COMPARATIVE ANALYSIS OF EXISTING WATER TARIFF STRUCTURE AND WATER CONSUMPTION: A CASE STUDY OF PUNE MUNICIPAL CORPORATION

A.A. Vidyasagar
Department of Geography, Shikshan Parasaraka Mandalis, Sir Parashurambhau College (Autonomous), Pune, Maharashtra
ashalata.vidyasagar@gmail.com

ABSTRACT

It is often said that water should be freely available to all because it is a gift from nature. It is observed that developing countries usually do not have a pricing policy for urban basic amenities such as water supply, sanitation, and solid waste disposal. These are normally considered public goods to be supplied free of cost. Generally, a token cost is collected which in no way reflects the actual cost of provision. It is observed that developing countries usually do not have a pricing policy for urban basic amenities such as water supply, sanitation, and solid waste disposal. These are normally considered public goods to be supplied free of cost. Generally, a token cost is collected which in no way reflects the actual cost of provision. Municipal authorities/ state governments in developing countries are especially hard press to design, develop and finance the basic urban services. The present research paper attempts to review the tariff structures present in Pune Municipal C, and makes a comparative analysis of water budget. The main objective in this research paper is to analyse the pricing pattern of water supply. This paper clearly highlights the need for changes in the management practices such as metering; applying appropriate user charges; reducing water losses; increasing water availability; coverage etc. to solve the water problems.

Keywords: *Water consumption, Property tax, Annual Ratable Value, Water tax, Revenue, Economic analysis*

Introduction

It is often said that water should be freely available to all because it is a gift from nature.It is observed that developing countries usually do not have a pricing policy for urban basic amenities such as water supply, sanitation, and solid waste disposal. These are normally considered public goods to be supplied free of cost. Generally, a token cost is collected which in no way reflects the actual cost of provision. Municipal authorities/ state governments are especially hard press to design, develop and finance the basic urban services. The present research paper attempts to review the tariff structures present in Pune Municipal C, and makes a comparative analysis of water budget. The main objective in this research paper is to analyse the pricing pattern of water supply. This paper clearly highlights the need for changes in the management practices such as metering; applying appropriate user charges; reducing water losses; increasing water availability; coverage etc. to solve the water problems.

It is observed that developing countries usually do not have a pricing policy for urban basic amenities such as water supply, sanitation, and solid waste disposal. These are normally considered public goods to be supplied free of cost. Generally, a token cost is collected which in no way reflects the actual cost of provision. Municipal authorities/ state governments in developing countries are especially hard press to design, develop and finance the basic urban services. This chapter clearly highlights the need for changes in the management practices such as metering; applying appropriate user charges; reducing water losses; increasing water availability; coverage etc. to solve the water problems. The present paper attempts to review the tariff structures present in PMC, and makes a comparative analysis of water budget.

Financing of infrastructure, in general, and basic urban services, in particular, is different from financing other industrial activities because of its characteristic features of non-excludability, externality, and huge investment requirements, and so on. The commodities that are marketable are generally priced on the basis of the equality between its level of demand and supply. The equality of the marginal cost of producing a commodity and the marginal revenue generated out of it determines the equilibrium price. Such a clear-cut pricing mechanism cannot be adopted for urban

services because of its features of non-excludability and externality.

Objectives

The following are the objectives of the study,

1. To understand property tax system in Pune Municipal Corporation
2. To understand and study the economics of water supply of the Pune city.

Hypothesis

As the main objective of this study is to discuss pricing pattern of water supply the following hypotheses are framed:

H1 - There is a significant correlation between water tax and water consumption.

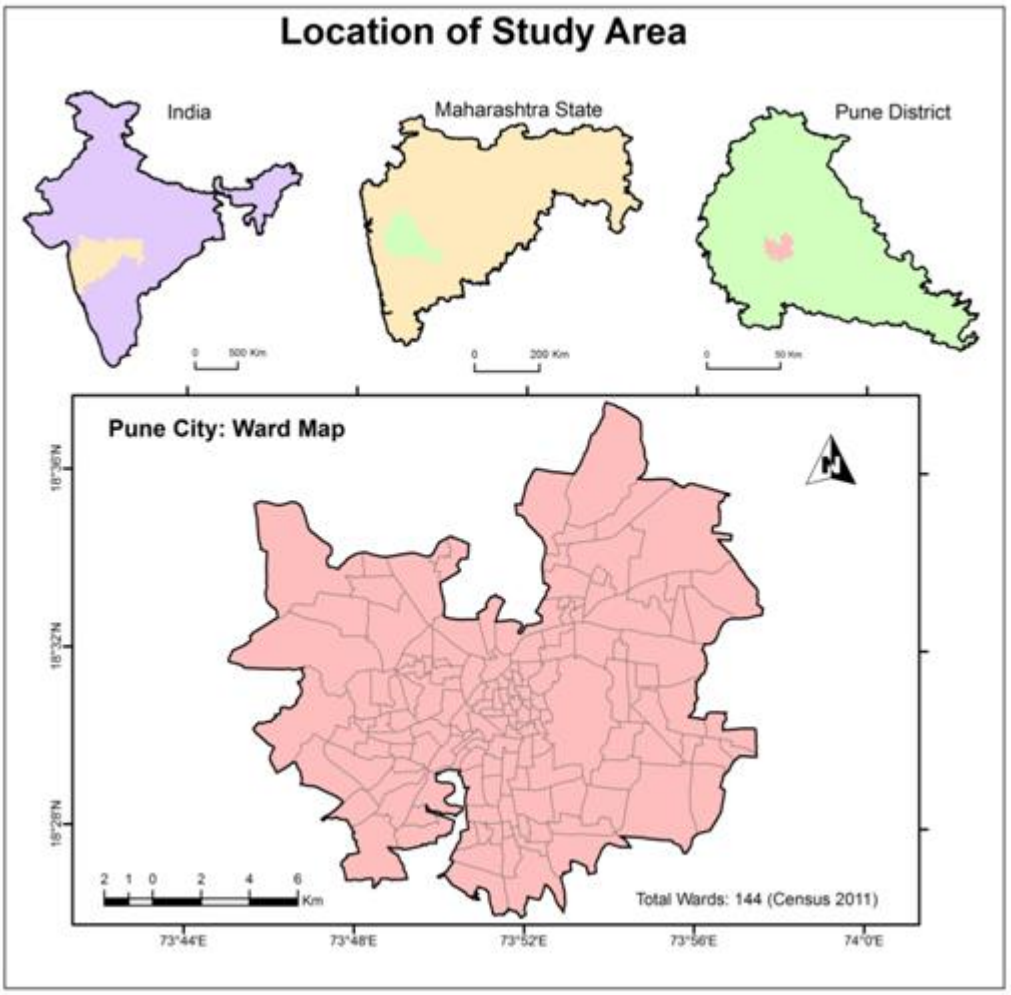
The hypothesis has been tested on the basis of K^2 statistical tool and 12 samples have been selected for studying relationship between citizen's water consumption and actual water tax they are paying.

Material and Methods

The material collected is mainly from the Pune Municipality and from other official sources including oral communication with PMC officers, official PMC websites and prominent citizens in the city who are able to recall the experiences of the past. Needless to say there are gaps in our information system and the level and quality of information is not the same at all places and in all aspects. Primary data collected by visiting door to door for collection of property tax. I have collected 200 property tax and after analysing all those 12 samples are selected for proving the hypothesis on the basis of random sample selecting techniques.

In the methodology, simple statistical and graphical techniques will be used for finding out the conclusion

Location of the Study Area



Map 1 - Location of the study area

Pune city is located at 18°32' North 72° 51' East. It is situated near the Western margin of the Deccan Plateau.Pune Municipal Corporation (PMC) area covers 243.31 sq. km.

composed of 144 general electoral wards according to 2007 which comes under 14 administrative wards of Pune Municipal Corporation. The city is located in saucer shaped basin at an average altitude of 560 m. from mean sea level. The area surrounded by off shots of Sahyadri hills extends mostly from west to east. Pune is slight hollow on bank of Mula and Mutha Rivers on Deccan plateau.

An Analysis of Existing Tariff Structure of Water Supply

At present, the water is supplied through the Khadakwasala Dam through Khadakwasla-Parvati pipeline and the Mutha Right Bank Canal by irrigation department. The meter system was introduced on 1st January 1980. Initially, fixed rates were set for usage of water for both domestic and non-domestic purposes.The problem with this system was that the water was supplied with uniform rates without considering the extent of usage. To differentiate the water usage and to get additional revenue from the water supply, the rates for water supply were revised from January 1st, 1982. Different rates for non-domestic water usage were introduced. But, this led to a series of problems in the revenue collection. Faulty meters disrupted the smooth flow as envisaged. This system also required the recruitment of a large number of field officials to go out and collect the meter readings personally from the citizens' residences and properties. This was a long and tedious process and was not well-received by the citizens. Moreover, those meters those were malfunctioned, required frequent attention. Some of the meters that were installed were affected by the dust accumulation and registered faulty readings. To deal with the situation, the PMC decided to charge the people whose meters were faulty or non-functioning on a quota basis. But this charge was higher than the normal charge and it led to conflict between the citizens and the corporation. Some citizens even refused to pay the higher charge.

From 01/04/2000 for domestic use water and non- domestic use of water charges were introduced. These user charges were linked with the property and according to the property type water tax was collected. The administration has repeatedly tried to introduce metered water billing system in the city, arguing that it will help them calculate water tax accurately. But as there is very less coverage of water meter, it is very difficult to calculate water tax. Previously, due to metering, faulty bills were prepared or due to some problem with the meter or non-working of meter, water charge was collected with some fixed rate basis on Kota system, without considering the property type and actual usage of water. The present reform says that, the water charges are more depend on the property. Therefore, basis on the property the usage of the water varies. In view of this, it was decided in the Pune Municipal Corporation that the water charges should be linked with the Property tax.

The reform "User Charges for Water Supply" was introduced by PMC with the primary goal of generating more revenue from the water supply. The reform was also aimed at providing certain other benefits, including an increase in the coverage of users, improvement in the method of measurement of service, improvement in the billing and collection efficiency and 100 per cent cost recovery. The corporation also decided to install a user-friendly tax collection system, cut down on cost and create a single window for the user charge. The implementation of user charges for water supply was an administrative decision. It was discussed in the general body meeting of the corporation and passed with the approval of the majority. The citizens accepted it as it was now more suitable for them to pay the charges along with the property tax.

Table 1 - Domestic Property Taxable Amount Slabs and Present Water Charge

Sr. No.	Slab (in Rs.)	Rate
1.	0-1000	Rs. 1159 per year
2.	1001-3000	Rs. 1288 per year
3.	3001-5000	Rs.1417 per year
4.	5001 and above	32% of RV or Rs. 3200 whichever is less

(Note: the charges are applied on the yearly property tax amount).

