.19
Other cereals	0.59	0.70	0.61	0.08	0.43	0.61	0.61	0.66	0.66	-0.26	0.46	0.86	0.60
Total pulses	0.60	0.71	0.84	0.84	0.85	0.64	0.74	0.77	0.76	0.57	0.84	0.70	0.41
Sugar cane	-0.16	0.06	-0.28	-0.34	-0.34	-0.65	-0.06	-0.01	0.20	0.42	-0.13	-0.46	-0.75
Ground nut	0.42	0.70	0.55	-0.18	0.44	0.54	0.35	0.52	0.62	0.44	0.56	0.57	0.33
Other oilseeds	0.46	0.63	0.70	0.66	0.49	0.78	0.59	0.61	0.64	0.61	0.37	0.68	0.28

Source: Authors own computation from Agriculture Statistics, GoO.

The above table shows shows the linear correlational as well as non-linear relationship in different districts in respect to the state of Odisha. Baalasore district is predominantly characterized for cultivation of paddy. The weather of this district is hot and the soil is very fertile situated along side mighty rivers. Its weather is advantageous for production of Pulses, Paddy, oil seeds i.e. mustard, groundnut, etc. There is linear correlational relationship between the growth of crop production of Balasore and Odisha. In case of rice production, there exists moderate positive linear correlation which means it is in line with growth of rice of the state moderately. Maize production exhibits slight positive correlation. There exists moderate positive linear correlation for other cereals and total pulses. There exists slight negative linear correlation in case of sugar cane production. Groundnut and other oilseeds production exhibit low positive correlation. From the above, it is concluded that sugar cane is away from the state growth in Balasore districts. The overall performance of the district is line with the

state. The total pulses are more co-related with the state performance than the cereals.

The hot and sub-humid weather is experienced in Bolangir district. On the basis of the irrigation potential and physiographic, the district is separated into four Agro ecological situation (AESs) and categorized by a hot arid summer and extremely unpredictable rainfall due to circulation of south west monsoons like Plain irrigated land, plain Rainfed land, undulating plain drought Prone and undulating sub mountainous tract Rainfed. Distribution of agricultural products is a major concern of the district. Methodical distribution of Cotton & paddy by RMCs is being planned in every year by the state government. The existing Poultry farm is procuring Maize. Distribution of other products lacks marketing expertise.

There is linear correlational relationship between the growth of crop production of Cuttack and Odisha. In case of rice, other oilseeds, total pulses, groundnut and maize production, there exists moderate positive linear correlation. There exists slight negative linear correlation in case of sugar cane production which indicates the performance of production of sugarcane of Cuttack district is negatively related to the production of sugarcane of the state and seems to be omitted. The pulses are more positive relation than the cereals in Cuttack districts. It shows that the climatic condition of the district is suitable for cereals and oil seeds. Further, the district is going towards to become a specialist in pulse production. Further, oil seeds, maize and groundnut is moderately due to comparative advantages.

The above table also represents linear correlational relationship between the growth of crop production of Dhenkanal and Odisha. In case of rice, maize, total pulses and other oilseeds production, there exists moderate positive linear correlation. Cereals seems to be the mono crop foodgrain due to comparative cost adavantage.The position of sugarcane cultivation has been deterioted in relation to the state .Other Cereals production exhibits slight positive correlation. There exists moderate negative linear correlation in case of sugarcane and Groundnut production. The district experiences a moderate relationship with the state in the areas of Pulses and cereals production. Sugarcane is more negative than the groundnut .The soil of Dhenkanal district is suitable for cultivation of rice and maize .It is also noticed that not a single food grain is fully in line with the state and the district has grown moderately for a particular set of major crops.

There is linear correlational relationship between the growth of crop production of Ganjam and Odisha. In case of total Pulses and Other oilseeds production, there exists moderate positive linear correlation. Maize, rice, other cereals and groundnut production exhibits slight positive correlation. There exists slight negative linear correlation in case of sugar cane production. The production of pulses is more in relation to the production of cereals. Further, the district depends on pisciculture From the above table, it is noticed that Ganjam district is not a specialist in production of any major crop.

In case of rice production, there exists moderate positive linear correlation of Kalahandi and Odisha. Maize production exhibits slight positive correlation. There exists moderate positive linear correlation for other cereals and total pulses. There exists slight negative linear correlation in case of sugar cane production. Ground nut and other oilseeds production exhibit moderate positive correlation.

Table shows linear correlational relationship between the growth of crop production of Kendujhar and Odisha. In case of rice production, other cereals, total pulses and other oil seeds, there exists moderate positive linear correlation and these crops grew more or less in tune with the state growth. Maize and groundnut production exhibits slight positive correlation. There exists slight negative linear correlation in case of sugar cane production, which is veered away from the state growth.The overal performance of this satisfactory due to comparative cost adavantage.

.The Koraputdistrict experienced a better production performance in line with the state. In case of rice, other cereals, total pulses and other oil seeds, there exists moderate positive linear correlation and these crops grew in tune with the state growth. There exists slight negative linear correlation in case of sugar cane production.All the foodcrops except sugarcane

has exhibited a better performance due to climate condition and fertile soil.

In case of rice, other cereals, total pulses and other oil seeds, there exists moderate positive linear correlation and these crops grow more or less in tune with the state growth in Mayurbhanj District. The maize production is highly positive due to suitable land area .To sum up the district produces all types of crops.

In Kandhamal, the pulse and oil seeds production, there exists moderate positive linear correlation with Odisha. There exists moderate positive linear correlation for other oilseeds, sugarcane and groundnuts. There exists slight negative linear correlation in case of other cereals production. Maize production exhibit low positive correlation.

In case of PuriDistrict ,the case of rice, pulse and groundnut production, there exists moderate positive linear correlation. There exists slight positive linear correlation in case of other cereals production. Maize and sugarcane production exhibit low positive correlation and away from the growth line of the state as tourism is given prior importance in this District due to Lord Jagannath Temple and other many places of pilgrimage along with various natural sites.

In case of Jabalpur District ,pulses and oil seeds production, there exists moderate positive linear correlation. There exists moderate positive linear correlation for other cereals, rice and groundnuts. There exists moderate negative linear correlation in case of sugarcane production. From the above, it may be concluded that except the production of sugarcane, all other are in tune with state.

In case of rice and other cereals production, there exists moderate positive linear correlation in Sundargarh District with respect to Odisha. There exists moderate negative linear correlation in case of sugarcane production. From the above, it may be concluded that except the production of sugarcane, all other are in tune with state.

Conclusion

From the above analysis, it is concluded that ten out of thirteen Districts are negatively correlated with growth rate of the state with respect to sugarcane production .All districts are in tune with the growth rate of Odisha with respect to production of rice which is a major food grain production of Odisha. Not a single food grain is negatively growth with the growth rate of Odisha in the case of Mayurbhanj district. Kalahandi is slightly negatively co related with the production of other cereals. The production of maize is only negatively correlated with growth rate of the state in case of Puri District. In the preceding analysis it became evident that all the principal crops underwent either relative as well as absolute decline either in some districts or others apart from an almost general consensus, as it were, in the pervasive decline in the production of pulses. Rice and pulses appeared to have been dichotomous in their growth. In between these two extremes the districts responded differentially to the state in respect of the growth of other crops. A matter of great concern was the decline of water prudent rainfed other cereals and wheatpropelling the process of mono culturization of farming and homogenization of human food habit across the districts. Decline in the production-relative or absolute-reflects contraction of crop diversity evolved over ages in tune with the tenet of bio-diversity served the local specificities obtaining from edaphic and climatic compulsions as also water resource management. Harmful outcome is the result of faulty decision. Water-intensive high-yielding variety of rice greatly displaced water-prudent traditional varieties and rainfed non-rice cereals. In this respect with the exception of kandhamal and, to some extent, Mayurbhanj, some of districts barely kept abreast of isometry or state growth. So far as rice is concerned even relative decline means a substantial absolute increase because of its overwhelming dominance in acreage but the same perception does not appear to hold good for other low acreage crops.

References

1. Dash, A., Dhakre, D. S., & Bhattacharya, D. (2017). Analysis of Growth and Instability in Pulse Production of Odisha during Rabi Season: A Statistical Modelling Approach. Int. J. Curr. Microbiol. App. Sci, 6(8), 107-115.
2. Patel, A. S. (1981). Irrigation: Its Employment Impact in the Command Areas of Medium Irrigation Projects in Gujarat. Indian Journal of Agricultural Economics, 36(902-2018-1817), 20-30.
3. Ashturkar B.W. (1986), "Progress and Prospects of Irrigation Water Management in Maharastra",Indian Journal of Agricultural Economics, Vol. 41(4), pp.523-528.
4. Bhalla, G. S., & Singh, G. (1996). Impact of GATT on Punjab Agriculture (Vol. 2). Institute for Development and Communication.
5. Boyce, J. K. (1987). Agrarian impasse in Bengal: Institutional constraints to technological change.
6. Mishra, P. K. (2017). Socio-economic impacts of climate change in Odisha: issues, challenges and policy options. Journal of Climate Change, 3(1), 93-107.
7. Machaqueiro, R. R. (2020). Environmentality by the United Nations Framework Convention for Climate Change: Neoliberal ethos and the production of environmental subjects in Acre and Mozambique<? AQ1?>. Environment and Planning E: Nature and Space, 3(2), 442-461.
8. Thenkabail, P. S., Dheeravath, V., Biradar, C. M., Gangalakunta, O. R. P., Noojipady, P., Gurappa, C., ... & Li, Y. (2009). Irrigated area maps and statistics of India using remote sensing and national statistics. Remote Sensing, 1(2), 50-67.
9. Nayak, D. K. (2016). Changing Cropping Pattern, Agricultural Diversification and Productivity in Odisha-A District-wise Study. Agricultural economics research review, 29(1), 93-104.
10. Pattanaik, F., & Mohanty, S. (2017). Changes in cropping pattern in Odisha agriculture in neo-liberal period. Journal of Rural Development, 36(1), 121-154.
11. Altenbuchner, C., Vogel, S., & Larcher, M. (2017, September). Effects of organic farming on the empowerment of women: A case study on the perception of female farmers in Odisha, India. In Women's Studies International Forum (Vol. 64, pp. 28-33). Pergamon.
12. Mahapatra, S. K., & Patra, C. (2020). Effect of migration on agricultural growth & development of KBK District of Odisha: A statistical assessment. Journal of Pharmacognosy and Phytochemistry, Sp, 9(2), 162-167.
13. Routray, S. (2017). Everyday State and Politics in India: Government in the Backyard in Kalahandi. Routledge.
14. Mahapatra, S. K., & Patra, C. (2020). Effect of migration on agricultural growth & development of KBK District of Odisha: A statistical assessment. Journal of Pharmacognosy and Phytochemistry, Sp, 9(2), 162-167.