(Source: Milkat kar Pustika, Corporation office, PMC, Page no.6, Meeting no. 116, 12/02/ 2018)

Existing Water Tariff Structure of Pune Municipal Corporation

Budgetary support is good for improving basic services. Current estimates indicate Rs. 398.7 Crores in the year 2015-16, was spent annually for water and sanitation. Of this amount approximately 80 % came from water tax 18% camefrom water benefit tax 2% came from different level of governments. Despites of this current level of investment, but the question remained whether people have access to safe drinking water.

The levels of social investment are required to improve the connectivity, quality and NRW. As the urban population is on the rise it is required that high amount of water with good and proper management.One such initiative taken by PMC in 2016 was the introduction of new tariff structure.

Table 2 - Water Supply Tariff of Pune Municipal Corporation

Sr. No.	Water usages	Unit (KL/Month)	Revised rate from 1/4/2016 (Rs. /KL)
Non –Meter Water Rate			
1.	A. Residential	1) 0 to 22.50 (150 lpcd)	Rs. 5.50/1KL
	B. Cantonment Board	2) 22.50 to 30 (150 to 200)	Rs. 9.20/1KL
		3) 30 to 37.50 (200 to 250)	Rs. 18.30/1KL
		4) More than 250	Rs. 37.50/1KL
2.	Non – Residential	1) 0 to 20	Rs. 47.50/1 KL
		2) 20 to 40	Rs. 49.40/1 KL
		3) 40 to 60	Rs. 51.90/1 KL
		4) more than 60	Rs. 59.80/1 KL

(Source: Water tax rate booklet, Corporation office, PMC, Page no.2, Section 'C', Meeting no. 99, Subject no. 861, 16/02/ 2016)

The tariff structures for municipal water supply in various cities are widely different from each other in terms of their supply slabs, connection type's viz. domestic, commercial, industrial etc. State and Government of India are responsible for choosing urban tariff structures. Broadly classifying, the tariff structure for municipalities in India can be divided into following two categories:

1. Metered Connections
2. Unmetered Connections

Most of the cities in India have a mixture of metered and unmetered connections. In PMC area, 30% connections are metered. These are in Pune and Kadki CB and meant for commercial areas.

Currently, water tax is calculated on the basis of property tax which is almost lump sum amount for 1 KL water. There are different arguments put forward by citizens from the housing societies as well from the slum areas, "PMC imposing their structure of water tax on us because there is no transparency in the water tax rate. Water tax is collected with same rate from high water consumption and low water consumption. Accurate consumption of water is not recorded anywhere. Hence, we are paying excess amount for water blindly".

Water tax calculation according to PMC's 'water rate chart booklet, 2016', 1000 litres water is provided at Rs. 5.50 for 150 lpcd water, Rs. 9. 20 for 150 to 200 lpcd, Rs. 18. 30 for 200 to 250 lpcd and Rs. 27.50 for more than 250 lpcd water for residential usage of water and for non-residential it depends on the carpet area and water meter count. For example, minimum water charges are for,

- Teashop - Rs. 900/ shop/month,
- Washing centres Rs.430/shop/month,
- Star hotels, Mangal Karyalayas Rs.3172/month, etc.

Water meters are to be installed in the all residential areas before the year 2021 year. Hence, water tax calculation for the residential areas is on the basis of Annual Rateable Value (ARV). This is again does not explain exact amount of water use. This rateable value is

basisd on property carpet area and not basisd on the water consumption.

PMC almost gets Rs. 197 crores revenue income from water tax which is almost 82%, of the total revenue. That is just because of high water rate. Majority of people has to pay this much amount of water without considering actual use of water. Water charge seems to be high. Then, water consumption, domestic water charge is Rs. 5.50 for 1000 litres water which means it is Rs. 165/month and Rs. 1980/ year. It is estimated that water charges are going to increase by 15% each year.

Result and Dissection

1. Meter system was introduced on January 1st, 1980. Initially, fixed rates were set for usage of water for both domestic and non-domestic purposes. The problem with this system was that the water was supplied with uniform rates without considering the extent of usage.

   But, this led to a series of problems in the revenue collection. Faulty meters disrupted the smooth flow as envisaged. This system also required the recruitment of a large number of field officials to go out and collect the meter readings personally from the citizens' residences and properties. This was a long and tedious process and was not well-received by the citizens.

   This situation changed from April 1st, 2000. The Municipal Corporation after much thought decided to link water charges with the Property Tax. Earlier, the faulty meters generated incorrect bills or in some cases the water charge was collected at a fixed rate basis on a quota system which did not consider the property type or the actual number of users in the property. The Pune Municipal Corporation (PMC) now started levying charges for domestic water usage. This charge was linked to the property and water tax was collected according to it.

   As water metres are not installed in PMC, water tax is collected on the basis of the ARV (annual rateable value) of the property for the residential property. Wherever water meters are installed for the commercial and industrial purpose, water tax is collected according to water usage. However, for the residential properties, water tax is collected on the flat area and not on the consumption of water. There is a direct relationship between water tax and flat area (large area - high water tax, small area - low water tax. This relationship is considered to calculate water tax amount for each flat).

   Hence, each family has to pay different water tax. That is why it is very difficult to link per head water cost and per head water usages.
2. It is observed that due to this system rich people pay more water tax than poor people with less consumption of water. Middle class pay comparatively low water tax with same water consumption. The following table clearly shows this:

Table 3 – An Example of ARV and Paying Water Tax

Sr. No.	Description	Family no 1 Rich family	Family no. 2 Middle family
1.	Annual rateable value	12280	3290
2.	Annual water tax	Rs. 4830	Rs. 1481
3.	Total family members	03	04
4.	Total annual water consumption @ 150 lpcd	162000 litres annually	216000 litres annually

(Source: Collected samples by field survey)

From the above table it is clear that, Family no. 1 is paying more water tax than family no. 2 with less water consumption. For applying water tax for each family, Municipal Corporation considered economic status of the family because water tax should be affordable for each citizen. The basis for applying water tax is economic condition of the family and not the water consumption.

3. There is a separate provision for slums to pay property tax. There are about 12 lakh (33%) slums in the city. The general body has proposed a lump sum tax of Rs. 100/

month for residential and Rs. 150/ month for commercial property as a service tax and not a property tax. Levying water tax rate for slum is also different; if it is temporary hut then water tax is Rs. 39.29/ month and Rs. 63.28/ month for permanent hut.

4. Almost more than 60 % slum does not get property tax or service tax bill so indirectly they do not have to pay their water tax. In fact, some slums are there at Vishrantwadi (Jaibhim nagar, Kamgar nagar, Sainik nagar, Vadar vasti), Yerawada (Bhim nagar), Bhosari (Adinath nagar, Vikas colony, shanti nagar, gavhane vasti), Parvati slum area (Janata Vasahat), having two PMC separate water connections given during elections. Among these, 60 % slums have illegal connections.
5. Maximum outlets connected to main drainage line are illegal and with very shallow depth. Hence, breakages of pipes are witnessed frequently and ample water goes waste. (It was observe during survey)
6. In general citizens pay 0.55 paisa for the 1litre of water; it is comparatively fewer amount which is paid to get drinking water. Water supply income is less and water supply expenditure is higher. That is why, the difference between income and expenditure has been increasing year by year.

Table 4 - Share of Investments in Different Services of Water Department

	Revenue: Income		Revenue: Expenditure	
Sr. No.	Revenue Details	Share of income (in %)	Expenditure Details	Share of Expenditure (in %)
1	Water tax	79	Employee salaries	33. 48
2	Receipt from system	1. 41	Loan repayment	2. 68
3	Water benefit tax	16	Electricity	37
4	Others	1. 82	Others	14. 28
5			Operation and Maintenance	1
6			Petrol and Diesel	0. 7
7	Total =	100 %	Total =	100 %

(Pune Municipal Corporation, Simplified budget, Water Department)

It has been observed that high amount of investment is required to improve water supply system.

7. This water tax system is not ideal; lack of management is mostly highlighted in this system of tax collection. Instead of investing high amount of money in improving water supply system there is high illegal water connection, high amount of non - revenue water, intermittent water supply, water contamination, water theft, etc.
8. Maximum water wastage and illegal connections are seen in the slum areas and as they do not pay water tax indirectly (it is free for them). Water contamination also has been found at high level in the slum areas due to high leakages and innumerable illegal connections.

Findings

1. Water charges are basis on the Annual Ratable Value.
2. Water tax increases as carpet area of property increases resulting in rich people paying more tax than common man.
3. There are some findings on the basis of available data which are given below with the help of some statistical data. Hypothesis have been tested on the basis of available data. The method of testing the hypotheses isChi square test. As explained, many of the statistical tools used for generalization cannot be used in this study to test the hypothesis. In some cases, if the replies of a majority of the respondents support a hypothesis then that hypothesis is considered as confirmed. Otherwise, it is considered as rejected.
4. The following hypothesis has been tested in this research paper basis on the available data:

I. There is a direct relationship between water tax and water consumption.

Hypotheses Testing 1

The hypothesis of the study is "There is a direct relationship between water tax and water consumption".

H0 Null Hypothesis: Water tax is equal to water consumption.

H1 Alternate Hypotheses: Water tax is not equal to water consumption.

This hypothesis has been tested for the water tax of selected citizens of Pune city by using Chi-square test. Water tax is actually collected on the basis of Annual Ratable Value and not on the basis of water consumption. Therefore, paying water tax is not appropriate according to water consumption.

Hypothesis 1: Water tax is equal to water consumption

Consumers are paying water tax (annual) on the basis of ARV slabs in Rupees. (O)	Expected Value for water consumption annual @ 150 lpcd in Rs.@ Rs.5.5 for 1 K.L. water (E)	(O-E)	$(O-E)^2$	$(O-E)^2$ /E
3680	891	2789	7778521	8730.102132
1481	1188	293	85849	72.26346801
1630	594	1036	1073296	1806.895623
1481	594	887	786769	1324.526936
1630	2079	-449	201601	96.97017797
1481	891	590	348100	390.684624
1481	1782	-301	90601	50.84231201
1630	1485	145	21025	14.15824916
1481	1188	293	85849	72.26346801
1481	1625.5	-144.5	20880.25	12.84543217
1630	594	1036	1073296	1806.895623
3680	891	2789	7778521	8730.102132
			Total =	23108.55

Degree of Freedom	11
Calculated Value	23108.55
Tabulated Values at following Level of Significance	
0.05	19.68

Conclusion

Conclusion: Calculated value is more than tabulated value
C.V. > T.V. That's why above Hypothesis is Rejected

Calculated value of Chi-square for 11 degree of freedom at 0.05 level of significance is **19.68** which is much lesser than the calculated value **23108.55**. As the calculated value is more than tabulated value, there is much considerable difference between T.V and C.V. Thus, the above Hypothesis is rejected. Hence, the null hypothesis of the study stands for rejection. Therefore, water tax is not equal to water consumption is proved.