ANANALYSIS OF FACTORS DETERMINING MODERN EDUCATION SYSTEM INSELF FINANCING COLLEGES AT THANJAVUR DISTRIC

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ABSTRACT

Training is entering into the computerized period where having the option to peruse and compose is essentially insufficient. Individuals additionally need data proficiency which is the ability to understand data and information. School and understudies need to figure out how to see the world from alternate points of view through different sorts of assets, while additionally having the option to acknowledge various perspectives. They additionally must probably pick the right answer from the 20,000 outcomes offered by Google. The substance of school instruction could be viewed as a little box, wherein we are attempting to fit however much data as could reasonably be expected. Along these lines, in many nations, the profundity of instruction is falling, while its 'width' is developing. Thus, younger students may successfully duplicate information or data, yet they are not ready to think as specialists, investigate procedures and realities, or do tests. In all nations, family riches are a decent indicator of a tyke's instruction level. Simultaneously, kids are immensely extraordinary as far as the nature of their training, contingent upon where they go to class. At most schools today, educational plans is structured some place from outside and instructors should then train this to kids. Nonetheless, this model isn't sufficient. In contemporary society, instructors ought not exclusively be free, yet should likewise gain from their best companions. By 2035, instruction will be 'freed' on a worldwide scale. At the end of the day, nations ought to abrogate the foundational supervision of educators' work. Simultaneously, the requirement for appraisals of the nature of educators' work, and above all, their abilities, is still there. Likewise, educators ought to be definitely keen on self-improvement and proceeding with instruction, since the advancement of long-separation training can guarantee better outcomes in a base measure of time.In general, specialists don't endorse a similar drug for all patients. So also, educators ought to customize their instructive methodology relying upon every tyke's needs. For this reason, courses ought to be structured in an unexpected way, while instructors themselves shouldn't be required to pursue brought together benchmarks and actualize obviously institutionalized methodologies. A venture approach as opposed to a subject-centered methodology ought to be sought after more regularly in the learning procedure. With this foundation the specialist has taken this theme to break down the variables deciding the present training arrangement of self-account schools in Thanjavur District.

Introduction

Training in each sense is one of the central variables of advancement. No nation can accomplish supportable monetary improvement without generous interest in human capital. Instruction gives one the best chances of getting to be effective in the cutting edge society. Regarding learning, characteristics, abilities, frames of mind, and limits, training empowers people to end up cognizant subjects of their development and dynamic capable members in a deliberate procedure of structure another world request. Instruction enhances individuals' comprehension of themselves and of the world. It improves the nature of their lives and prompts wide social advantages to people and society. Instruction raises individuals' efficiency and inventiveness and advances business and mechanical advances. Moreover, it assumes a significant job in verifying monetary and social advancement and improving pay dissemination. Instruction reinforces majority rule government by granting to the natives the apparatuses expected to completely take an interest in the Government. Training additionally acts an integrative power in the public eye, bestowing values that cultivates social position and national character. Perceiving the significance of instruction, the State Government has put a remarkable spotlight on development of training, altogether improving the nature of training granted and guaranteeing that instructive open doors are accessible to all fragments of the general public. Tamil Nadu has performed well in front of other major Sates as to rudimentary training. The Composite Education Development Index for evaluating the status of basic instruction registered by the National University of Educational Planning and Administration (NEUPA) and the Government of India (Ministry of Human Resource and Development, Department of School Education and Literacy) set the State in the main position. The Report on Annual Status on Higher Education 2011-12 brought out by Ministry of

Human Resource Development and Department of Higher Education positioned Tamil Nadu as first in gross enrolment proportion of advanced education.

Perceiving the essentialness of instruction in the improvement procedure and the monetary basic of "value training for all" during the twelfth Plan time frame (2012-2017), the Government of Tamil Nadu had reserved a sizeable measure of Rs.19,608crore for instruction out of the total expense of Rs.2,11,250 crore. It works out to 9.28 percent of the complete Plan expense. A bigger cut of the expense, 34 percent is assigned to auxiliary and professional training, trailed by 28 percent to essential instruction and 19 percent to advanced education. The objectives of the twelfth Plan are widespread access, general enrolment, all-inclusive maintenance, all-inclusive accomplishment and value.

Objectives

To analyse the various factors determining the present education system in Self Finance Colleges in Thanjavur District**.**

Hypothesis framed

Ho: There is no significant difference between the socio economic variables and the opinion of the respondents about the factors determining the present education system

Analysis of Variance

$H_{02\ (i)}$: There is no significant difference between gender and the opinion of the respondents about the factors determining the present education system

Factors of Present Education system		Sum of squares	df	F	Sig.
Teaching Methods	Between Groups	.629	2	.827	.364
	Within Groups	389.212	472		
	Total	389.883	474		
Smart Class Room	Between Groups	.068	2	.200	.655
	Within Groups	145.964	472		
	Total	146.023	474		
Selection Methods	Between Groups	.175	2	.397	.529
	Within Groups	250.924	472		
	Total	251.078	474		
E - Library	Between Groups	1.195	2	1.748	.187
	Within Groups	351.482	472		
	Total	352.648	474		
E Learning	Between Groups	.889	2	1.529	.017*
	Within Groups	297.765	472		
	Total	298.648	474		
Infrastructure	Between Groups	.068	2	.200	.655
	Within Groups	145.964	472		
	Total	146.023	474		
Job Oriented Learning	Between Groups	.175	2	.397	.029*
	Within Groups	250.924	472		
	Total	251.078	474		

*Significant at 5 per cent level **Significant at 1 per cent level

The ANOVA of factors determining the present education system and the age of respondents have been presented in the table. The results indicate that the factors namely E learning and job oriented learning is significant at 5 per cent and also indicate other variables are insignificant. The significance represents that the variables are lesser than 5 per cent and hence the null hypothesis is rejected for these variables. The variables for which the significance level is higher than 5 per cent the null hypothesis will be accepted.

$H_{02\ (ii)}$: There is no significant difference between age and the opinion of the respondents about the factors determining the present education system

Factors of work life balance	Sum of squares	Df	F	Sig.

Teaching Methods	Between Groups	.629	2	.888	.347
	Within Groups	389.212	472		
	Total	389.883	474		
Smart Class Room	Between Groups	.068	2	3.567	.059
	Within Groups	145.964	472		
	Total	146.023	474		
Selection Methods	Between Groups	.175	2	3.339	.068
	Within Groups	250.924	472		
	Total	251.078	474		
E – Library	Between Groups	1.195	2	13.125	.000**
	Within Groups	351.482	472		
	Total	352.648	474		
E Learning	Between Groups	.889	2	10.402	.001**
	Within Groups	297.765	472		
	Total	298.648	474		
Infrastructure	Between Groups	.068	2	.254	.583
	Within Groups	145.964	472		
	Total	146.023	474		
Job Oriented Learning	Between Groups	.175	2	12.357	.001**
	Within Groups	250.924	472		
	Total	251.078	474		

*Significant at 5 per cent level **Significant at 1 per cent level

The above table infers the ANOVA of factors determining the present education system and gender classification of respondents. It can be referred from the table that certain variables namely E Library, E Learning and job oriented learning significance level is less than 1 per cent can be treated significant and hence the null hypothesis can be rejected. The other variables whose significance level is higher than 1 per cent can be treated insignificant and the null hypothesis is accepted.

Marital status wise factors determining the present education system of respondents – Analysis of Variance

$H_{02\ (iii)}$: There is no significant difference between area of domicile and the opinion of the respondents about the factors determining the present education system

Factors of work life balance		**Sum of squares**	**df**	**F**	**Sig.**
Teaching Methods	Between Groups	.629	2	.509	.770
	Within Groups	389.212	472		
	Total	389.883	474		
Smart Class Room	Between Groups	.068	2	1.929	.088
	Within Groups	145.964	472		
	Total	146.023	474		
Selection Methods	Between Groups	.175	2	2.127	.061
	Within Groups	250.924	472		
	Total	251.078	474		
E – Library	Between Groups	1.195	2	3.056	.010**
	Within Groups	351.482	472		
	Total	352.648	474		
E Learning	Between Groups	.889	2	2.226	.051*
	Within Groups	297.765	472		
	Total	298.648	474		
Infrastructure	Between Groups	.068	2	12.258	.582
	Within Groups	145.964	472		
	Total	146.023	474		
Job Oriented Learning	Between Groups	.175	2	12.220	.258
	Within Groups	250.924	472		
	Total	251.078	474		

*Significant at 5 per cent level **Significant at 1 per cent level

The ANOVA of factors determining the present education system and the marital statuses of respondents have been presented in the table. The results indicate that certain variables namely E library and E learning are significant at 5 per cent and 1 per cent respectively and also indicate some variables are insignificant. The significance represents that the variables are lesser than 5 per cent and 1 per cent level and hence the null hypothesis is rejected for these variables. The variables for which the significance level is higher than 5 and 1 per cent the null hypothesis will be accepted.

$H_{02\ (iv)}$: There is no significant difference between gender and the opinion of the respondents about the factors determining the present education system

Factors of work life balance		Sum ofsquares	df	F	Sig.
Teaching Methods	Between Groups	.629	2	.852	.258
	Within Groups	389.212	472		
	Total	389.883	474		
Smart Class Room	Between Groups	.068	2	.486	.022*
	Within Groups	145.964	472		
	Total	146.023	474		
Selection Methods	Between Groups	.175	2	3.921	.012*
	Within Groups	250.924	472		
	Total	251.078	474		
E – Library	Between Groups	1.195	2	1.229	.570
	Within Groups	351.482	472		
	Total	352.648	474		
E Learning	Between Groups	.889	2	3.258	.009**
	Within Groups	297.765	472		
	Total	298.648	474		
Infrastructure	Between Groups	.068	2	2.369	.852
	Within Groups	145.964	472		
	Total	146.023	474		
Job Oriented Learning	Between Groups	.175	2	.369	.362
	Within Groups	250.924	472		
	Total	251.078	474		

*Significant at 5 per cent level **Significant at 1 per cent level

The above table infers the ANOVA of factors determining the present education system and educational qualification of respondents. It can be referred from the table that certain variables namely smart class room, selection methods and E learning whose significance level is less than 5 per cent and 1 per cent can be treated significant and hence the null hypothesis can be rejected. The other variables whose significance level is higher than 5 per cent and 1 per cent can be treated insignificant and the null hypothesis is accepted.

Multiple Regression Analysis

Satisfaction of the Respondents with Selected Factors of Modern Education System

H_{01}: All are dissatisfied with the present education system

Variable	Coefficient	Std. Error	t-Statistic	Prob.
F1	-1.198	8.216	-0.628	0.538
F2	1.258	6.325	-1.255	0.554
F3	2.365	3.654	-3.254	0.125
F4	1.368	6.254	-0.254	0.325
F5	1.215	3.398	3.584	0.241
F6	-5.099	1.002	-3.368	0.009
C	-5.188	1.900	-3.832	0.033
R-Squared	0.435		**Durbin-Watson stat**	1.932
Adjusted R-squared	0.665			
F-statistic	9.892		**Prob. (F-statistic)**	0.001

Source: Calculated and Compiled from Venture Intelligence

The above table above shows the regression analysis between the level of satisfaction and the modern education system. The analysis placed satisfaction as dependent variable and

modern education system as independent variable. The analysis shows (R^2 = 0.435), which states that the modern education system contributed significantly for the changes in satisfaction. It can be inferred from the table that Adjusted R-square value is 0.665. This indicates that 66 percent of the variations in the satisfaction are explained by the modern education system. The F-statistic is significant at all levels indicating that the hypothesized relationship between the level of satisfaction and the modern education system. The value of Durbin-Watson statistic is 1.932 indicating that the model is not suffering from auto correlation problem. The calculated F value is more than the table value and hence, the null hypothesis is rejected and there is a significant effect by the modern education system factors on satisfaction.

Conclusion

In view of the discoveries of the past, contemporary examinations and down to earth rules found in the writing, it very well may be inferred that Bandura's social learning hypothesis discovers its real application in instructive terms. The character of educators and social learning forms that are to a great extent spoken to in instructing have a significant academic and mental ramifications in the whole field of instructive exercises. Suitable instructive projects can fill in as significant variables of character improvement of educators and empower the execution of proper techniques with the point of enacting and animating the working of different systems of social discovering that keeps on adding to the psychosocial advancement of understudies in the ideal bearing. The intensity of social learning must not be thought little of in the showing procedure, basically in light of the fact that that way various wanted, and undesired conduct in adolescence could be received. Therefore, it is fundamental that instructors and teachers are always mindful of their significant position and job in the general improvement of the school and pre-school kid, and of consistently close to home and expert endeavors to empower the reception of master social practices in youthful age.

Reference

1. Witmer, D. F., Colman, R. W., & Katzman, S.L. (1999). From paper-and-pencil to screen-and-keyboard (pp. 145-162). Thousand Oaks, CA: Sage.
2. Honey, M., Culp, K. M., & Spielvogel, R. (2005). Critical issue: Using technology to improve student achievement. Tersedia: http://www. ncrel. org/sdrs/areas/issues/ methods/technlgy/te800. html [3 Juli 2010].
3. Dehmle, K. M. (2009). Adolescent Technology Usage. Sleep, Attention and Academics.
4. Simuforosa, M. (2013). The impact of modern technology on the educational attainment of adolescents. International Journal of Education & Research, 1(9), 1-8.
5. Koivusilta, L. K., Lintonen, T. P., & Rimpelä, A. H. (2007). Orientations in adolescent use of information and communication technology: a digital divide by sociodemographic background, educational career, and health. Scandinavian journal of public health, 35(1), 95-103.
6. Leedy, P. D., & Ormrod, J. E. (2005). Practical Research Planning and Design new Jersey: Pearson Merrill Prentice Hall.
7. Subrahmanyam, K., Kraut, R. E., Greenfield, P. M., & Gross, E. F. (2000). The impact of home computer use on children's activities and development. The future of children, 123-144.
8. Simuforosa, M. (2013). The impact of modern technology on the educational attainment of adolescents. International Journal of Education & Research, 1(9), 1-8.
9. Watt, H. J. (2010). How does the use of modern communication technology influence language and literacy development? A review. Contemporary Issues in Communication Science and Disorders, 37(Fall), 141-148.
10. Simuforosa, M. (2013). The impact of modern technology on the educational attainment of adolescents. International Journal of Education & Research, 1(9), 1-8.

A THEORETICAL STUDY OF ELECTRICAL RESISTIVITY OF POLYPYRROLE/PVC POLYMER BLENDED FILMS AT HIGH PRESSURE

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ABSTRACT

The electrical resistivity of polymer semiconducting materials shows variation with temperature and pressure. In this paper, the pressure dependency of the electrical resistivity of poly pyrrole/PVC thin films has been studied theoretically. A formula $R= A (P/P_c)^{\alpha} exp (\beta P/P_c)$ has proposed for the theoretical analysis of the pressure effects on the electrical resistivity of polypyrrole/PVC blend thin films. The constants A, αand β are adjustable constant and P_c is arbitrary pressure. In this study, the pressure range has divided in three sub-ranges (I) 0 to 2 GPa (II) 2GPa to 4.5GPa and (III) 4.5GPa to 14GPa,The calculated values of resistivity found close agreement with experimental values in pressure sub ranges (I) and (III). At low pressure sub range (I), the variation in resistivity is described by $(P/P_c)^{\alpha}$. The assumption that electrical resistivity varies as $exp (\beta P/P_c)$ holds well in high pressure sub-range (III). The value of β has found close to 0.3 in different set of calculations.

Keywords: -*Electro-active polymer, resistivity, High pressure, conducting polymer, resistivity, volume effect*

Introduction

Electro-active polymers such as polypyrrole, polyvinyl and polythiophens are well known for their high electrical conductivity [1, 3] and good environmental stability. In recent years numbers of experimental studies have been carried out to the study of the variation of electrical properties of electro-active polymers with temperature and pressure [4, 8]. It has been found that the structural and electro-optical properties vary with high pressure [9, 10]. Recently, the pressure dependencies of electrical properties of polymer materials have been studied theoretical for polystyrene thin film and polyethylene polymer[11, 12]. The effects of pressure on electrical properties for organic and inorganic materials have been also studied earlier [13, 15].

In the present paper, the theoretical analysis has done for electrical resistivity of polypyrrole / PVC blends thin films at high pressure. A simple formula has derived for studying pressure dependence of electrical resistivity of polypyrrole / PVC blends thin films. The theoretical data has compared with experimental studies which havereported by K. M. Kesharwani [13]. Polypyr role is an organic polymer which is insulator in normal condition but blending with Polyvinyl chloride (PVC) shows its resistivity decreases as a function of pressure.

Theory

The molecular separation decrease with applying an external pressure P on some material, On the basis of this pressure effects following two assumptions have used for driven the relation between electrical resistivity and pressure.

I. The electronics shells of the neighbour molecules overlap due to pressure, in this condition a force of repulsion becomes important. This repulsive interaction tends to decrease the electrical resistivity R with increase in pressure. It means R is proportional to Pressure P^{α}, where α is a constant.

II. At very high pressures, the pathways of the electrons [10] come too close to each other due to which mean free time between charge carrier collisions decreases with increase in P. This extra resistance may be taken to be proportional to $exp (\beta_0 P)$. Here β_0 is a constant.

The combined effect of above two processes may be written as

$$R= A_0 P^{\alpha} exp (\beta_0 P) \quad \text{---------- (1)}$$

The above two effects oppose each other. One can, therefore, expect that at some critical pressure P_c the resistivity to be minimum. By using critical pressure $P_c$equation (1) has modified as where A_0 and β_0 replaced by another constants

$$R= A (P/P_c)^{\alpha} exp (\beta P/P_c) \quad \text{---------- (2)}$$

Where $A_0 = A/ (P_c)^{\alpha}$ and $\beta_0= \beta/P_C$

Calculations

The electrical resistivity of Polypyrrole/PVC thin films at high pressure has been reported experimentally [13]. The theoretical calculations of resistivity have calculated by using equation (2). The parameter A, α and β have been calculated by using equation (2) with simple algebraic mathematical operations. The value of these parameters have been fixed in a manner, so as to obtained best fit with experimental values, for which the Δx has been calculated minimum

$$\Delta x = \sum_{i=1}^{n} [R_e(P_i) - R_t(P_i)]^2$$

Where

$R_e(P_i)$ ➤ Experimental resistivity as a function of pressure

$R_t(P_i)$ ➤ Theoretical resistivity as a function of pressure

The theoretical calculations compared with experimental data in figure (1) for constant temperature 300K and in figure (2) for constant temperature 330K. The value of parameters A, α and β used for these calculations are given in table (1) and table (2).

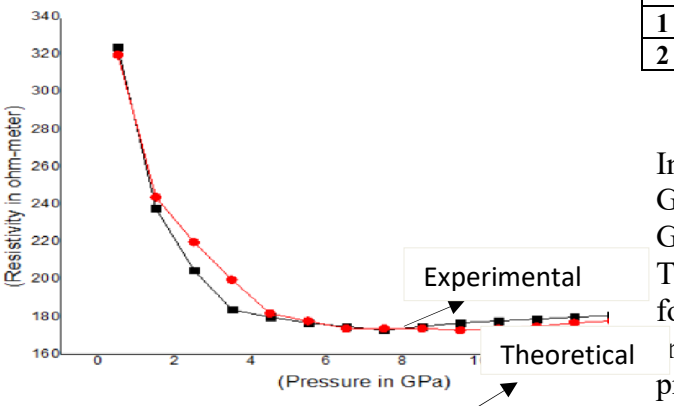

Figure (1); -Resistivity (ohm-meter)Vs Pressure (GPa) for polypyrrole / PVC film at 300K Temperature

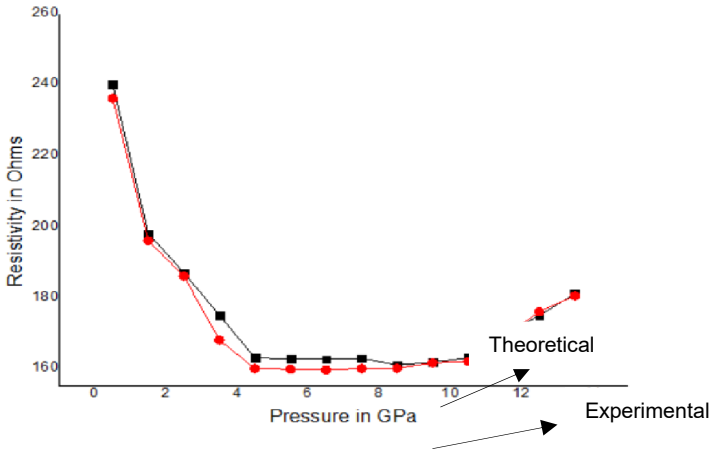

Figure (2); - Resistivity (ohms-meter) Vs Pressure (GPa) for polypyrrole / PVC film at 330K Temperature

Table 1:- Calculated Values of Parameter A, α and β

Figure No.	Temperature	A	α	β	α/ β
1	**300K**	**115**	**-0.509**	**0.309**	**1.65**
2	**330K**	**106**	**-0.417**	**0.299**	**1.40**

Table 2:- Calculated values of Δx in three pressure sub ranges

Figure No	Temperature	Δx in sub-range I (0 to 2GPa)	Δx in sub-range II (2 to 4.5GPa)	Δx in sub-range III (4.5 to 14GPa)
1	**300K**	**2.5×10^2**	**8.5×10^2**	**0.7×10^2**
2	**330K**	**1.3×10^2**	**5.4×10^2**	**1.2×10^2**

Observation

In the presented study pressure range 0 to 14 GPa has divided in three sub ranges (I) 0 to 2 GPa, (II) 2 to 4.5 GPa and (III) 4.5 to 14 GPa. Table 1 is showing the calculated parameters for the theoretical calculation of resistivity. n figure (1), the calculated results are presented for A=115.0 Ohms, α = -0.509 and β = 0.309 at constant temperature 300K. It has been found that that calculation shows fairly good agreement with experimental results in pressure sub ranges (I) and (III). However, agreement is not up to the mark in the criticalpressure sub range (II). In table 2, $\Delta x = 8.5\times10^2$ is highest square of difference in pressure sub-ranges (II) which is showing disagreement of the theory in this pressure sub range.

In figure (2), the calculated results are compared with experimental data for the parameter A = 106 Ohms, α = -0.417 and β = 0.299 at constant temperature 325K. Here, the agreement in theory and experiment is excellent in pressure sub-ranges (I) and (III) but there is a marked discrepancy in pressure sub-range (II) with highest value of square of difference $\Delta x = 5.4\times10^{2}$. The value of β is almost similar 0.3 for both system 300K and 330K which is also found similar to β=0.3 in the study of polystyrene thin films [11].

Conclusions

From the present calculations, it is clear that different types of mechanism for current transport are working in the three pressure sub-ranges. The results are not surprising. In layered semiconductors [15], various types of transport mechanisms have been observed in different temperature range. From the present work, the following conclusions are drawn –

(1) The parameter α is negative and β is always positive in various mode of calculations.

(2) The value of parameter β is almost constant quite close to 1/3. As it is evident from figure (1) and figure (2), the assumption that electrical resistivity varies as exp ($\beta P/P_c$) holds well in pressure sub-range (III).

(3) At low pressure, the variation in resistivity is described by $(P/P_c)^{\alpha}$. However, in pressure sub-range (II), theory does not take stock well of the situation.