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COMPARATIVE ANALYSIS OF OPTIMIZED CURVELET ALGORITHM AND OPTIMIZED MOVING FRAME BASED DECOMPOSITION FRAMEWORK ALGORITHM

P. Aspalli[1] and P. Prakash[2]
[1,2]CSE Department, PDA College of Engineering, Kalaburagi, India
[1]aspallipooja@gmail.com and [2]prakashpattan@pdaengg.com

ABSTRACT

Comparison of optimized Curvelet transform and optimized Moving Frame Decomposition Framework algorithmis carried out for image fusion. Both the transform based method and spatio- temporal methods are compared in this paper. Structural Similarity Index Measurement (SSIM) is considered as the parameter that is considered for the comparison of both the methods. MATLAB based simulation is developed for Grey wolf optimized curvelet transform based image fusion algorithm and the optimized Moving Frame Based Decomposition Framework algorithm. Comparative analysis clearly shows the domination of the Moving Frame Based Decomposition Framework while SSIM based comparison is carried out.

Keywords: *Computer Tomography, Magnetic Resonance, Image Fusion, Multimodal Image Fusion, Grey Wolf Algorithm, Moving Frame Based Decomposition Framework*

Introduction

Image registration combines images that are taken from different modalities, different sensors and different timelines. Geometric alignment of the images gets correctedusing registration algorithms. Image fusion methods get information from multiple images to obtain an image that combines the main details from different images and provide a fused image with good idea about any problem to be solved. In medical imaging there are multiple modalities in which the images are captured. Each Image modality will havea visualization perspective which gives idea about the medical condition. When fusion is implemented the idea and perspective of both the modalities are accumulated in the fused image and providing the consolidated idea from both the modalities. An image fusion technique using wavelet transform and gray level feature is applied in [1]. Two-dimensionalthree level Discrete Wavelet Transform (DWT) is applied on both the images and then the pixel fusion rule is applied to obtain the fused image.DWT and Sparse representation based image fusion method is applied by combining the high frequency components from both the images and combining using the sparse representation algorithm [2]. Sharpened fused image is applied using the Curvelet transform based image fusion methods and also used for obtaining more specific data from the fused images. Curvelet based implementation of image fusion in [3] has provided sharpened fused images. Different publications that apply curvelet based methods has shown improvement in the fusion standard and performances [4-6]. Images with different modalities are fused in [7] with a technique called the optimized homomorphic wavelet fusion algorithm. A modified Grey wolf algorithm which uses genetic operators for modification is used in the wavelet based fusion algorithm. Weighted blending in image fusion algorithm has provided good results while applied on the non-subsampled shearlet transform (NSST) using chaotic grey wolf algorithm. Performance parameters like entropy, visual information fidelity for fusion (VIFF), feature mutual information (FMI).A modified grey wolf algorithm is applied on the image fusion algorithm that combines Modified Grey wolf algorithm which includes the Cuckoo search algorithm combination in dynamics [9].Weight mapping algorithm is proposed in the algorithm using the guide filtering algorithm to obtain the image fusion in the spatial domain. Both texture and approximation components are extracted from the image multi-modal medical images and combined in the weight mapping domain to obtain the fused image [10].

This paper is a comparative analysis of two different algorithmsfrom the transform based algorithm and Moving Frame Based Decomposition Framework based algorithm. The SSIM based comparison between these two algorithms is developed and results are tabulated.

2. Optimized Curvelet based image Fusion and MFDF based image Fusion:

2.1 Optimized Curvelet based image Fusion

The Curvelet based image fusion implementation, that is developed using the modified grey wolf algorithm that is combined with the Genetic algorithm (GA)in order to get a hybrid meta-heuristic algorithm, is developed. Curvelet transformed image from both the modality that is CT and MRI images are fused in the transformed domain and combined to obtain the fused image. During the combining the image back to the fused image the parameters that are used for fusing is optimized using the Greywolf algorithm hybridized using the genetic algorithm.

Optimization of the scaling variable called as alpha1, alpha2 for combining the transformed image in that proportion is obtained that provides the fusion image. Mutual information (MI) is considered as the objective for optimizing the fusion algorithm in the hybrid algorithm thus developed.

The algorithm for the curvelet based image fusion algorithm optimized by hybrid greywolf-genetic algorithm is as given.

Step1. Curvelet Transform is applied on the image using the method in [11]

Step2. In transformed domain two parameters one for average rule and another for max rule are considered which are alpha 1 and alpha2

Step3: Before applying the inverse curvelet algorithm the average and the max rule is applied on the transformed image.

Step 4: Inverse curvelet transform is applied on the inverse transformed image

Step 5: Mutual information is found for the given alpha 1 and alpha 2

Step 6: Hybrid greywolf-genetic algorithm is applied on the parameters alpha1 and alpha 2 to get the optimized mutual information.

Step 7: Better the Mutual information, better is the fused image Apply the updated alpha1 and alpha 2 values to get the better inverse curvelet transform image.

Step8: Best values of alpha1 and alpha2 is obtained which corresponds to the best mutual information.

2.2 Moving Frame based Decomposition Framework

The MFDF method uses only the single level of decomposition for the fusion method to get the approximation and textural components.

$$P = \begin{bmatrix} \frac{I_x}{|\nabla|\sqrt{1+\mu^2|\nabla I|^2}} & -\frac{I_y}{|\nabla|} & -\frac{\mu I_x}{\sqrt{1+\mu^2|\nabla I|^2}} \\ \frac{I_y}{|\nabla I|\sqrt{1+\mu^2}} & \frac{I_x}{|\nabla I|} & -\frac{\mu I_y}{\sqrt{1+\mu^2|\nabla I|^2}} \\ \frac{\mu|\nabla I|}{\sqrt{1+\mu^2|\nabla I|^2}} & 0 & \frac{1}{\sqrt{1+\mu^2|\nabla I|^2}} \end{bmatrix} \quad (1)$$

Fusion of texture based component of both the CT and MRI images are obtained by using the max absolute rule.

$$MAX_A = MAJORITY(abs(A_T), W) \quad (2)$$

$$MAX_B = MAJORITY(abs(B_T), W) \quad (3)$$

$$mm = \left((MAX_A > MAX_B) * W\right) > floor(r \times r/2) \quad (4)$$

$$F_T = mm.\times A_T + \left((\sim mm).B_T\right) \quad (5)$$

While the fusion of the approximation component of both the CT and MRI images are done using the Gaussian and Laplacian filtering implementation.

$$S_A = Gau(Lap(A_A, W_t), W_{gr,g\sigma} \quad (6)$$

$$S_B = Gau(Lap(B_A, W_t), W_{gr,g\sigma} \quad (7)$$

Where Lap is Laplacian filter and Gau represents the Gaussian filtering. The window size W_t is 3X3. Using these components, the mapping P_A and P_B are developed using the equation (12) and (13).$W_{gr,g\sigma}$ of size $(2g_r + 1) \times (2g_r + 1)$ and the parameter g_r *and* σ_r are set the same values.

$$P_A = S_A > S_B \quad (8)$$

$$P_B = S_A < S_B \quad (9)$$

The fused image is applied with thresholding algorithm to process the thresholding algorithm. After applying the thresholding the images are combined.

Thresholds defined in equation (10) and (11) is defined as th1 and th2 for two images. This threshold is calculated by finding the mean of the first 5%-pixel values original images.

$$w_1 = Thsegment(A_A, th1) \quad (10)$$

$$w_2 = Thsegment(B_A, th2) \quad (11)$$

The guided filter is applied on the images combined and Guided Filter is applied on it. While applying the guided filter there are two parameters that guide the output fusion output. The fusion is controlled by the variable '$r\ and\ \epsilon$. The subscript r is the size and ϵ is the blurring constant of the guiding filter.

Segmented images $w_1\ and\ w_2$of both the images A and B are further filtered using the guide filter as discussed in equation (12) and (13).

$$T_A = GF_{r,\epsilon}\left((P_A|w_1)\&(\sim w_2)\right), A_A\Big) \quad (12)$$

$$T_B = GF_{r,\epsilon}\left((P_B|w_2)\&(\sim w_1)\right), B_A\Big) \quad (13)$$

Where $GF_{r,\epsilon}$ represents the guide filtering operation, and the parameters $r\ and\ \epsilon$ set to 4 and 0.3. The subscript r is the size and ϵ is the blurring constant of the guiding filter.

the segmentation procedure is essential in refining the final map which shows the effectiveness of the segmentation procedure in the computation of $T_A\ and\ T_B$. The computation of $T_A\ and\ T_B$ without the segmentation procedure can be expressed as formulas (14) and (15).

$$T_A = GF_{r,\epsilon}(P_A, A_A) \quad (14)$$

$$T_B = GF_{r,\epsilon}(P_B, B_A) \quad (15)$$

Finally, the fused approximation component F_A is obtained by the weight average of $A_A\ and\ B_A$ with the final map $T_A and\ T_B$

$$F_A = T_A \times A_A + T_B \times B_A \quad (16)$$

The optimization of these parameters improves the fusion performance. These guided filtering parameters are optimized in order to provide the output for a best fused image. The algorithm of the MFDF based algorithm is as given below,

Step 1: Both CT and MRI images are decomposed as given in [10].

Step2: Max absolute rule is applied to the decomposed texture component images to obtain the fusion

Step3: Gaussian and Laplacian filtering is used to obtain the fusion of approximate components

Step4: Thresholding value is applied and Guided filter is applied on the fused images.

Step 5: Variables $r\ and\ \epsilon$ are the parameters that control the guided filter which is optimized to obtain the best fused image.

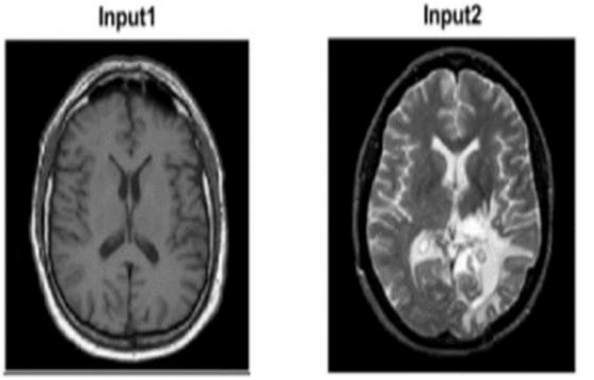
Both the curvelet based and the MFDF based algorithm in this paper is applied on the CT and MRI images to obtain the SSIM value as the parameter that is to be compared.

3. Results and Discussion

MATLAB based simulation is carried out on the CT and the MRI images on both the curvelet based and the MFDF based method. The Curvelet method is optimized using the GA-GWO hybrid algorithm and MFDF algorithm follows a manual parameter tuning method. The parameters that are incorporated for the optimization of curvelet based algorithm is as given in table 1.

Table1: Optimized Curvelet Algorithm Parameter using Hybrid Grey Wolf-Genetic Algorithm

SL No.	Parameters used for the Hybrid algorithm		
	Parameter	GA	GWO
1	Population Size	20	30
2	Iterations	30	50



The CT and the MRI brain images used for the fusion in both the algorithms are as given in Figure 1.

Fig 1:CT (Input 1) and MRI (Input 2) brain images

The process of the image fusion during the optimized curvelet algorithm is iterative in nature. Intermediate fused image during the iterative image fusion process is as shown in Figure 2.

Fig 2:Fused image

The mutual information obtained from the fused image obtained from the optimized curvelet transform is considered for choosing the fused image. Optimized alpha1 and alpha2 values for the maximized Mutual Information (MI) are considered for the fused image. MI optimized images during the mid-iterations is given in Figure 3 and fused image during the complete optimized fusion image is given in figure 4.

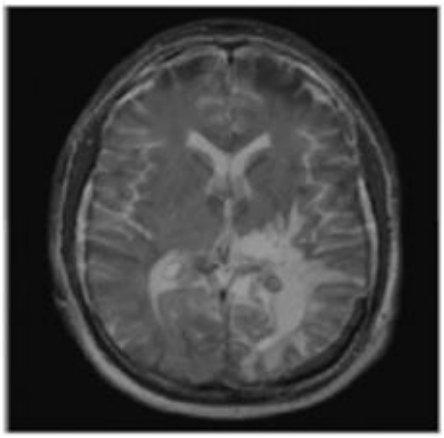


Fig3:MI optimized Fused Brain Image (Intermediate fused)

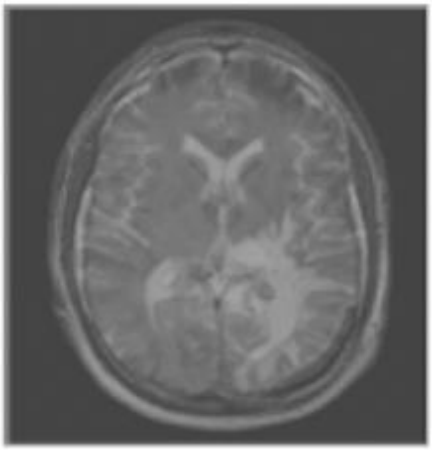


Fig4: MI optimized Fused Brain Image (Final fused)

Similar to the brain image , the same process is also applied on the spine images in order to develop the Curvelet based fusion by optimization.The input spine images of CT and MRI used for fusion process is as given in Figure 5 and 6 respectively.

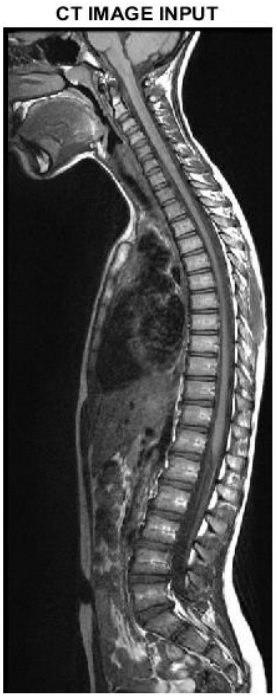


Fig 5. CT image

Fig 6. MRI image

The Fused image for the Curvelet based fusion technique is obtained from the implementation. The fused image during the optimization process is as given in Figure 7 and the complete fused image after the optimization is as shown in figure 8.

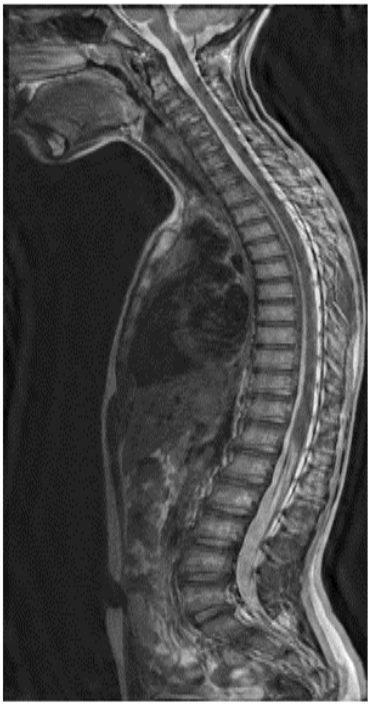


Fig 7. Fused image during Curvelet based optimization

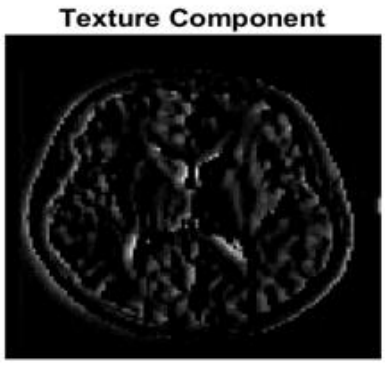
Fig 8. Final Fused image -Curvelet

Based optimization

The results obtained from the MFDF implementation is as following. The input brain images shown in Figure 1 are used for the optimization.The parameters used for the MFDF implementation is as given in the following Table 2.

Table 2. Parameters used for Image Fusion

Sl.No	Parameter	Notation	Values
01	Majority filtering operation in the window size	w	3
02	Laplacian filtering	W1(2,2)	8
03	Guide filtering operation parameters	R, ϵ	4(Size),0.3 (Constant)



The Figure 9 and 10 shows the approximation and the texture component of brain images after the first procedure in the MFDF technique is applied. And the fused image is obtained from the guided filter which is as shown in Figure 11.

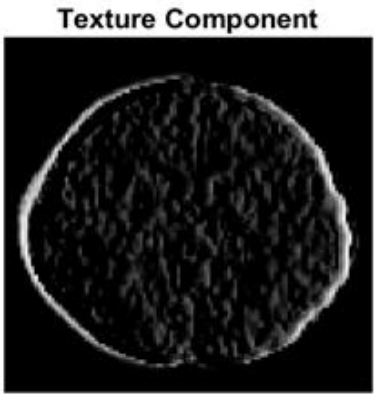


Fig 9. Approximation Component CT and MRI image

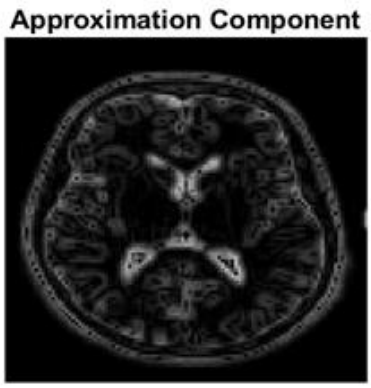


Fig 10. Texture Components of CT and MRI images

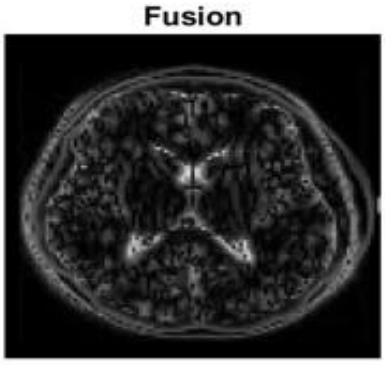


Fig 11. Fused Output Image

Similar to the brain images the same process is carried out with spine images.Figure 12 and 13 represents the texture and approximation component of CT and MRI images respectively.

Fig 12. Texture and approximation component of CT image

Fig 13. Texture and approximation Component of MRI Image

Fig 14. Fused Image

Tabulated values of Mean Square Error (MSE) and Structural Similarity Index Measurement (SSIM) are obtained between the actual image and the corresponding original CT and MRI images. The values are shown in the Table 3. The image size of 328X328 images is applied in the proposed method.

SSIM values obtained between the fused images and CT and MRI image is defined as SSIM1 and SSIM2 respectively. The increased value of SSIM clearly indicates that the fused image represents both the CT and MRI images in a very close manner.

Table 3. SSIM comparison MFDF and Curvelet

IMAGE	Graywolf optimization with Curvelet Method (SSIM)	MFDF (SSIM)
BRAIN	SSIM1=0.2886 SSIM2= 0.3849	SSIM1=0.3389, for r=1, $\boldsymbol{\varepsilon}$ **=0.3** SSIM2=0.4462, for r=1, $\boldsymbol{\varepsilon}$ **=0.003**
SPINE	SSIM1=0. 5230 SSIM2=0.2295	SSIM1=0.3724, for r=1, $\boldsymbol{\varepsilon}$ **=0.003** SSIM2=0.2621, for r=1, $\boldsymbol{\varepsilon}$ **=0.003**

It is found that for the value of r=1 and epsilon =0.003 the SSIM values hasoutperformed the curvelet based optimization problem.

Conclusion

MATLAB based implementation of both Optimized Curvelet and MFDF technique which provides the alpha variable optimization and optimal guided filter value for a better image fusion. The Structural Similarity Index Measurement is compared for both the algorithm and is tabulated for two different kind of medical images. Brain and Spine images for both the CT and MRI modality is used to get the fused image and results of SSIM obtained are tabulated. It is found that the MFDF method performed better with higher SSIM values.

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NEED OF PHONOLOGY/PHONETICS FOR EFFECTIVE COMMUNICATION?

Arun Behera
Department of English, Sri Sathya Sai Institute of Higher Learning, Bangalore
drbehera65@gmail.com

ABSTRACT

Communication refers to the act of transmitting information from one person or a group of persons to another. It involves at least one sender, one receiver and the message. But in order for the communication, especially the spoken mode, to be effective, some knowledge or use of phonology and phonetics is necessary. In the present paper, we discuss the various aspects of phonology and phonetics that help improve our spoken communication thereby rendering the communication more effective. We will, however, restrict the discussion to communication and phonology or phonetics in English.

Keywords: *Communication, Phonology, Phonetics, Language, Sound*

Introduction

Communication is generally thought to be independent, especially, of phonology and phonetics. Though some researchers believe that phonology and phonetics should be restricted to the study of linguistics, and not communication, yet all communication is done using a language that involves phonology and phonetics. So adding phonology and phonetics to the communication curriculum may help the users get the required accuracy in expressing their ideas or thoughts. In other words, communication and phonology or phonetics are inseparable fundamentally because while phonology or phonetics deals with the sounds of a language, how they are articulated and also the rules governing their articulation with accuracy in expression, communication depends on accurate sounds and articulation.

It is a common knowledge that right communication involves accurate articulation of sounds in any message delivery instance. The act of speaking involves, among other things, phonation, which refers to "the vibration of the vocal folds; more commonly known as voicing." (Roach: 2011) The phonemes of the language should be clearly articulated by the speech organs. Phonology is important and relevant simply because it is all about speaking with accurate articulation and communication involves, among other things, speaking.

Communication:

Communication involves two or more persons exchanging information. It is pertinent to look at how it is defined by several people. Holt (1993), for example, defines communication as "the sum of all the things a person does when he wants to create understanding in the mind of another. It is a bridge of meaning. It involves a systematic and continuous process of telling, listening and understanding." In other words, communication conveys the meaning in a systematic manner. Davis (1953) who too echoes similar views says, "Communication is the process of passing information and understanding from one person to another. The act of communication thus include as transmitting and receiving information from one person to another with a view to create mutual understanding." Put differently, communication transmits information from one person to another.

It is evident from all the definitions referred to in the preceding paragraph that message constitutes the crux of communication. Communication involves the speaker(s) or the transmitter(s) or the encoder(s) and the hearer(s) or the receiver(s) or the decoder(s). It also involves the channel or the vocal auditory path through which the sound wave or the sound of the language of communication passes. The sound of the language, therefore, is indispensable to the effectiveness of communication.