Acknowledgement

The authors are thankful to Dr K. M. Kesharwani (retired) and Prof. Ranveer Kumar Head of Department of Physics Dr Harisingh Gour Central University Sagar M.P. India for co-operation during the present investigations

References

1. He, G., Liu, Y., Gray, D. E., & Othon, J. (2021). Conductive polymer composites cathodes for rechargeable aqueous Zn-ion batteries: A mini-review. Composites Communications, 100882.
2. Prunet, G., Pawula, F., Fleury, G., Cloutet, E., Robinson, A. J., Hadziioannou, G., & Pakdel, A. (2021). A Review on Conductive Polymers and Their Hybrids for Flexible and Wearable Thermoelectric Applications. Materials Today Physics, 100402.
3. Aziz, S. B., Woo, T. J., Kadir, M. F. Z., & Ahmed, H. M. (2018). A conceptual review on polymer electrolytes and ion transport models. Journal of Science: Advanced Materials and Devices, 3(1), 1-17.
4. Gong, L., Chen, G., Lv, J., Lu, M., Zhang, J., Wu, X., & Wang, J. (2021). Phase transition-enabled MnFe2O4 nanoparticles modulated by high-pressure with enhanced electrical transport properties. Applied Surface Science, 565, 150532.
5. Yaseen, M., Ambreen, H., Mehmood, R., Iqbal, M., Iqbal, J., Alshahrani, T., ... & Laref, A. (2021). Investigation of optical and thermoelectric properties of PbTiO3 under pressure. Physica B: Condensed Matter, 615, 412857.
6. Wang, Y., Wu, T., Xu, L., Liu, G., Zhou, Y., He, Z., ... & Liu, L. (2019). Pressure induced semiconductor-metal transition in polycrystalline β-Ag0. 33V2O5. Materials Letters, 236, 271-275.
7. Yang, L. T., Ding, L. P., Shao, P., Tiandong, Y. H., Zhao, Z. L., Zhang, F. H., & Lu, C. (2021). Influence of pressure on phase transition, electronic and thermoelectric properties of SnSe. Journal of Alloys and Compounds, 853, 157362.
8. Saeed, M., Ali, M. A., Murad, S., Ullah, R., Alshahrani, T., Laref, A., & Murtaza, G. (2021). Pressure induced structural, electronic, optical and thermal properties of CsYbBr3, a theoretical investigation. journal of materials research and technology, 10, 687-696.
9. Huang, D., Xie, D., Gao, J., Lv, W., & Hong, S. (2013). Pressure dependence of the electrical resistivity in polymer polyaniline. Advances in Materials Science and Engineering, 2013.
10. Patel, A. S., & Kesharwani, K. M. (2008). A theoretical study of band-gap and

electrical resistivity of FeS2 (pyrite) at high pressure. High Pressure Research, 28(1), 69-73.

11. Rajendra Kumar Dixit, Sandhya Patel, "The theoretical study of electrical conductivity of polystyrene polymer films under high pressure" , Asian J.Exp. Sci. Vol. 35, NO. 2, 2021; 33-35
12. R. K. Dixit, Sandhya Patel, Shadab Anwar, "Study of current density of electro-active low density polyethylene polymer", International journal of multidisciplinary educational research, Vol. 10, 6(7), 2021
13. K. M. Kesharwani "effect of pressure on electrical resistivity of polypyrrole / PVC blended film" Proceedings of Indian Science Congress (Lucknow), Part iv, no.1 (2002).
14. R.K. Dixit, K.M. Kesharwani "A study on effects of polarising fields on electrical conductivity of polystyrene thin films" Proceeding of Indian Science Congress Banglore, Jan. 3-7, 2003., 185.
15. Sangawar, V., & Adgaonkar, C. S. (1996). Effect of pressure on dc electrical conductivity of polystyrene thin film thermo-electrets. Indian journal of pure & applied physics, 34(2), 101-105.

DESIDOC JOURNAL OF LIBRARY AND INFORMATION TECHNOLOGY (DJLIT): A SCIENTOMETRICS ANALYSIS.

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ABSTRACT

The DESIDOC Journal of Library and Information Technology (DJLIT), formerly known as the DESIDOC Bulletin of Information Technology, is a bimonthly peer-reviewed, open-access journal. This paper provides a Scientometrics Study of the journal in order to analyse the growth rate of research output presented in it. The articles, the authorship trend, the geographic distribution of production, the topics addressed, and the number of citations an review of the sources attached to the articles and their development over the time spans (2015-2020).

Keywords: *Scientometrics study, DESIDOC, Journal of Library & Information Technology, DJLIT, and Citation Analysis.*

Introduction

Journals are effective resources of communication for researchers. They put the most up-to-date information to the attention of researchers. In India, several journals in science and technology, as well as social sciences, are published. The DESIDOC Journal of Library & Information Technology (DJLIT), formerly known as the DESIDOC Bulletin of Library and Information Technology Journal, has been published since 1981 and is a significant journal in the field of library and information science (LIS). It is a bimonthly, open access, peer-reviewed publication that brings new advances in information technology (IT) to the attention of readers in the field of library and information science. It is targeted at librarians, documentation and information specialists, scholars, teachers, and those who are interested in the subject. The journal publishes original research and evaluation papers on the application of information technology to library operations, facilities, and products. Scopus, LISA, LISTA, EBSCO Abstracts/Full-text, Library Literature and Information Science Database/Full-text, The Informed Librarian Online, DOAJ, Open J-Gate, Indian Science Abstracts, Indian Citation Index, The Informed Librarian Online, DOAJ, Open J-Gate, Indian Science Abstracts, Indian Citation Index, Indian Science Abstracts, Indian Citation Index, Indian Science Abstracts, Indian Citation Index, Indian Science Abstracts, Users may also log in and post documents, as well as view the status of their articles at any time. The journal utilizes an online peer review mechanism, and the full text of all issues, dating back to the first issue in 1981, can be found on the website listed.

Objectives

The study's goals are as follows:

1. To determine the number of contributions and the growth rate of papers written in the journal from 2015 to 2020.
2. To know the author productivity;
3. To find out year wise productivity;
4. To identify and rank the prolific author having largest number of publications

Methodology

Data and Methodology.

The core journal is open access and can be found at publications.drdo.gov.in/ojs/index.php/djlit on the DRDO website. The study's data was downloaded for 5 years, from volume 35 (2015) to volume 40 (2016), from the above-mentioned website (2020). The information includes the year of publication and volume number, the author's name, affiliations, and geographical area, the total number of contributors, and number of references cited by the article. The information was saved on MS Excel sheets. To achieve the above goals, data was analysed. The data processing was done using the complete count procedure.

The study is limited to the productivity patterns of DESIDOC Journal of Library and Information Technology. The study is also confined to the productivity patterns of authors, who published their publications in

the DJLIT which is the DRDO publication located in Delhi.

Scientometric analysis of 5 volumes (from Volume No. 35 to 40) from the year 2015 to 2020 of Journal of Library & Information Technology (DJLIT) covering 5 issues containing 285 contributions was achieved. All the bibliographic specifics were noted and recorded in tabular form for the determination of in-depth analysis. Based on the analysis of the recorded data, findings have been presented.

Table 1:- Growth Ratio of Literature in DESIDOC –JLIT Vs. Year

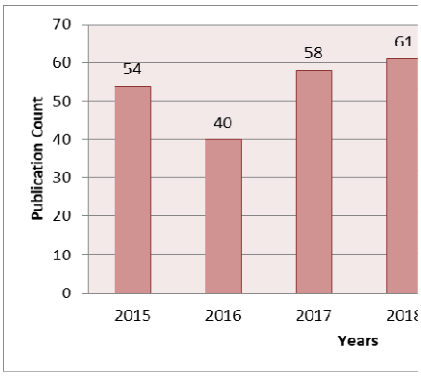

Fig1:- Growth Ratio of Literature in DESIDOC –JLIT Vs. Year

Table 1 presents the data on the number of papers published during 2015-2020. It indicates that 285 articles were published in 6 issues during 2015-2020. The 61 highest publications in the year 2018 remaining all year is 2015 is 54, 2016 is 40, 2017 is 58, 2019 is 56 and least 2020 is 16 because we took half year.

Table 2:- Distribution of citations (Volume No)

	Distribution of contributions (Volume no)						
Count of Issue	35	36	37	38	39	40	Grand Total
1	9	7	9	11	7	8	51
2	8	7		11	12	8	46
3	11		11	11	8		41
4	10		9	10	9		38
5	8	9	20	10	8		55
6	8	8	18	8	12		54
Grand Total	54	31	67	61	56	16	285

This table shows the grand total 285 volumes. thehighest volume is 67 in the year 2017, distribution of contribution by volume wise we find 6 count of issue the volume between 35 to 40. The 1st 35 vol (2015) has 6 issue total number is 54, 36 vol (2016) has 4 issues total number 31, 37 vol (2017) has 5 issues total number is 67, 38 vol (2018) has 6 issues total number is 61, 39 vol (2019) has 6 issues total number is 56, and final 40 vol (2020) has 2 issue as per our study we took 6 months total number is 16.

Table 3:- Year-wise distribution of articles

Sl. o.	Years	No. of Records	%	Cumulative	Cum%
1	2015	54	18.95	54	18.9
2	2016	40	14.04	94	33.0
3	2017	58	20.35	152	53.3
4	2018	61	21.40	213	74.7
5	2019	56	19.65	269	94.4
6	2020	16	5.61	285	100
	Grand Total	285	100		

There are 285 articles which were published during the period of 2015-2020 in selected reputed DESIDOC-JLIT. The output of DESIDOC -JLIT in this field varied from 54 papers in the year 2015 to 409 papers in the year 2016. The highest percentage is 2018(21.40) 2015-2020 the overall distribution 2015(18.95), 2016(40.40), 2017(20.35), 2018(21.40), 2019(19.65) and 2020(5.61). the last 2020 year is least because of we took 6 months (January-June) we took half year. we observed that table 4 defined 2018 highest publication campare to the other publications. There exists highest growth in the years 2017, 2018 and 2019. The growth pattern was found to be fluctuating between 5.43% to 6.77 during the period 2015-2019. However, 2% to 5% of publications increase every year can be seen from 2017 onwards. A graph showing quantum of literature published in DESIDOC-JLIT during the study period is shown in figure table 4.

Table 4:- Top 10 Author Publication

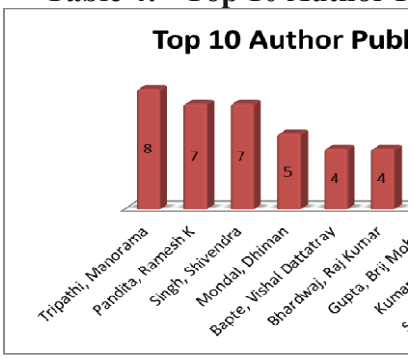

Fig2:-Top 10 Author Publication

This table represents the top 10 authors and their publication count in the articles which were published during the period of 2015-2020 in selected reputed DESIDOC-JLIT, In this articles the first top author with highest publication count is Tripthi, Manorama with 8 publications, then next authors with second highest publication is Pandita, Ramesh K and Singh, Shivendra published 7 publications respectively, then the third highest publication was 5 publications by MondalDhiman, then the further highest publication is by the Bapte, Vishal Dattatray, Bhardwaj, Rajkumar, Gupta, Briji Mohan, Kumar, Shailendra and Sonlar, Shard kumar published 4 Publications respectively. The last and lowest published count is by Ansari, MohdShoaib is 3 publications.

Table 5:-Year wise Author partnership

Year	1 Author	2 Author	3 Author	<3 Author	Total Author year
2015	17	25	10	2	54
2016	15	19	4	2	40
2017	12	34	8	4	58
2018	15	28	13	5	61
2019	17	26	10	3	56
2020	5	7	2	2	16
GrandTotal	81	139	47	18	285

This table represents The total number of two authors published the articles in this publication is of 139 authors. The total number of three authors published the articles in this publication is of 47 authors and the total number of more than three authors were published the article in this publication is of 18 authors. In this 5 years the highest authors published the papers was in 2018 by 61 authors. And the lowest count of authors was in the current year 2020 with 16 authors. The table represents the grand total of authors published the papers or articles from 2015-2020 is with 285 authors.

Last 5 years we found in this research single authors are very less compare to the double authors. The single authors has to concentrate more on the publication.