It means the 'sound of the language' holds the key to phonology because a speaker first forms

an idea or a message, then encodes the message and then produces some expression or sound in a language which, of course, the hearer decodes and makes out the meaning and responds accordingly. And the entire process results in effective communication. For Akmajian et al (2007), there exist several types and shades of communication, viz. literal communication, non-literal communication, sign language, symbolism etc. The linguistic communication is applied to make the communication clear by bringing together so many aspects such as the speaker and the hearer or the transmitter and the receiver or the encoder and the decoder, and the channel. The channel, of course, is the vocal auditory path that includes the sound wave or the sound of the language of communication. Thus the idea of the 'sound of the language' is central to phonology as it is to communication studies.

It may not be out of context here to quote Katz (1966) who states:

"The speaker … chooses some message he wants to convey to his listeners: Some thought he wants them to receive or some command he wants to give them or some question he wants to ask. This message is encoded in the form of a phonetic representation of an utterance by means of the system of linguistic rules with which the speaker is equipped. This encoding then becomes a signal to the speaker's articulatory organs, and he vocalizes an utterance of a proper phonetic shape. This, in turn, is picked up by the hearer's auditory organs. The speech sounds that stimulate these organs are then converted into a neural signal from which a phonetic representation equivalent to the one into which the speaker encoded his message is obtained. This representation is decoded into a representation of the same message the speaker originally chose to convey by the hearer's equivalent system of linguistic rules. Hence because the hearer employs the same system of rules to decode that the speaker employs to encode, an instance of successful linguistic communication occurs."

The 'sound of the language' involves phonetics and phonology both of which are sometimes interchangeably used as terms though they can be used as concepts at other times. "Phonetics is the scientific study of sounds, giving the description or analysis of what one hears" (Omachonu: 2010). However, Roach (2000) makes the definition clearer by causing a difference between "phonetics" and "phonology". He says, "Phonetics is the scientific study of speech." He further adds, "the most basic activity in phonology is phonemic analysis, in which the objective is to establish what the phonemes are and arrive at the phonemic inventory of the language." In other words, while phonetics is the system of speech sounds of a language, phonology is the study of how these sounds are organized and used in natural languages.

Notwithstanding the distinction, both phonetics and phonology are all about the 'sounds of a language' and it is the 'sounds of a language' that is used in human linguistic communication. Like the sounds of any language, those of English are equally crucial to all communications done in English. Moreover, phonology is of real importance to communication because if the sounds are not clearly articulated, communication may not be effective or may even fail.

The Sounds Of English:

In order to understand the sounds of English so as to articulate them properly, it is necessary to describe each of them as per the International Phonetic Alphabet (IPA). There are, in all, forty-four sounds: twenty vowel sounds and twenty-four consonant sounds. While vowels are those sounds which "make the least obstruction to the flow of air." (Roach: 2011) These sounds are produced without any obstruction to the pulmonic egressive air or the air from the lungs. As contrasted to this, a consonant sound is made with clear obstruction to the pulmonic air. In other words, vowels are produced with an open air passage from the lungs all the way through the vocal folds and the teeth and the lips.

The twenty (20) vowel sounds in English (/ iː ɪ uː ʊ e ə ɜː ɔː æ ʌ ɑː ɒ ɪə eə ʊə eɪ ɔɪ aɪ əʊ aʊ/) can be divided into two categories: pure vowels or monophthongs (12) and diphthongs (8). The twelve pure vowels are further categorised into five long vowels (/ iː uː ɜː ɔː

ɑ:/) as in the words 'peel', 'pool', 'pearl', 'Paul' and 'part' respectively; and the remaining seven short vowels (/ɪ ʊ e ə æ ʌ ɒ/) as in the words 'pit', 'put', 'pet', 'apart', 'pat', 'but', 'pot' respectively. The long vowels are written with a colon (:) in front of them (/ i: u: ɜ: ɔ: ɑ:/) and are articulated with long beats, longer than their short counterparts. The short vowels, on the contrary, are shorter than their long counterparts and are represented without any colon (/ɪ ʊ e ə æ ʌ ɒ/).

The diphthongs are also vowel sounds and are considered long. What O'Connor (1980) feels about diphthongs is worth mentioning. He states, "a diphthong involves the gliding of the tongue from the position of one pure vowel sound to the position of another pure vowel sound." The eight diphthongs in English are categorised into three groups:

1) those gliding towards / ɪ / (/eɪ ɔɪ aɪ/) as in 'bale', 'boil', 'bile' respectively;

2) those gliding towards / ʊ / (/əʊ aʊ/) as in 'load' and 'loud' respectively; and

3) those gliding towards /ə/ (/ɪə eə ʊə/) as in 'peer', 'pair', and 'poor' respectively.

As has been stated above, there are twenty-four (24) consonant sounds in English which can be described according to their place of articulation, manner of articulation and the voicing. In means we can describe consonants using three-term labels, viz. the places where certain consonants are produced, the manner in which certain other consonants are generated, and whether consonants are produced without obstruction or with obstruction in the air passage. The discussion below gives a detailed picture of the consonants on the basis of the three-term labels.

The place of articulation refers to the part of the mouth in which an obstruction is formed against the air flow. There are seven types of consonants on the basis of the place of articulation which are as under:

1) Bi-labial that involves both the two lips (/p b/) as in 'pin' and 'bin' respectively;

2) Labio-dental, that involves the lower lip and the upper teeth (/f v/) as in 'fan' and 'van' respectively;

3) Dental, that is, between the two sets of the teeth (/t d n l/) as in 'tip', 'dip', 'nip' and 'lip' respectively;

4) Alveolar, i.e. the point where the tip of the tongue touches the hard palate (/t n d/) as in 'tip', 'nip' and 'dip' respectively;

5) Palato-alveolar which is the point at which the tongue touches the soft palate (/ʃ dʒ tʃ ʒ/) as in ''sheep', 'jeep', 'cheap', 'pleasure' respectively;

6) Velar, which is the point at which the back of the tongue touches the velum (/k g ŋ/) as in 'came', 'game', and 'king' respectively; and

7) Glottal, i.e. the point of obstruction at the glottis (/h/) as in 'house'.

Secondly, on the basis of the manner of articulation, the consonant sounds are divided into five principal types:

1) Plosives are made with an explosion as a result of the total obstruction built against the air by some of the organs of speech (/p b t d k g/) as in 'pin', 'bin', 'tin', 'din', 'kin', and 'gin' respectively;

2) Fricatives are made with friction. Sounds such as /f v s z h/ as in 'fan', 'van', 'sane', 'Zen' and 'hen' respectively are fricatives.

3) Affricates (/tʃ dʒ/) as in 'sheep' and 'jeep' respectively are a combination of the plosive and the fricative; the sound begins with an explosion and ends up in friction.

4) The nasals (/m n ŋ/) as in 'some', 'son' and 'song' respectively are made with the air exiting through the nasal cavity instead of the mouth cavity.

5) The laterals or approximants (/l r w j/) as in 'lake', 'rake', 'wake' and 'yak' respectively are those during the production of which the air passage does not go in the usual way; instead, there is complete closure between the centre of the tongue and the part of the roof of the mouth where a contact is to be made.

The third way in which consonants can be divided is whether they are voiced or voiceless.

1) Voiced sounds are those during the production of which the vocal chords vibrate, for example, /b d g dʒ v ð z ʒ m n ŋ l r/ as in

'boat', 'dote', 'goat', 'jute', 'vote', 'that', 'zip', 'measure', 'mate', 'note', 'ring', 'loot' and 'rote' respectively.

2) The voiceless sounds are produced without any obstruction in the mouth; the air passes freely through the mouth at different points. There are eight voiceless consonant sounds such as /p t tʃ k f θ s ʃ/ as in 'pin', 'tin', 'chin', 'kin', 'fin', 'thin', 'sin' and 'shin' respectively.

The Sounds Of English Vis A Vis Communication:

For any communication to succeed, one of the basic requirements is the knowledge of the sounds of the language- English in the present context. In other words, as a consequence of imperfect or flawed learning of the linguistic aspects and factors pertaining to English, people fail to articulate words accurately and appropriately resulting in failure to deliver the intended message which leads to miscommunication. Williamson's (1984) observation is relevant here when he identifies the lack of correlation between the sounds of English and the letters. There are twenty-six letters of the English alphabet but forty-four sounds which is one of the major reasons for people's poor articulation of some English words. This lack of correlation accounts for cases of Mother Tongue Interference (MTI), which means the impact of the usage of our mother tongue on the second language, in some non-native English speech. For example, the words Asian/eɪʒən/(/esɪən/), Blood /blʌd/[blɒd], Book/bʊk/[buːk], Bury/bʌrɪ/[berɪ], Cello/tʃeləʊ/[seləʊ], Clerk/klɑːk/[klɜːk], Coffee/kɒfɪ/[kʌfɪ], Colonel/kɜːnəl/[kɜːnel], Cottage/kɒtɪdʒ/[kɒtedʒ], Cupboard/kʌbəd/[kʌpbɔːd], Dhoti/dəʊtɪ/[dhəʊtɪ], Equation/ɪkweɪʒən/[ɪkweɪʃən], Garage/gærɑːʒ/[gæredʒ], Ghost/gəʊst/[ghəʊst], Jojoba/həˈhəʊbə/[dʒəʊdʒəʊbə], Lingerie /lɒnʒərɪ/[lɪnŋerɪ], Move/muːv/[mʊv], Negro /niːgrəʊ/[nɪgrəʊ], Noxious/nɒkʃəs/[nɒksəs], Ocean/əʊʃən/[əʊsən], Passion /pæʃən/[pæsən], Pension/penʃən/[pensən], People/piːpəl/[pɪpʊl], Pizza/piːtsə/[pɪzɑː], Pleasure/pleʒ.ər/ [pledʒər], Raspberry/rɑːzbərɪ/[ræspberɪ], Rouge /ruːʒ/[ruːdʒ], School /skuːl/[ɪskʊl], Seizure /siːʒə/[sɪzər], Shepherd/ʃepəd/[sefəd], Simple/sɪmpl/[sɪmpʊl], Social/səʊʃl/[səʊsɪəl], Status/steɪtəs/[stetɒs], Stephen /stiːvn/[stɪfen], Sugar/ʃʊgə(r)/[sʊgər], Sure/ʃɔː/[sjɔːr], Visible/vɪzəbəl/[vɪzɪbʊl], Women/wɪmɪn/[wʊmen], Yacht /jɒt/[jɒtʃ], Zucchini /zukiːnɪ/[zutʃɪnɪ] etc. are mispronounced as a consequence of the MTI which leads to miscommunication. The (mis)pronunciations of these words resulting from the MTI [given within square brackets] help us understand how far we deviate from the standard pronunciation transcriptions of which appear alongside the words. Of course, the problem pertaining to MTI can be dealt with in a systematic manner, for example, by constant and conscious practice.