Table 6:-Author partnership with DC &Collaborative Index (CI)

Sl. No.	Year	Single Authors	Two Authors	Three Authors	More Than Three Authors	DC	CI
1	2015	17	25	10	2	0.21	1.94
2	2016	15	19	4	2	0.30	1.83
3	2017	12	34	8	4	0.54	2.07
4	2018	15	28	13	5	0.46	2.13
5	2019	17	26	10	3	0.74	1.98
6	2020	5	7	2	2	0.42	2.06
	Grand Total	81	139	47	18		

This table represents the authors count in the publications which were published during the period of 2015-2020 in selected reputed DESIDOC-JLIT, In this publication the authors published the articles and the total number of single authors in the period of 2015-20 is of 81single authors. The total number of two authors published the articles in this publication is of 139 authors. The total number of three authors published the articles in this publication is of 47 authors and the total number of more than three authors were published the article in this publication is of 18 authors. In these 5 years the highest authors published the papers was in 2018 by 61 authors. And the lowest count of authors was in the current year 2020 with 16 authors. The table represents the grand total of authors

published the papers or articles from 2015-2020 is with 285 authors. The growth ratio how increasing single and double author we observed in this research, the range between DC is 0.21 and 0.42, CI range between 1.94 and 2.06.

Table 7:-Year-wise authorship pattern of contribution

Sl. No.	Year	Single Authors	Two Authors	Three Authors	More Than Three Authors	DC	CI	CC
1	2015	17	25	10	2	0.21	1.94	0.38
2	2016	15	19	4	2	0.30	1.83	0.34
3	2017	12	34	8	4	0.54	2.07	0.44
4	2018	15	28	13	5	0.46	2.13	0.43
5	2019	17	26	10	3	0.74	1.98	0.39
6	2020	5	7	2	2	0.42	2.06	0.40
	Grand Total	81	139	47	18			

This Table indicates that the Degree of Collaboration (DC) ranges between 0.21 and 0.42. This indicates that collaborative research is prevalent in DESIDOC. While the Collaborative Index (CI) ranges between 1.94 and 2.06. This indicates that there is at least average of 3 authors per joint article. Further, the Collaborative Coefficient (CC) range between 0.38 and 0.40. It is observed that the collaborative coefficient it is stable all years, where it showed a slight decreasing trend.

Table 8:- Top 10 Prominent authors &Institute publication count

Rank	Author	Institution	Country	Pub Count
1	Tripathi, Manorama	Jawaharlal Nehru University, Delhi,	India	8
2	Pandita, Ramesh K	BGSB University, Rajouri	India	7
3	Singh, Shivendra	All India Institute of Medical Sciences, Patna	India	7
4	Mondal, Dhiman	Ananda Mohan College Kolkata	India	5
5	Bapte, Vishal Dattatray	Knowledge Resource Centre, SantGadge Baba Amravati University, Amravati	India	4
6	Bhardwaj, Raj Kumar	St Stephen's College University of Delhi,	India	4
7	Gupta, Brij Mohan	CSIR- NISTADS, Delhi	India	4
8	Kumar, Shailendra	Department of Library and Information Science, University of Delhi	India	4
9	Sonkar, Sharad Kumar	BabasahebBhimraoAmbedkar University Lucknow	India	4
10	Ansari, MohdShoaib	Govt. Kaktiya PG College, Jagdalpur	India	3

This table represents the rank of the authors, author name, country and publication count. The authors which were published in India during the period of 2015-2020 in selected reputed DESIDOC-JLIT, we are selected top 10 author and their institution publication per year. This table represents that the rank-1 author was Tripathi, Manorama who published 8 publications by Jawaharlal Nehru university, Delhi also observed that the Jawaharlal Nehru is highest . And in the second place the authors was published 7 papers by Pandita, Ramesh K and Singh by BGSB University, Rajouri, Shivendra published by All India Institute of Medical Sciences, Patna respectively. Then the Mondal, Dhiman published 5 publications by Ananda Mohan College Kolkata. Then futher the authors like Bapte, Vishal Dattatrayby Knowledge Resource Centre, SantGadge Baba Amravati University, Amravati , Bhardwaj, Raj Kumar by St Stephen's College University of Delhi,, Gupta, Briji Mohan CSIR- NISTADS, Delhi, Kumar, Shailendra Department of Library and Information Science, University of Delhi, Sonkar, and Sharad kumar Babasaheb Bhimrao Ambedkar University Lucknow, these authors published

4 publications respectively and finally the lowest published author was Ansari, Mohd Shoiab by Govt. Kaktiya PG College, Jagdalpur published 3 publications.

Table 9:-Major Research

Keyword	Count of Keywords
Bibliometrics	28
India	26
Scientometrics	24
Citation analysis	12
E-resources	11
Academic libraries	10
Higher education	10
Authorship pattern	8
Information retrieval	8
Nigeria	8

The keywords used in the articles which were published during the period of 2015-2020 in selected reputed DESIDOC-JLIT, publications per year in the articles the first highly used keyword is Bibliometrics is 1st position28 number, in this research 26 repeated keyword followed by India, then the keyword scientometrics is 24 times, then citation analysis is 12times, further e-resources for 11 times respectively, then the academic libraries and higher education keywords are of 10times respectively, the lowest used keywords are Authorship pattern, information retrieval and Nigeria for 8 times respectively these are not least but author pattern.

Table 10:- country wise publication

Country	Country wise top Pub
India	204
Nigeria	19
Iran	18
Indonesia	8
United States	6
Saudi Arabia	5
Fiji	4
Russia	3
South Africa	5
Brazil	2

This table represents the country wise publications. The articles which were published country wise during the period of 2015-2020 in selected reputed DESIDOC-JLIT, The highest count of articles published in India about 204 publications, the second publication was by Nigeria country is of 19 publications, then Iran published 18 publications, then further publication published by Indonesia is 8, United-states 6, Soudi Arabia 5, Fiji 4, Russia 3, South Asia 3 publications respectively and the least or lowest publications was published was published by Brazil is 2.

Table 11:- Country with Time Cited

Country	Times cited
India	137
Iran	9
Nigeria	9
Saudi Arabia	3
Colombo	2
Malaysia	2
South Africa	2
U.S.A	2
Russia	2
South Africa	1

This table represents the country wise citations in the articles which were published during the period of 2015-2020 in selected reputed DESIDOC-JLIT. In this above table the country and its number of items cited count is represented. In this the highest time cited country is India is of 137 times cited, then the second highest time cited countries are Iran and Nigeria is of 9 times cited respectively, then the Saudi Arabia is cited for 3 times, then the cited countries like Malaysia, South Africa, USA and Russia are cited 2 times respectively and the lowest cited country is south Africa for 1 time cited.

Table 12:- Top 10 Articles and Time Cited

Rank	Title	Authors	PubYear	Times cited
1	Bibliometrics of Library and Information Science research in India during 2004-2015	Garg, K.C.; Sharma, Chetan	2017	8
2	MOOCs: Changing Trend Towards Open Distance Learning with Special Reference to India	Nisha, Faizul; Senthil, V.	2015	7
3	Software Selection and Deployment for Library Cooperation and Resource Sharing Among Academic Libraries in South-West Nigeria , ,	Iroaganachi A., Mercy; James, Juliana Iwu; Esse, UgwunwaChinyere	2015	7

4	Bibliometrics to Altmetrics: Changing Trends in Assessing Research Impact	Dhiman, Anil Kum Ar	2015	6
5	Webometric analysis of Library Websites of Higher Educational Institutes (HEIs) of India: A study	Chakravarty, Rupak; Wasan, Shalini	2015	5
6	Use of Social Media in Marketing of Library and Information Services in Bagladesh	Islam, Md. Maidul; Habiba, Umme	2015	5
7	Social Networking Tools in Library Service Delivery: The Case of Academic Libraries in South-East Zone of Nigeria	U. Omeluzor, Saturday; Oyovwe-Tinuoye, Gloria O.; Abayomi, Imam	2016	4
8	An Overview of Mobile Reading Habits	Shimray, Somipan R; Keerti, Chennupati; Ramaiah, Chennupati K	2015	4
9	Implementation of RFID Technology at Defence Science Library, DESIDOC: A Case Study	Nisha, Faizul	2018	3
10	Massive Open Online Courses: Hype and Hope	Gul, Sumeer; Mahajan, Iram; Shafiq, Huma; Shafi, Muzamil; Shah, Tariq Ahmad	2018	3

This table represents the authors count in the publications which were published during the period of 2015-2020 in selected reputed DESIDOC-JLIT, According to rank wise 2015-2020 2017 is got highest 8 citation that is a finding in this research that means that article is very good, which we collected 2015-2020 articles the rank 1 Garg, K.C.; Sharma, Chetan which contain the title which is highest citation 2017 compare to the all 5 years this followed 8 remaining all followed by 7, 6, 5, 4, and 3.

Table 13:- Open Access Count

Access	Count of Access
All OA; Gold	154
All OA; Green, Accepted & Submitted	72
Closed	59
Grand Total	**285**

This table represents, Whatever we collect 285 articles on that 154 articles 54.03% table 16 it interpret that the overall collection 285 articles which is contained OA; Gold like that the OA Green, Accepted and Submitted and closed access then in that the Gold Access content 154 Article 54.03%, 25.27% and 20.70% that mean whatever we collected 285 in that over all 154+72 Open Access we found that 52(20.70%) Articles closed Access we identified not able to access.

Table 14:- Country wise top 10 research area

Country	Count Of Pub	Bibliometrics	Scientometrics	Citation analysis	E-resources	Academic libraries	Higher education	Authorship pattern	Information retrieval	Research productivity	University libraries
India	206	19	16	9	10	8	8	7	4	5	6
Nigeria	19	1	0	1	0	1	0	0	2	1	1
Iran	18	1	3	0	0	0	1	1	2	0	0
Indonesia	8	1	1	1	0	1	0	0	0	0	0
United States	6	1	2	0	1	0	0	0	0	0	0

Saudi Arabia	5	0	0	0	0	0	0	0	0	1
Fiji	4	1	0	0	0	0	1	0	0	1	0
Russia	3	0	0	0	0	0	0	0	0	0	0
South Africa	5	1	0	0	0	0	0	0	0	0	0
Brazil	2	0	0	0	0	0	0	0	0	0	0

This table represents the authors count in the publications which were published during the period of 2015-2020 in selected reputed DESIDOC-JLIT, The India over all publication is 206 based on that top keyword used. This study Bibliometrics19 times used, scientometrics 16 times. The next Nigeria is highest used keyword is information retrieval compare to the others Iran Scientometrics , United states which is highest, they are over all concentrating more.

Lotka'sLaw final Table with interpretation

Table-18 Author productivity based on Lotka's Law

Lotka's Law describes the authors' frequency of publication in a given field of study. The law states that "... the number of authors making n contributions is about 1/n2 of those making one; and the proportion of all contributors, that make a single contribution, is about 60 percent" (Osareh and Mostafavi, 2011).Similarly, the Table 5.17, presented that around 82.51% of scientists have authored single article, whereas only 17.49% of scientists have authored multiple articles.