Conclusion

The discussion above with ample examples of the sounds of English proves that communication in English is dependent on the knowledge the user has of the sounds of English. It has been found that half-baked knowledge or imperfect learning of the sounds of English amounts to miscommunication or ineffective communication. It is, therefore, suggested that the users of English leave no stone unturned to attain the standard English pronunciation. It is, of course, true to a large extent that attaining the standard English pronunciation like the BBC accent is nearly impossible. However, speakers should strive towards it because our communication is no longer confined to the geographical boundaries of our country, thanks to the globalization. It may be a good idea to encourage communication experts to study some phonology and phonetics, especially the sound system because that would give them the necessary perspective and knowledge so that they can pronounce the words correctly. Adding some basic phonology and phonetics to the syllabus of communication study will also help the learners to a considerable extent because they can get appreciate the manner in which each sound in a word is pronounced.

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RELATION BETWEEN HOME ENVIRONMENT AND SOCIAL ANXIETY OF ADOLESCENTS

Archana Vikraman and Harish Kumar C V
Department of Psychology, Sree Sankaracharya University of Sanskrit, Kalady, Kerala

ABSTRACT

The present study is to give light to the understanding of effect of home environment and social anxiety among adolescents. In this study, 160 adolescents were selected, out of which 81 were boys and 79 were girls from different schools and colleges in Thrissur district of Kerala, between the ages of 12 to 18 years. The instruments used are, Social Anxiety Measure, Home Environment Inventory, and Personal Data Sheet. The data collected were analysed using SPSS. The result showed that adolescent have significant relation between most of the dimentions of home environment and social anxiety.

Keywords: *Home Environment, Social Anxiety, Adolescents.*

Introduction

A peaceful mind plays an important role in the human beings life. It helps an individual to attain a proper level of mental health. Anxiety is one of the most common mental health problem that increasingly prevalent in modern society. But a low level of anxiety can be a useful motivating force. Social anxiety is the fear of social situations that involve interaction with other people. It is a pervasive disorder and causes anxiety and fear in most all areas of a person's life. It is chronic because it does not go away on its own. People with social anxiety are many times seen by others as being shy, quiet, backward, withdrawn, inhibited, unfriendly, nervous, aloof, and disinterested. Paradoxically, people with social anxiety want to make friends, be included in groups, and be involved and engaged in social interactions. But having social anxiety prevents people from being able to do the things they want to do. Although people with social anxiety want to be friendly, open, and sociable, it is fear (anxiety) that holds them back. Family environment plays an important role in the development of social anxiety (Thomas A. Richards, 2019).

The word anxiety is derived from German term 'angst' which means fear. Fear is the heart of all anxiety states. Anxiety can be acquired or learned avoidance response or reaction pattern. An individual who is born and brought up in a family atmosphere where the parents show undue concern anxiety even on tiny matters are naturally prone to develop an anxious nature. They are more likely to develop an anxiety disorder when confronted with stresses and strains in life. The avoidance situation presented by parents are incorporated by the child. This may lead to the formation of a developmental anxiety sequence which gets reinforced by the avoidance responses or reaction patterns that are being taught by the parents or which the child himself has learned by imitating his parents. It is the faulty social learning model that is being presented by parents which leads to the development of an anxiety reaction patterns similar to that of parents (A. J. Thottungal, 2009).

Common stressful family situations are those in which one or more members find themselves playing roles which are difficult for them, and thus anxiety provoking; and those which arise when a family runs in to difficulties negotiating a particular developmental stage (Ved, P. Varma, 2001). Such situations may of course provoke anxiety in adult family members.

Need and significance of the study

Anxiety is one of the most common mental health problem that increasingly prevalent in modern society. It is considered a disorder when person experiences fear of things that most people would not find stressful or when that fear persists after the apparent cause is gone. Social anxiety is a shorthand term that describes the fear, nervousness and apprehension most people at times experience in their relationships with other people. Family or home environment plays an important role

in the development of social anxiety in children. A child who is born and brought up in a family atmosphere where the parents show undue concern anxiety even on tiny matters are naturally prone to develop an anxious nature. They are more likely to develop an anxiety disorder when confronted with stresses and strains in life. The avoidance situation presented by parents are incorporated by the child. This may lead to the formation of a developmental anxiety sequence which gets reinforced by the avoidance responses or reaction patterns that are being taught by the parents or which the child himself has learned by imitating his parents. Despite the availability of treatments, fewer than 5% of people of with social anxiety disorder seek treatment in the year following initial onset and more than a third of people report symptoms for 10 or more years before seeking help (Anxiety and Depression Association of America 2010-2018). the present study investigates about the relation between social anxiety and home environment among adolescents.

Definition of Key Terms

Social anxiety

Social anxiety is defined as a cognitive and affective experience produced by a social situation that includes both physiological arousal and apprehension about possible uncontrollable positive outcomes. (Crozier & Alden, 2001).

Home environment

Conditions, circumstances, etc., of the place one lives, especially with one's family and which affect their life. (Oxford Dictionary of Psychology, 2001).

Adolescence

Adolescence is the period that begins with the onset of puberty and ends when individuals assume adult roles and responsibilities. (Baron, 1995).

Objective:

To find out the significant relationship between social anxiety and home environment of adolescents

Hypotheses

There will be significant relationship between social anxiety and (home environment) control, protectiveness, punishment, conformity, social isolation, rewarding behaviour, deprivation of privileges, nurturance, rejection, and permissiveness of adolescents.

METHOD

Sample

The study was conducted on 180 adolescents, out of which 81 were boys and 79 were girls from different schools and colleges in Thrissur district of Kerala. Purposive sampling method was used for the selection of sample.

Personal Data Sheet

Personal data sheet was prepared by the investigator in order to collect certain personal details of the subjects under study. It consist of certain questions related to age, sex, school or college, class, and family type.

Home Environment Inventory (Dr. Karuna Shanker Misra, 1983)

The HEI (Home Environment Inventory) was developed by Dr. Karuna Shanker Misra (1983). HEI has 100 items belonging to ten dimensions of home environment .They are (A) Control, (B) Protectiveness, (C) Punishment, (D) Conformity, (E) Social Isolation , (F) Reward, (G) Deprivation of privileges, (H) Nurturance, (I) Rejection , (J) Permissiveness. Each dimension has ten items belonging to it. There is no time-limit for this tool.

Social Anxiety Measure (Sananda Raj, 1995)

This test was developed for measuring the 'anxiety resulting from the prospects or presence or interpersonal evaluation in real or imagined social settings' or what is called 'social anxiety' (Sananda Raj, 1995). Social anxiety measure was developed earlier in 1988 and the revised version (Sananda Raj, 1995) was used in this study. There were 30 items in the present scale, covering a wide variety of social situations involving anxiety. It may be mentioned here that there are equal number of positive, and negative statements (items) in this test.

Procedure for data collection

For the purpose of data collection, permission was granted by the principals of respective colleges. The selected sample were contacted prior to the study and obtained permission to collect responses. Then the investigator established a good rapport with participants. After a brief introduction about the purpose of the study all the instrument was distributed into a group of adolescents. Informal consent was also collected from all the subjects. After collecting the responses, it was securitized for omission and incompleteness, then scored with the help of respective manuals.

Analysis of data

The analysis was done using SPSS.Correlation was used for analysis

Pearson's 'r' was employed in the present study to estimate the interrelationships among the different variables. The significance of the obtained 'r' was compared with the limits established using the standard error of 'r' which is calculated for 0.1 percent, 1 percent and 5 percent level.

Result and Discussion

Result obtained in the study are reported and discussed below

Table1: Correlation for Social Anxiety and dimensions of Home Environment

	Control	Protectiveness	Punishment	Conformity	Social Isolation	Reward	Deprivation of Privileges	Nurturance	Rejection	Permissiveness
Social Anxiety	.187*	.084	.106	-.052	.398**	.075	.428*	.077	.307**	.075

The result of Correlation analysis between social anxiety and (home environment) control, protectiveness, punishment, conformity, social isolation, rewarding behaviour, deprivation of privileges, nurturance, rejection, and permissiveness of adolescents are presented in Table 4. 10. The correlation value of control dimension of home environment (.187*) indicates that there is significant correlation between control dimension and social anxiety of adolescents. Control dimension indicates the autocratic atmosphere, and restrictions that are imposed on children by their parents in order to discipline them. Adolescents who have more control behaviour leads to develop social anxiety.

The correlation value of social isolation dimension of home environment (.398**) indicates that the dimension social isolation is highly correlated with social anxiety. The social isolation indicates the use of isolation from beloved persons except family members for negative sanctions. Adolescents who are more isolated leads to social anxiety.

The correlation value of deprivation of privileges dimension of home environment (.428**) indicates that the dimension deprivation of privileges is highly correlated with social anxiety. Deprivation of privileges indicate the controlling children's behaviour by depriving them or their rights to seek love, respect, and childcare from parents. Deprivation of privileges may lead to frustration and other psychological disturbances. They have a chance to develop social anxiety.

The correlation value of rejection dimensions of home environment (.307**) indicates that the dimension rejection is highly correlated with social anxiety. Rejection indicate the conditional love recognizing that the child as no rights as a person, no right to express his feelings, no right to uniqueness, and no right to become an autonomous individual. A child who was completely rejected in their family, have the chance to develop social anxiety as a result of their raring patterns.

The results of the study by Wamboldt and Wamboldt in 2000, on the topic related to the role of family in the onset and outcome of childhood disorders, also found that families can cause problems, but many times the problems families have are in response to child's problems.

Brynjar Halldorsson and Cathy Creswell (2017), investigated about social anxiety in pre-adolescent children. From the result, there was evidence that high social anxiety were significantly associated with a tendency to interpret social situations as threating, use safety-seeking behaviours, high elevated levels of self-focused attention, negative anticipatory or post-event processing and with the experience of more negative parental behaviours.

Conclusion

The present study was aimed to find the effect of home environment and social anxiety among adolescents. The result found that there is a significant correlation between social anxiety and control dimension, a highly significant correlation between social isolation, deprivation of privileges, and rejection dimensions of home environment among adolescents. The findings of present study will be useful for the area of research of social anxiety.

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SOCIO-ECONOMIC CHANGE OF TRIBAL PEOPLE OF BILASPUR PLAIN AREA (CHHATTISGARH STATE) (REFERENCE TO SAMPLE VILLAGE OF MASTURI BLOCK) BILASPUR DISTRICT

S. Shukla
Govt. Bilasa Girls P.G. College, Bilaspur (C.G.)

ABSTRACT

The paper mainly study on Socio-Economic Change of Tribal People of Bilaspur plain Area of Chhattisgarh State. It studies the physical and socio-economic environment of study Masturi Block in Bilaspur District.

Keywords: *Socio-Economic Change, Tribal People, Economic Development, Environment*

Introduction

The concept of economic development was to change the overall socio-economic changes of under privileged high tradition heritage of tribal's, constitutional safe guards has been incorporated. But now the whole socio economic vision have, been changed and economic development, either in rural or scheduled area become, the means and cheap way to capture the vote bank of illiterate and exploited population.

Socio economic development reduced poverty of the rural area the standard and quality of life and build of a equitable society are the main goal of plan. During the planning period country made a great stride in socio-economic development increased food production, industrial product, electricity generation, similarity, hospital beds, schools, literacy are also increased.