Table 15:- Calculation of exponent n

X	Y	X= log x	Y= log y	XY	XX
1	382	0.00	5.95	0.00	0.00
2	61	0.69	4.11	2.85	0.48
3	11	1.10	2.40	2.63	1.21
4	5	1.39	1.61	2.23	1.92
5	1	1.61	0.00	0.00	2.59
6	0	1.79	0.00	0.00	3.21
7	2	1.95	0.69	1.35	3.79
8	1	2.08	0.00	0.00	4.32
	463	10.6046	14.7568	9.0638	17.5205

The exponent 'n' was calculated using formula:

n=N∑XY-∑X∑YN∑X2-(∑X)2

n = 3.03101

Further, the 'c' value was calculated using formula:

c=11p-11xn+ 1n-1pn-1+12pn+n24p-1n+1

∑1xn=1p-11xn+ 1n-1pn-1+12pn+n24p-1n+1

C = 0.836928

15:- Kolmogorov-Smirnov (K-S) test

The Kolmogorov-Smirnov (K-S) test is implemented to analyse the conformity of the observed author distribution versus Lotka's distribution. The K-S test, which is another measure of the goodness of fit of a theoretical distribution, has several advantages over the Chi-Square test for it is more powerful test and is easier to use since it does not require that data be grouped in any way (Levin,1984). Table5.18 presents the acquired data that are tested against the Lotka's Law with the exponent n being 3.03101:

Table 16:- Kolmogorov-Smirnov test, n = 3.03101

no. of pubs	no. of auth	% of Auth	Cum % of Auth	Expected % of Auth	Cum expected % of Auth	D
X	Yx	fo(Yx)= Yx/ΣYx	Σfo(Yx)	fe(Yx)=c(1/x to power n)	Σfe(Yx)	Σfo(Yx) - Σfe(Yx)
1	382	0.00702	0.00702	0.836927	0.650494	-0.64347
2	61	0.00112	0.00815	0.102391	0.752885	-0.74474
3	11	0.00020	0.00835	0.029959	0.782844	-0.77450
4	5	0.00009	0.00844	0.012527	0.795371	-0.78693
5	1	0.00002	0.00846	0.006369	0.80174	-0.79328
6	0	0.00000	0.00846	0.003665	0.805406	-0.79695
7	2	0.00004	0.00850	0.002297	0.807703	-0.79921
8	1	0.00002	0.00851	0.001533	0.809235	-0.80072
	463					

Finally, when the Kolmogorov-Smirnov (K-S) goodness-of-fit test was applied to determine whether the data fits the model, the maximum deviation, i.e. D is found to be: Dmax = Σfo(Yx) - Σfe(Yx). Since the K-S Dmax of -0.64347 has been found lesser than the level of significance, p=0.01 of 0.0757, as (Table5.18), the data conforms to Lotka's distribution. Thus, following parameters are obtained on applying Lotka's law:

(a) **Dmax=Σfo(Y_x) - Σfe(Y_x)** = -0.64347

(b) **Critical Value** at the 0.01 level of significance

K-S Statistics = 1.63/√n = 1.63/√463 =1.63/21.517=0.0757

Since, D <0.0757, consequently, data conforms to Lotka's law.

Findings

- Research found that 61 highest publications in the year 2018
- There exists highest growth in the years 2017, 2018 and 2019. The growth pattern was found to be fluctuating between 5.43% to 6.77 during the period 2015-2019. However, 2% to 5% of publications increase every year can be seen from 2017 onwards
- Tripthi, Manorama with 8 publications, then next authors with second highest publication is Pandita, Ramesh K and Singh, Shivendra published 7 publications respectively
- In this 5 years the highest authors published the papers was in 2018 by 61 authors. And the lowest count of authors was in the current year 2020 with 16 authors.
- The growth ratio how increasing single and double author we observed in this research, the range between DC is 0.21 and 0.42, CI range between 1.94 and 2.06.
- Degree of Collaboration (DC) ranges between 0.21 and 0.42. This indicates that collaborative research is prevalent in DESIDOC. While the Collaborative Index (CI) ranges between 1.94 and 2.06. This indicates that there is at least average of 3 authors per joint article. Further, the Collaborative Coefficient (CC) range between 0.38 and 0.40. It is observed that the collaborative coefficient it is stable all years, where it showed a slight decreasing trend.

  rank-1 author was Tripathi, Manorama who published 8 publications by Jawaharlal Nehru university, Delhi also observed that the Jawaharlal Nehru is highest . And in the second place the authors was published 7 papers by Pandita, Ramesh K and Singh by BGSB University
- first highly used keyword is Bibliometrics is 1st position 28 number, in this research 26 repeated keyword followed by India, then the keyword scientometrics is 24 times, then citation analysis is 12 times
- The highest count of articles published in India about 204 publications, the second publication was by Nigeria country is of 19 publications, then Iran published 18 publications
- In this the highest time cited country is India is of 137 times cited, then the second highest time cited countries are Iran and Nigeria is of 9 times cited respectively
- Gold Access content 154 Article 54.03%, 25.27% and 20.70% that mean what ever we collected 285 in that over all 154+72 Open Access we found that 52(20.70%) Articles closed Access we identified not able to access.
- This study Bibliometrics 19 times used, scientometrics 16 times. The next Nigeria is highest used keyword is information retrieval compare to the others Iran Scientometrics

Conclusions

A Scientometric analysis of 5 volumes (from Volume No. 35 to Volume No. 40) of the Journal of Library & Information Technology (DJLIT) from 2015 to 2020 was completed, covering 5 issues with 285 contributions. For the purpose of determining in-depth analysis, all bibliographic specifics were documented and recorded in tabular form. From 2015 to 2018, the rate of increase in citations has slowed. In terms of authorship patterns, solo authorship has overtaken the other collaborative forms. Nonetheless, the contributions of corporate authors are notable.The sorted list provides an overview of the discipline's most important journals. The current research is significant since it concerns

one of India's most prestigious library and information science magazines. The citation analysis of such a publication was quite useful, however the results may not be completely generalizable to the entire profession. More extensive investigations, including those from India's leading library and information science journals, are needed to supplement this research. Nonetheless, the findings are critical in understanding DJLIT's citation behaviour, which may be valuable for future research in this area.

References

1. Ralph, R., Lew, J., Zeng, T., Francis, M., Xue, B., Roux, M., ... & Kelvin, A. A. (2020). 2019-nCoV (Wuhan virus), a novel Coronavirus: human-to-human transmission, travel-related cases, and vaccine readiness. The Journal of Infection in Developing Countries, 14(01), 3-17.
2. Karampelias, V., Karonis, D., & Psaroudi, V. (2020). The psycho-emotional impact of COVID-19 on surgical staff working in emergency departments. European Journal of Trauma and Emergency Surgery, 46(4), 747-749.
3. Pouris, A., & Pouris, A. (2011). Scientometrics of a pandemic: HIV/AIDS research in South Africa and the World. Scientometrics, 86(2), 541-552.
4. Fricke, R., Uibel, S., Klingelhoefer, D., & Groneberg, D. A. (2013). Influenza: a scientometric and density-equalizing analysis. BMC infectious diseases, 13(1), 1-7.
5. Scutaru, C., Quarcoo, D., Sakr, M., Shami, A., Al-Mutawakel, K., Vitzthum, K., ... & Groneberg-Kloft, B. (2010). Density-equalizing mapping and scientometric benchmarking of European allergy research. Journal of Occupational Medicine and Toxicology, 5(1), 1-8.
6. Luchs, A. (2012). Profile of Brazilian scientific production on A/H1N1 pandemic influenza. Ciencia & saude coletiva, 17, 1629-1634.
7. Yao, Q., Chen, K., Yao, L., Lyu, P. H., Yang, T. A., Luo, F., ... & Liu, Z. Y. (2014). Scientometric trends and knowledge maps of global health systems research. Health research policy and systems, 12(1), 1-20.
8. Saadik, B. M. (2018). A scientometric appraisal of global research output on Swine Flu with special reference to India during 1993-2017. International Journal of Information Dissemination and Technology, 8(3), 125.
9. Bhattacharya, S., & Singh, S. (2020). Visible insights of the invisible pandemic: A scientometric, altmetric and topic trend analysis. arXiv preprint arXiv:2004.10878.
10. Haghani, M., Bliemer, M. C., Goerlandt, F., & Li, J. (2020). The scientific literature on Coronaviruses, COVID-19 and its associated safety-related research dimensions: A scientometric analysis and scoping review. Safety science, 129, 104806.
11. Zhang, L., Zhao, W., Sun, B., Huang, Y., & Glänzel, W. (2020). How scientific research reacts to international public health emergencies: a global analysis of response patterns. Scientometrics, 124, 747-773.

SERVICE QUALITY GAP ANALYSIS: EVIDENT FROM SUPERMARKETS IN PUDUCHERRY.

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ABSTRACT

Service quality and customer satisfaction are very important factors that the Supermarkets must understand in order to remain competitive in business and hence grow. It is very important for them to know how to measure these constructs from the consumers' perspective in order to better understand their needs and hence satisfy them. Service quality is considered very important because it leads to higher customer satisfaction, profitability, reduced cost, customer loyalty and retention. The present study evaluates the customer perceptions and the GAP in service quality with respect to the supermarket. Through GAP Analysis, Dimensions Attributes are rated by customers in which Reliability, Assurance, Empathy shows less Gap among them. Most of the respondents rated Service Quality, Price, Product Availability, Vehicle Parking, and Employee Response are the most influencing factors in the Service quality.

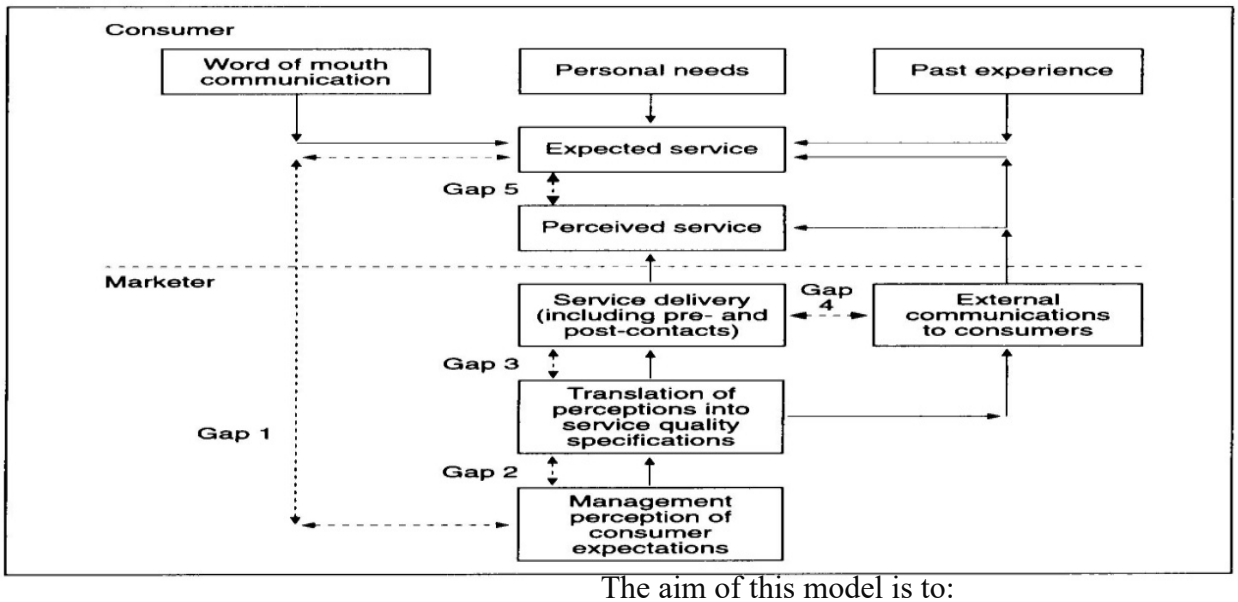
Keywords: *Tangibility, Reliability,Responsiveness, Assurance, Empathy.*

Introduction

Service quality is a concept that has aroused considerable interest and debate in the research literature because of the difficulties in both defining it and measuring it. Nowadays, with the increased competition, service quality has become a popular area of academic investigation and has been recognized as a key factor in keeping competitive advantage and sustaining satisfying relationships with customers (Zeithmal et al...2000). Service quality can be defined as the difference between customer's expectations for service performance prior to the service encounter and their perceptions of the service received. (Asubonteng et al., 1996). If expectations are greater than performance, then perceived quality is less than satisfactory and hence customer dissatisfaction occurs (Parasuraman et al., 1985; Lewis and Mitchell, 1990). Today's consumer has become increasingly demanding. They not only want high quality products but they also expect high quality customer service. From a consumer's point of view, customer service is considered very much part of the product.

The five dimensions of service quality measured by the SERVQUAL Instrument are:Tangibility, Reliability, Responsiveness, Assurance and Empathy.

Service GAP Model



The aim of this model is to:

- Identify the gaps between customer expectation and the actual services provided at different stages of service delivery
- Close the gap and improve the customer service

This model developed by Parasuraman, Zeithaml and Berry in 1985 identifies five different gaps:

Statement of The Problem

Service Quality is one of the important factors where most of the supermarkets failed to provide the promised service for the customers. The customer perceived differently from what the actual service is delivered by the supermarket, the Customer satisfies partially based on the service delivered in every aspect that can retain them to add value to the service they deliver.

In this Study the **Service Quality Dimension tools** [Tangibility, Reliability, Responsiveness, Assurance, Empathy] are used to find out where the GAP is been formed in this respective supermarket. So that the Management can get attention towards that area and can solve the issue effectively and before it makes a leak towards the flow of Business and affects the Shopping Experience of the Customers.

Objectives of the Study

- To determine the most Influencing factors that affects the service quality of supermarkets.
- To determine the impact of various service quality dimension son customer satisfaction in the Supermarkets.
- To identify the GAP between perceived and received service quality from the customer's perspective.

Research Design

The research design followed for this research study is descriptive research design where we find a solution to an existing problem. The problem of this study isto find how satisfied are the customers based on the service quality dimensions provided by the supermarket and to find the service quality GAP between the Service provider and the customers.

Population and Sample

The population for this study is comprised of all the people who are entering into this supermarket. For this purpose, convenience sampling method is used. To gather the primary information, a structured questionnaire was framed and conducted with 300 respondents.

Description of the Sample

1. **Sampling Frame**
   All the Customers who are entering into the Supermarket for the Purchase.
2. **Sample Size**
   The size of the Sample for this research is 300.
3. **Sampling Method**
   For this study, non-probability sampling is used. The Foot falling of the customers entering into the supermarket is high. Therefore, Convenience sampling method is used to cut sort from the total Population.
4. **Instrumentation**
   The instrument used for this research is questionnaire. The questionnaire included 9 questions that included demographic questions as well as questions regarding Customer satisfaction with Dimensions of service quality. The questionnaire will focus more on the qualitative aspect of the respondents than the quantitative aspects because of the nature of the research. Questionnaire will consist of various types of question such as ranking scale questions, single response questions, multiple response questions, LIKERT scale and others.
5. **Validity and Reliability**
   For validity, questionnaires were reviewed with the experts. Past questionnaires were also referred from reports carried out on similar topics. The questionnaire will ensure that it meets the research objective. A small pretesting was conducted with few samples in order to find any ambiguities and difficulties in answering the questions. For reliability, the researcher has administered the question personally to each respondent so that there is no inconsistency in answering the question. The results and findings of the research has also been compared with results of similar research. If degree of variance is excessively large, the research will be investigated for reliability. Internal consistency reliability will also be tested using LIKERT scale.

Analysis and Interpretation
Correlation Analysis

1. **Correlation between perceived Service Quality Dimensions of Customer Satisfaction and Tangibility Factors.**

Variables Chosen:

1. Dimensions of Service Quality of Customer Satisfaction
2. Store Ambience
3. Baskets& Trolleys
4. Vehicle Parking

Hypothesis 1:

H0 –There is no statistically significant relationship between Service Quality Dimensions of Customer satisfaction and Tangibility Factors.

H1 –There is a statistically significant relationship between Service Quality Dimensions of Customer satisfaction and Tangibility Factors.

Table1: Correlation between Perceived Service Quality Dimensions of customer satisfaction and Tangibility Factors.

		Dimensions of Service Quality of Customer Satisfaction	Store Ambience	Basket Trolley	Vehicle Parking
Dimensions of Service Quality of Customer Satisfaction	Pearson Correlation	1	.889	.301	.590
	Sig.(2-tailed)		.008	.030	.040
	N	300	300	300	300
	Pearson Correlation	.889	1	.082	.039
Store Ambience	Sig.(2-tailed)	.008		.156	.506
	N	300	300	300	300
	Pearson Correlation	.301	.082	1	-.043
Basket Trolley	Sig.(2-tailed)	.030	.156		.458
	N	300	300	300	300
	Pearson Correlation	.590	.039	-.043	1
Vehicle Parking	Sig.(2-tailed)	.040	.506	.458	
	N	300	300	300	300

**. Correlation is significant at the 0.05 level (2-tailed).

Interpretation

From the above table, the Pearson Correlation values **r** is found to be *0.889, 0.301 and 0.590,* which signifies that there is a strong(0.889), weak(0.301) and moderate(0.590) relation between perceived Service Quality dimension of customer satisfaction and chosen Tangibility variables (*Store Ambience, Basket & Trolley, Vehicle Parking*). The**p-**values (*0.008, 0.030, 0.040*) obtained from the table were found to be lower than the significant level 0.05, which indicates that there is a statistically significant correlations between the chosen variables.

2. **Correlation between perceived Service Quality Dimensions of customer satisfaction and Reliability Factors**.

Variables Chosen:

1. Service quality dimensions of customer satisfaction
2. Product Pricing/offers & Discounts
3. Bill Clarity
4. Product Variety

Table2: Correlation between Perceived Service Quality dimensions of customer satisfaction and Reliability factors.

		DSQ of Customer Satisfaction	Product Price/ Offers & Discounts	Bill Clarity	Product Variety
DSQ of Customer Satisfaction	Pearson Correlation	1	.883	.522	.773
	Sig.(2-tailed)		-.016	-.037	.033
	N	300	300	300	300
Product Price / Offers &Discounts	Pearson Correlation	.883	1	.110	.023
	Sig.(2-tailed)	-.016		.057	.688
	N	300	300	300	300
Bill Clarity	Pearson Correlation	.522	.110	1	.141*
	Sig.(2-tailed)	-.037	.057		.014
	N	300	300	300	300
Product Variety	Pearson Correlation	.773	.023	.141*	1
	Sig.(2-tailed)	.033	.688	.014	
	N	300	300	300	300

*.Correlation is significant at the 0.05level(2-tailed).

Interpretation:

From the above table, the Pearson Correlation values **r** is found to be *0.883, 0.773* and *0.522* which signifies that there is a strong(0.883 & 0.773) and moderate(0.522) relation between perceived Service Quality dimensions of customer satisfaction and chosen Reliability variables (*Product price /offers, Bill Clarity, Product Variety*). The**p-**values (*0.016, 0.037, 0.033*) obtained from the table were found to be lower than the significant level 0.05, which indicates that there is a statistically significant correlations between the chosen variables.

Correlation between Service Quality Dimensions of Customer satisfaction and Responsiveness Factors

Variables Chosen:

1. Service Quality Dimensions of customer satisfaction
2. Employee Response
3. Solving Problems & Complaints
4. Number of Checkout Counters

Table 3: Correlation between Service Quality Dimensions of customer satisfaction and Responsiveness Factors.

		DSQ of Customer Satisfaction	Employee Response	Solving Problems & Complaints	No. of Checkout Counters
DSQ of Customer Satisfaction	Pearson Correlation	1	.835	.557	.322
	Sig.(2-tailed)		.046	.043	-.029
	N	300	300	300	300
Employee Response	Pearson Correlation	.835	1	.020	.993
	Sig.(2-tailed)	.046		.726	-.001
	N	300	300	300	300
Solving Problems & Complaints	Pearson Correlation	.557	.020	1	.119*
	Sig.(2-tailed)	.043	.726		.039
	N	300	300	300	300
No. of Checkout Counters	Pearson Correlation	.322	.993	.119*	1
	Sig.(2-tailed)	-.029	-.001	.039	
	N	300	300	300	300

*.Correlationis significantat the0.05 level(2-tailed).

Interpretation:

From the above table, the Pearson Correlation values **r** is found to be *0.835, 0.557 and 0.322* which signifies that there is a strong(0.835), moderate(0.557) and weak(0.322) relation between perceived Service Quality dimensions of customer satisfaction and chosen Responsiveness variables (*Employee Response, Solving Problems & Complaints, Number of checkout counters*). The**p-**values (*0.046, 0.043, 0.029*) obtained from the table were found to be lower than the significant level 0.05, which indicates that there is a statistically significant correlations between the chosen variables.

Correlation between Service Quality Dimensions of Customer Satisfaction and Assurance Factors:

Variables chosen:

1. Service Quality of Customer Satisfaction
2. Product Knowledge of employees
3. Safe Transaction
4. Freshness of the Product

Table 4: Correlation between Service Quality Dimensions of customer satisfaction andAssurance Factors:

		DSQ of Customer Satisfaction	Product Knowledge of Employees	Safe Transaction	Freshness of product
DSQ of Customer Satisfaction	Pearson Correlation	1	.506	.579	.977
	Sig.(2-tailed)		.044	.031	.002
	N	300	300	300	300
Product Knowledge of Employees	Pearson Correlation	.506	1	.416	.941
	Sig.(2-tailed)	.044		.047	.004
	N	300	300	300	300
Safe Transaciton	Pearson Correlation	.579	.416	1	.631**
	Sig.(2-tailed)	.031	.047		.000
	N	300	300	300	300
Freshness of Product	Pearson Correlation	.977	.941	.631**	1
	Sig.(2-tailed)	.002	.004	.000	
	N	300	300	300	300

**.Correlationis significantat the0.01 level(2-tailed).

Interpretation:

From the above table, the Pearson Correlation value **r** is found to be 0.977, 0.506 and 0.579 which signifies that there is a moderate(0.579 & 0.506)relationship between Service Quality Dimensions of customer satisfaction and Assurance variables *(Product Knowledge of employees, Safe Transaction)*. It is also found that the Pearson Correlation value **r** is 0.977 which signifies that there is a Strong relation between Service Quality Dimensions of customer satisfaction and Freshness of the Product. The**p-**values (*0.044, 0.031, 0.002*) obtained from the table were found to be lower than the significant level 0.05, which indicates that there is astatistically significant correlations between the chosen variables.

Correlation between Service Quality Dimensions of Customer satisfaction ands elected Empathy Variables:

Variable Chosen:

1. Service Quality of Customer satisfaction

2. Individual Attention towards customers
3. Home Delivery
4. Membership Schemes

Table5: Correlation between Service Quality Dimensions of Customer satisfaction and Empathy Variables.

		SQD of Customer Satisfaction	Individual Attention	Home Delivery	Membership Scheme
SQD of Customer Satisfaction	Pearson Correlation	1	.933	.136	.853
	Sig.(2-tailed)		.005	.066	.011
	N	300	300	300	300
Individual Attention	Pearson Correlation	.933	1	.897	.116*
	Sig.(2-tailed)	.005		.007	.044
	N	300	300	300	300
Home Delivery	Pearson Correlation	.136	.897	1	.105
	Sig.(2-tailed)	.066	.007		.070
	N	300	300	300	300
Membership Scheme	Pearson Correlation	.853	.116*	.105	1
	Sig.(2-tailed)	.011	.044	.070	
	N	300	300	300	300

*.Correlation is significant at the 0.05level (2-tailed).

Interpretation:

From the above table, it is evident that the Pearson Correlation values **r** is found to be *0.933, 0.853 and 0.136* which signifies that there is a strong and weak relation between perceived Service Quality dimensions of customer satisfaction and chosen Empathy variables (*Individual attention, Membership scheme & Home delivery*). The**p-**values (*0.005, 0.011, 0.066*) obtained from the table were found to be lower than the significant level 0.05, which indicates that there is a statistically significant correlations between customer satisfaction and chosen Empathy variables.