Selection of Topic

India is country of villages where 70% of total population on is living in our country rural development on is living in our country rural development is the national development. Positive change in the socio economic condition of the villages make the country's economy sound. Present study which is based on villages level survey will be helpful not only to say to evaluation the socio economic condition of the rural area but it will also help to understanding the problem of rural area. The study will also be useful in planning for raised solution of the socio-economic problems at gross root level enhancing the quality of life of the rural areas.

OBJECTIVE

The study includes the following objective –

(i) To study the physical and socio-economic environment of study area (sample villages)

(ii) To study their changes of socio economic structure and level of tribal population.

Study Area

Chhattisgarh state is in central India formed on November 2000. Chhattisgarh is popularity recognized as rice bowl of the country. Bilaspur district is situated in north western part of Chhattisgarh state is bounded by longitude $80^0 21^0$ to 82^0 27' and by north latitude 20^0 42' to 23^0 06' north.

The study area Masturi block is situated southern part of Bilaspur district which are physically plain area part of Mahanadi Basin.

Geographical location of Masturi block lie between the latitude 21^0 42' to 22^0 19' North and longitude 82^0 10' East to 82^0 29' East. An area of 739.00 sq kilometer. The total populationof Mastiri Block 297726 according to 2011 census.

Sample Village

(i) Tendua– Tenduavillage situated in northern part of Masturihead quarter The village cover 306.240, hactare area. The village geographical location lie 20^0 05' 30' North to 82^0 20' 02" East longitude Average hight of the surface, 220 meters, and distance from Musturi head quarter to15 kilometers. Tendua village comes out 90% of Tribal population, according to 2011 census.Tendua village including under

patwari halka 37 number. The total surveyed house hold (during 2014-15 year) is 100 out of 120 total house hold are according 2011 census.

(ii) Betri –Betrivillage situated in southern part of Masturihead quarter including patwari halka38 number. The total population of village 714 as (2011 census). The villege mostly comes tribal population. The village Covered 212.24 hactare area. The number of house hold 120 and total surveyed house hold are 111 during 2014-15 surveyed year .

(iii)Kosamdih :- Kosamdih village situated western part of Masturihead quarter, distance from 19 kilometer. It is lie between extend 20^0 00' north latitude to 82^0 01' East longitude. The total area an 554 hactare. It is come out patwari halka number 39. Kosamdihthe number of house hold 311 and total surveyed house hold are 154 during 2014-15 surveyed year .

Data Collection

The study is based on both primary and secondary data. Primary data is collected through the field survey by interview, questionnaire and schedule during survey year 2014-2015. The ultimate unit of the study of house hold which is 80% of total house hold of the sample village.

Secondary data is collected from different govt. official records as census report, national sample survey, Block head quarter, Bilaspur Head Office RI office respectively and some of the information about village is collect through discussion with villages, sarpanch, patwari of the village.

Methodology

Methodology depends on the study objects. But some part of it is very common from introduce to conclusion for any research work. Even in our socio economic survey of village, we applied some methodology like sample selection of villages, unit comes Number of family (80% field survey), Examine their socio economic level from indicator, like income level, land size holding, literacy and and other infrastructure facilities, collect all primary and secondary data, then analysis of data percentage, were calculate and used in the table to compare. Beside this many graphs and diagrams were made by using data to analysis the socio economic condition of surveyed villages.

Following indicators are use to socio economic status of villages

A- Demographic Characteristics
(i) Population structure / Growth
(ii) Age structure
(iii)Sex Ratio
(iv)Literacy Rate
B- Economic Characteristics –
(i) Agricultural Land use
(ii) Cropping pattern
(iii)Land under Irrigation
(iv)Agricultural Equipments
(v) Live stock
(vi)Land size holding
(vii) Income level
C- Infrastructure Facilities
D- Socio Economic level Index

A (1) Population Growth

Table –1: Surveyed village: population growth (1991-2001)

Years	Tendua		Betri		Kosamdih	
	Population	Growth Rate	Population	Growth Rate	Population	Growth Rate
1981	300	-	442	-	571	-
1991	328	9.3	568	28.5	878	53.76
2001	311	-5.1	435	-23.41	748	-14.80
2011	430	26.0	714	64.13	1425	90.50

Source – Census data.

The growth of population is directly influenced by trends in fertility and mortality and pattern of migration. All effects to improve socio economic condition of the people are thrown out of year by tremendous increase in total population.

All three villages the population is increasing in year 2011 the growth rate Tendua village 26.0, Betri 64.13 &Kosamdih 90.5.

The main causes those are –

1- Most of the people are conservative and fulfill the demand off mail child so population is increase.
2- Low literacy rate is also effect the population growth.
3- Medical facility is available the nearest health centre, so death rate is low.

Population of Surveyed Families

Population of surveyed families.(Tendua, Betri&Kosamdih) aregiven below table.In The100 house hold are surveyed out of 120 in Tendua village., Betri are surveyed 110 number of house hold,out of 111 house hold. and Kosamdih are surveyed 154 house hold. Out of 311 house holdWhich are respectively 83%, 99%, 80% Percentage of total house hold.

Table – 2: Surveyed Village – Population of Surveyed Family

Surveyed Village	Total House hold according census (2011)	No. of Surveyed House hold	Total Population	Male	Female
Tendua	120	100	535	211	324
Betri	111	110	617	320	297
Kosamdih	311	154	862	425	437

The above table shown that Tendua and kosamdih villages are tribal village which are respectively 75%,and86% of tribal population. But in Betri 77% population are schedule cast.

Table – 3: Category wise Population Structure-(Surveyed Data)

	Total population	ST population		SC population	
		T	%	T	%
Tendua	536	315	58.7	22	4.1
Betri	617	140	22.0	466	75.5
Kosamdih	823	590	71.6	68e	8.2

(ii) Age Structure :- The composition of population of according to age and sex is called the age and structure The universal features of human population are fundamental to understanding demographic process of fertility ,maortility and migration Age composion may be summarized in term of age group (0-6),(18-45),(above 45) as child group, adult group, and old group.The age structure of given country or region may be analysised on the basis age group.On the basis of physiological and economic activites,the population is generally classified in to three group-

(i) Child group (ii)Adult group (iii)Old group. The socio economic and political implication of these age group and the geographical variation in their distribution worthy of serious consideration.

Table – 4: Surveyed village : Age Group Population (Surveyed Data)

Village	Survey h.h.	Population			Child group 0-6		Adult group 18-45		Old group 45-above	
		T	M	F	T	%	T	%	T	%
Tendue	100	536	212	324	162	30.0	241	44.9	59	11.0
Betri	110	617	320	297	175	28.3	298	48.2	42	6.8
Kosamdih	124	823	443	380	288	34.9	449	54.0	46	5.5

The above table show that 0-6 age child group,high range 34.9% found in kosamdih and 30%in Tendua,and low percentage in Betari28.3%.The adult age group 18-45 are high percentage in Kosmdih and low is Tedua village

Sex Ratio

The numerical measurement of sex composition of a population is often expressed in term of sex ratio. The sex ratio is calculated in terms of number of females per thousand (1000) male.

Table – 5: Survey Village – Sex Ratio (Census 1991-2011)

	Tendua				Betari				Kosamdih			
Year	T	M	F	Sex Ratio	T	M	F	Sex Ratio	T	M	F	Sex Ratio
1991	328	163	165	1012	568	270	298	1103	878	442	436	986
2001	341	157	184	1171	435	221	214	968	748	399	349	874
2011	430	205	225	1097	714	377	337	893	1425	727	698	960

Literacy

Education is the key factor for the rapid development of a region. " Among the various indicators of population quality achievement in the space of literacy are the most important in the content of developing area"(Gosal and Krishan 1984)

Table – 6: Surveyed Village – Literacy Rate(Census Data – 1991-2011)

	Tendua			Betri			Kosamdih		
Year	Total Popu.	Litrate Popu.	Literacy %	Total Popu.	Litrate Popu.	Literacy %	Total Popu.	Litrate Popu.	Literacy %
1991	328	87	26.5	568	193	33.9	878	320	36.4
2001	311	135	43.4	435	247	56.7	748	364	48.6
2011	430	237	55.1	714	325	45.5	1425	885	62.1

According to census data the low percentage of literacy rate of village in 1991 year Tendua 26%, Betri 33% and Kosamdih 36% in 2011 year the literacy rate increase as Tendua 55% Betri 45% and highest literacy rate in village Kosamdih 62% that reasons the people of villages awareness for their education.

(i) Agriculture Land use :-The economic condition of the village depend upon the agriculture. It is clear from land use data that main and primary occupation of the villages is agriculture activities. Expect April May and Jun the cultivators are engaged in agriculture activities.

(ii) Land use :- Man has been using land far one purpose or another from time immemorial, and thy system utilization of knowledge relating to land use dates as for back as the imposition of taxes on land according to its use and quality. Land use actually is a dynamic culture concept which is a result of mutual action of physical economic and social factors.

Table - 7

Name of the villages	Total area in (hec.)	Forest land	Land put of non agricult6ural use (%)	Fallow land (%)	Net Sown area (%)	Double Crapped area (%)
Tendua	306.24	-	19.4	0.6	70.00	6.5
Betri	212.00	-	18.3	2.1	68.25	3.5
Kosamdih	554.31	-	20.80	1.3	71.25	9.7

Source (Land Record Office, Bilaspur C.G

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(iii)Cropping pattern :-In surveyed village Paddy is the prime crops on it is some in all over Chhattisgarh but wheat, teora, Gram, Arhar also grown in some part through in a small ratio.

Table – 8: Surveyed Village – Crapping Pattern

Village	Craps	Area in (Hectare)	% From total Crapped area

Tendua	Paddy	160.33	54.31
	Arhar	19.33	6.54
	Wheat	21.59	7.28
	Tiwara	65.89	22.32
	Others	28.13	9.52
	Total Cropped area	295.18	-
Betri	Paddy	102.38	51.29
	Arhar	23.72	11.57
	Wheat	12.81	6.03
	Tiwara	20.54	10.06
	Others	41.2	20.62
	Total Cropped area	198.84	-
Kosamdih	Paddy	268.30	50.75
	Arhar	38.21	7.42
	Wheat	48.32	9.37
	Tiwara	128.42	24.98
	Others	30.12	5.85
	Total Cropped area	512.25	-

Data Source – Land Record Office Bilaspur (C.G.)

(iv)Irrigation

Table – 9: Surveyed Village – Land Under Irrigation

Name of Village	Irrigated area in (Hectare)	% of Irriagated Area in T.C.A.	Total Area in Hectare
Tendua	38.251	12.5	306.24
Betri	44.096	20.8	212.00
Kosamdih	167.308	30.2	554.31

Source – R.I. Office Bilaspur (C.G.)

In Tndua village the percentage of irrigated area from total cropped area (TCA)is 12.5% ,inBetri village,20.8%, and kosamdih is30.2% irrigated by cannals

(v) Agricultural Equipments :-Efficient agriculture machinery or equipment are necessary for agricultural productivity. The presence of agricultural equipment in indicators of technological level of the region.