REGRESSIONANALYSIS:

Regression Analysis between Perceived Service Quality of Customer Satisfactionand Tangibility Factors:

VariableChosen:

Dependent Variable:*Perceived Service Quality of the Customer Satisfaction***Independent Variable:***StoreAmbience,Baskets&Trolleys,VehicleParking*

Table 2.1 Model Summary of Service Quality of customer Satisfaction and Tangibility factors:

ModelSummary

Model	R	R Square	Adjusted R Square	Std.Error of the Estimate
1	.659[a]	.456	.423	31.3040

a.Predictors:(Constant), Vehicle Parking,Store Ambience, Basket &Trolley

Fromtheabovetable,R-valueisfoundtobe0.659,whichindicatesmoderatedegreeofcorrelationbetweenServiceQualityofcustomer satisfaction and Tangibility factors.

Anova Result of P e r c e i v e d Service Quality of customer satisfaction and Tangibility factors:

ANOVA[a]

Model	SumofSquares	df	MeanSquare	F	Sig.
Regression	.462	3	.154	.652	.038[b]
Residual	69.974	296	.236		
Total	70.437	299			

a. DependentVariable:SQ of Customer Satisfaction

b. Predictors:(Constant),Vehicle Parking,Store Ambience,Basket & Trolley

From the ANOVA table, significant value is found to be 0.038whichislessthan0.05. It indicates that our regression model statistically significantly predicts the outcome variable (Customer Satisfaction).

Coefficient result of Perceived Service Quality of customer satisfaction and Tangibility factors:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std.Error	Beta		
1	(Constant)	4.216	.416		10.145	.000
	Store Ambience	.756	.057	.889	-.264	.008
	Basket &Trolley	.321	.056	.301	1.090	.030
	Vehicle Parking	.659	.053	.590	.915	.040

a. Dependent Variable:SQ of Customer Satisfaction

From the above table, B – Coefficient is significantly variable to the other variable. It indicates that there is coefficient between perceived service quality of customer satisfaction and chosen Tangibility factors.

Regression Analysis between perceived Service Quality of Customer satisfaction and Reliability Factors:

Variable Chosen:

Dependent Variable: *Service Quality of the Customer Satisfaction*

Independent Variable: *Product Price& Offers, Bill Clarity, Product Variety*

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.756[a]	0.535	0.512	51.3546

a. Predictors: (Constant), Product Variety, Product Price Offers &Discounts, Bill Clarity

From the above table, R is found to be 0.756, which indicates Strong degree of correlation between Perceived Service Quality of Customer satisfaction and Reliability Factors.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.211	3	.070	.297	.028[b]
	Residual	70.226	296	.237		
	Total	70.437	299			

a. *Dependent Variable: Service Quality of Customer Satisfaction*

b. Predictors: (Constant), Product Variety, Product Price Offers& Discounts, Bill Clarity

From the ANOVA table, significant value is found to be 0.028 which is less than 0.05.It indicates our regression model statistically significantly predicts the outcome variable (Customer Satisfaction).

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.685	.377		12.413	.000
	Product Price Offers& Discounts	-.856	.053	.883	-.211	.-016
	Bill Clarity	-.562	.057	522	-.700	.-037
	Prod Variety	.824	.055	.773	.662	.033

a. *Dependent Variable: Perceived Service Quality of Customer Satisfaction*

From the above table, B-Coefficient is significantly variable to the other variable. Also it indicates negative which represents increase in one variable leads to decrease in another variable.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.675[a]	.389	342	42 .4 86

Regression Analysis between perceived Service Quality of Customer satisfaction and Responsiveness factors.

Variable Chosen:

Dependent Variable: Perceived Service Quality of the Customer Satisfaction

Independent Variable: Employee Response, Solving Complaints & Problem, Number of Checkout Counters.

Model Summary

a. *Predictors: (Constant), No Of Checkout Counters, Emplyee Response, Solving Complaints &Problems.*

From the above table, R - value is found to be 0.675, which indicates Moderate degree of correlation between perceived service quality of customer satisfaction and chosen Responsiveness factors.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.396	3	.132	.558	.043[b]
	Residual	70.040	296	.237		
	Total	70.437	299			

a. Dependent Variable: Service quality dimensions o f Customer Satisfaction
b. Predictors: (Constant), No Of Checkout Counters, Employee Response, Solv Complaints &Problems.

From the ANOVA table, significant value is found to be0.043 which is less than 0.05.It indicates our regression model statistically significantly predicts the outcome variable (Customer Satisfaction).

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.667	.372		12.555	.000
	Employee Response	1.223	.050	.835	.978	.046
	Solving Complaints &Problems	.978	.055	.557	-.710	.043
	No. of Checkout Counters	-1.118	.052	.322	-.404	.-.029

a. *Dependent Variable: Perceived Service Quality of Customer Satisfaction*

From the above table, B- Coefficient is significantly variable to the other variable, which indicates that there is significantly coefficient between perceived service quality of customer satisfaction and selected Responsiveness factors.

GAP ANALYSIS
GAP ANALYSIS SCORE

No	STATEMENTS	EXPECTATION	PERCEPTION	SERVICE GAP [E-P]
	TANGIBILITY			
1	Store Ambience	**8.96**	**7.85**	**1.11**
2	Vehicle Parking	**8.82**	**7.47**	**1.35**
3	Employee Dress Code	**8.84**	**7.72**	**1.12**
			Average GAP Score	**1.19**
	RELIABILITY			
4	Price/ Discounts	**8.99**	**7.90**	**1.09**
5	Product Variety	**8.89**	**7.77**	**1.12**
6	Service Quality	**8.86**	**7.75**	**1.11**
			Average GAP Score	**1.10**
	RESPONSIVENESS			
7	Employee Response	**8.59**	**7.41**	**1.18**
8	Solving Complaints /Problems	**8.63**	**7.43**	**1.2**
9	(Quick)Prompt Service	**8.87**	**7.73**	**1.14**

			Average GAP Score	**1.17**
	ASSURANCE			
10	Safe Transaction	**8.87**	**7.78**	**1.09**
11	Product Knowledge of Employees	**8.67**	**7.53**	**1.14**
12	Product Availability	**8.95**	**7.88**	**1.07**
			Average GAP Score	**1.1**
	EMPATHY			
13	Membership Schemes	**8.77**	**7.65**	**1.12**
14	Operating Hours of the Store	**9.02**	**7.92**	**1.1**
15	Individual Attention towards customer	**8.99**	**7.78**	**1.21**
			Average GAP Score	**1.14**

NO	DIMENSIONS	GAP SCORES	
1	Average Score For Tangibles	**1.19**	
2	Average Score For Reliability	**1.10**	
3	Average Score For Responsiveness	**1.17**	
4	Average Score For Assurance	**1.1**	
5	Average Score For Empathy	**1.14**	

Average Gap Score Of The Supermarket

NO	DIMENSIONS	GAP SCORES	
1	Average Score For Tangibles	**1.19**	
2	Average Score For Reliability	**1.10**	
3	Average Score For Responsiveness	**1.17**	
4	Average Score For Assurance	**1.1**	
5	Average Score For Empathy	**1.14**	

Total **5.70**

Average (Total/5) Un Weighted Score

(1.14)

Interpretation:

The above table represents the gap scores for the Supermarket. The difference between the customer's expectation and perception of service is the gap score which is then averaged for each dimension.

Highest Gap Score Of The Supermarket

NO	ATTRIBUTES	DIMENSIONS	GAP SCORE
1	Vehicle Parking	Tangibility	**1.35**
2	Individual attention towards customers	Empathy	**1.21**
3	Employee Response	Responsiveness	**1.18**
4	Prompt Service	Responsiveness	**1.14**

Interpretation:

Above table represents the attributes having the highest gap scores observed from the Gap analysis table. It indicates that the customers are not satisfied with regard to the service of these attributes: *Vehicle Parking **1.35**[Tangibility], Individual attention towards customers **1.21** [Empathy], Employee Response **1.18** [Responsiveness], Prompt Service **1.14** [Responsiveness].*

Lowest Gap Score Of The Supermarket

NO	ATTRIBUTES	DIMENSIONS	GAP SCORE
1	Product Availability	Assurance	**1.07**
2	Price/Discounts	Reliability	**1.09**
3	Service Quality	Reliability	**1.11**
4	Solving Complains & Problems	Responsiveness	**1.2**

Interpretation:
Above table represents the attributes having the lowest GAP scores between the customer Expectation and Perception of service quality.

Reliability Test

Cronbach's alpha is the most common measure of internal consistency ("reliability"). It is most commonly used when we have multiple Likert questions in a survey/questionnaire.

Reliability Statistics

Cronbach's Alpha	N of Items
0.736	12

From the above table,**Cronbach's alpha** is found to be**0.736** which indicates high level of internal consistency for our scale

ESTIMATION OF MEAN

No	FACTORS	MEAN VALUE	RANK
1	Vehicle Parking	**3.92**	**6**
2	Store Ambience	**3.66**	**9**
3	Product pricing& Offers	**4.13**	**3**
4	Product Variety	**3.67**	**10**
5	Service Quality	**4.54**	**1**
6	Employee Response	**3.85**	**7**
7	Freshness of the Product	**3.96**	**5**
8	Product Availability	**4.41**	**2**
9	Checkout Counters	**3.56**	**12**
10	Store Location	**4.13**	**3**
11	Employee Dress Code	**3.63**	**11**
12	Display Rack	**3.71**	**8**

Above table represents the factors which influencing the service quality of supermarkets are ranked according to the customers response. It includes the most influencing factors such as *Product Availability, Product Pricing/offers, Store Location,Freshness of the Product, Vehicle Parking &Employee Response*.

Findings& Suggestions

From the customers response, it is found that the most important factors which influence the service quality of customer satisfaction are *Product Availability, Product Pricing/offers, Store Location, Freshness of the Product, Vehicle Parking & Employee Response.*Through GAP Analysis, it is also evident that SERQUAL Dimensional attributes such as *Reliability, Assurance, Empathy* shows

less Gap between customers expectation and perception. The results of statistical analysis show that, there is a significant relationship between service quality of customer satisfaction and chosen SERQUAL dimensional factors. In order to build a better brand and to improve the service quality, the company have to concentrate and sort out the deviations with the attributes such as *Vehicle Parking[Tangibility],Individual attention towards customers[Empathy], Employee Response[Responsiveness] and Prompt Service[Responsiveness]*. This study contributes and helps to understand the potential of the supermarkets from the customers perspective which is considerably valuable to improve the service quality among the service provider. As service quality ispre dominant factor, the management have to work towards the customer satisfaction.

References

1. Asubonteng, P., McCleary, K. J., & Swan, J. E. (1996). SERVQUAL revisited: a critical review of service quality. Journal of Services marketing.
2. Caruana, A. (2002). Service loyalty: The effects of service quality and the mediating role of customer satisfaction. European journal of marketing.
3. Chumpitaz, R., & Paparoidamis, N. G. (2004). Service quality and marketing performance in business-to-business markets: exploring the mediating role of client satisfaction. Managing Service Quality: An International Journal.
4. Dr.Chandrakala.S,(2009),"Effectiveroleof CRMinBankingSector",BankingFinance.
5. Gefen, D. (2000). E-commerce: the role of familiarity and trust. Omega, 28(6), 725-737.
6. Joshua, A. J., Moli, V., & Koshi, P. (2005). Expectation and perception of service quality in old and new generation banks. Indian Journal of Marketing, 37(3), 18.
7. Choudhury, K. (2007). Service quality dimensionality: A study of the Indian banking sector. Journal of Asia-Pacific Business, 8(4), 21-38.
8. NairM.V,"Banking-newdirectionsofgrowth",TheHindu-SurveyofIndianIndustry2010.
9. Hazra, S. G., & Srivastava, K. B. (2009). Impact of Service Quality on Customer Loyalty, Commitment and Trust in the Indian Banking Sector. IUP Journal of Marketing Management, 8.
10. Sudesh, K. (2007). Service quality in banks-a study in Haryana and Chandigarh. NICE Journal of Business, 2(1), 55-65.
11. Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through web sites: a critical review of extant knowledge. Journal of the academy of marketing science, 30(4), 362-375.