Table – 10: Surveyed Villages – Equipment use in Agriculture

Village	Tractor	Plough	Bullock cart	Tube well
Tendua	04	08	08	02
Betri	07	10	10	08
Kosamdih	14	13	18	10

Data Source :- Sample Survey 2014

(vi)Live Stock:-The term live stockreferes to animal husbandry. Animal are the resource of one area. It is very essential for agriculture. The total animal are

Table – 11: Surveyed Village – Live Stock

	Name of Animals					
Village	Ox	Cow	Calf	Baffalow	Other	Total
Tendua	12	25	18	15	20	90
Betri	15	28	15	25	21	104
Kosamdih	13	70	20	17	12	133

(vii)Land size holding :-In the study area the land size holding devided by five group – 1 land less (ii) below - 2 acar land size (iii) 2 - 5 land size (iv) 10-15 acar land size (v) 15-25 acar land size holding. The number of surveyed family hold this categories has been shown by below table.

Table – 12: Surveyed Family – Land Size hold

Land size hold (acars)	Tendua Number of Family	Betri Number of Family	Kosamdih Number of Family
Less Land	05	04	10
Below - 2	10	08	22
2 - 5	31	42	44
10 - 15	45	28	20
20 -25	17	24	20
25 - above -	02	04	08

Income level –During the field survey the below data have been collect from villagers income for their various sources. Major source of their income gainagriculture work and some part time of secondary and ternary work.

Table – 13: Surveyed village income level (Annual)

Income level (Annual)	Tendua	Betri	Kosamdih
Below – 6000	15	18	22
6000-12000	20	19	30
12000-30000	12	20	22
30000 - Above	10	12	18

Source survey Data

Infrastructure Facilities

Table – 14: Surveyed village Infrastructure Facilities

Facilities	Tendua	Betri	Kosamdih
1- Education Facilities Agan Badi/ Primary School	01 Nearest	01	01
Primary school	Jai Ram Nagar	01	01
Middle school	2 km	01	01
High school	NIL	NIL	NIL, Nearest
Higher Secondary	NIL , Nearest	NIL, Nearest	Masturi 3 km.
/ UG/PG Level	5 km .Masturi	12 km Masturi	Masturi 3 km.
2- Health Facilities			
Primary health center	NIL	NIL	NIL
Sub health center	NIL	NIL	NIL
Alopathic / Dispencary	Nearest 4 km.	01	01
(Nearest Dispencary)	Masturi 5 km.	Head quarter (masturi)	Masturi 3 km.
3- Transport Facilities			
Bus / Railway	Bus &Railway	Bus – 01	Bus – 01
Other – (By cycle two wheelor	Yes	Yes	Yes
Road – Matlled / non mattled	Yes Road	Yes mettaled road	Yes

4- Drinking water -			
Well	01	02	02
Ponds	02	05	06
Hand pumps	05	05	10
River/ Tank/ Canals	01 (River)	01 Tank	
Tube well	01 (canals)	01 (canals)	
5- Market – Facilities			
Local -	Yes	Daily	Yes daily
Nearest Center	Masturi	Weekly	Weekly
Electricity	Jai ram Nagar	12 km.	Masturi 3 km.
Yes / No	Yes	Yes	Yes
6- Post & Communication			
Post office Y/No	No	No (Nearest) 1 km.	No. Nearest Masturi 3 km.
Telephone Y/No	No	No	No

Socio Economic Index of Surveyed Village

Socio-economic level depend on per capital income occupation infrastructure facility. Such as health, drinking water supply, sanitation, latrine, education, employment. So far describe the level of socio economic sample house hold description another important fact. The data are collected by field survey during 2014-2015. It help to analysis the socio economic condition and life quality.

In the surveyed villages, the study of socio economic level are analysis following weight assigned to different indicators at House hold level

Table – 15: Weight Assigned To Different Indicators at House hold levels

S.No.	Indicators	Weight
1.	Education of head of family of house hold	
	Illiterate	NIL
	Up to primary	1
	Up to metric	2
	Up to Graduation	3
	Above Graduation	4
2.	Per capital income (Annual)	
	< 6000	1
	6000-12000	2
	12000-30000	3
	> 30000	4
3.	Occupation of head of house hold	
	Labour	1
	Business	2
	Service	3
4.	Housing Occupancy Status	
	Tenant	1
	Owner	2
5.	House Type	
	Kachha	1
	Pakka	2
6.	Sanitary	
	No	Nil
	Yes	1
7.	Sewerage System	
	Open system	Nil
	Septic Tank	1

	Under Ground System	2
8.	Source of Drinking water	
	River Public stand past Tap/ Hand Pump	Nil 1 2
9.	Agricultural equipment	
	Plough Bullock cart Tractor Tube Well	1 2 3 4
10.	Irrigation	
	No Yes	1 2
11.	Use of Fertilizer	
	No Yes	1 2
12.	Other Facilities in Village	
	Education Transport Market Health (PHC) Electricity supply	1 2 3 4 5
13.	Other Facilities in family	
	Bicycle T.V. Cooler Mobile News Paper	1 2 3 4 5
14.	Facilities Bath room Toilet	
	No Yes	NIL 1

These indicator were added by giving weight in order to all composite scores of socio economic levels of house hold as the basis of all percentages of house hold than classified in the three categories –

1. Low Index
2. Middle Index
3. High Index

Table – 16: Socio-economic level Index

		Name of Village					
Different Socio Economic level of house hold	Score	Tendua		Betri		Kosamdih	
		House hold Number	%	House hold Number	%	House hold Number	%
Low Index	Below-10	69	69	48	43	69	55
Middle Index	10-15	25	25	52	47	41	33
High Index	15 above	06	6.0	10	9.0	14	11

(i) Low Socio Economic Level

The village Betriis 43%, Tendua is 69% and Kosamdih is 55% are including in this group. The per capita income are very low, less than 6000 per year. Small house holding 0-2 acres rested house the family size are big, and literacy among male and female both are low percentage are the major characteristics of this level. They were mostly agricultural labour.

They have no more facilities for agricultural work as so their land left as a fallow land because no more capital and other facility for cultivation and their living standard are very low. Comparatively the village Tendua comes (69%) families are this categories.

(I) Middle socio economic level

In the study area, the surveyed village Tendua total house hold surveyed (100) and 25% comes this level the village Betri total house hold (110) and comes 47% this level and kosamdih village total house hold surved 124, and 33% come middle level. This group, the per capita income is less than 8000-12000. The most of the house holds having the land about 5-10 acres and working as cultivators as well as agriculture labour. There education level is medium and mostly family have pass out primary and middle school. They have both types house (Kacha&Pakka). They have available of irrigation facilities in cultivation. The use also tractor and other equipment for agriculture works. They advantage to many Govt. plan. comparatively the Betrivillage (47%) families, come middle socio economic level.

(II)High Socio Economic Level

Analysis the socio economic level index. It is noted that very low percentage of house hold are comes under this group like. Tendu (6%), Betri village is (9%) and Kosamdih village (11%) Annual per capita income of this group are more than 25000. Literacy rate of male and female is also high in comparison with low and middle although agriculture is the primary activity of all three group, but in high level people have their own land with average size land holding above 20 acres. The all agriculture facility are available. They use, high breed seeds, pesticide and all equipment tractor, thrasher and machine for agriculture work. Mostly house hold Family available mobile, T.V. cooler and scoter, some family are engaged govt. job and other engaged secondary and tertiary work.

Socio Economics Changes

In surveyed village some socio economics changes have been found, as described below:-

(1) Awareness towards education.
(2) Change in the age ofgirls getting married.
(3) Some families have knowledge of family planning, so their family size is small.
(4) They are now more alert towards their family health. If they suffer from any serious illness then they come to nearest health centre and avoid (BaigaGuniya)Upchar.
(5) They takeadvantage of many government planning as KisaanYojna, Kanya VivihYojna, Banking facility Yojna, Health planning, MatrutavYojna, MahtariYojna, Pension Yojna, Scholarship Yojna, BetiBachavaurBetiPadhavYojna etc..
(6) The changes in the socio-economics status of village is effected by Lady Sarpanch election. Lady Sarpanch plays the main role in solving the problem of rural areas.

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QUALITATIVE ASSESSMENT OF THE CONSUMPTION OF WASTEWATER IN THE DAIRY INDUSTRY

D.V. Gómez[1], E.B. Cuatis[2], P.L. Veloz[3], P.M. Arévalo[4], C.J. Pilco[5]
[1,2,3,4,5]Universidad Estatal de Bolívar, Facultad de Ciencias Agropecuarias, Carrera Agroindustrias, Guaranda – Ecuador
[1]dvillalta@mailes.ueb.edu.ec

ABSTRACT

Milk is one of the basic and essential foods in the human diet, due to its high nutritional content a wide range of by-products is made, ranging from fermented products, such as yogurt and cheese, to non-fermented ones. It is estimated that between 9 and 10 kg of cow's milk are required to make 1 kg of cheese, which determines a high volume in liters of wasted whey that ends up in sinks as highly polluting wastewater. Thus, in this study a qualitative bibliographic inquiry was carried out from an impact matrix to determine the possible solutions to face this problem. After the quantitative assessment (importance), values less than -25 predominated above all in impacts that deteriorate the water. In the same way, in draining there is an importance of the impact of -32; in the elaboration of yoghurt a rating of -25 is obtained. Considering these results, several authors recommend some alternatives among them are; effluent treatment (based on the BOD / COD ratio); Treatment of brines (Concentration, Pasteurization, Microfiltration and UV exposure) and use of by-products such as Whey, from this you can make ricotta cheese, whey powder, fermented and hydrating drinks, preparation of animal feed, preparation of agricultural inputs. Finally, in several investigations they recommend optimizing the use of water and energy, optimizing raw materials, Plan, Do, Check, Act, maintenance and inspection of equipment and combat noise.

Keywords: *Qualitative assessment, dairy products, alternatives, uses, recommendations*

1. Introduction

Milk is one of the basic and essential foods in the human diet, since it is rich in nutrients and a source of proteins of high biological value, this raw material includes a wide range of by-products ranging from fermented products, such asyogurt and cheese, even unfermented. Generally, dairy processing plants tend to be located on the periphery of urban centers close to consumer markets (**Bidot Fernández, 2017**).

It takes between 9 and 10 kg of cow's milk to make 1 kilo of cheese, which determines a high volume in liters of wasted whey that eventually ends up in sinks such as sewage, in fact, in developing countries it is common to note that theproduction of these dairy products takes place on the same dairy farms (**Contexto Ganadero, 2017**).

In its economic aspect, it is estimated that more than 150 million people around the world are engaged in milk production.The dairy sector provides more employment per unit of milk production in developing countries than in developed countries (**FAO, 2021**).

The generation of wastewater is the most important environmental aspect of the dairy industry activity, both due to the high volumes generated and the associated pollutant load.Most of the water that is used eventually ends up as effluent, this given that there is no water supply to the final product(**Del Carpio Salas et al., 2021**).

In general, between 80 and 95% of the total water consumed in this industry is part of the final effluent.The partial streams that contribute the most in volume and / or pollutant load to the final effluent come from the cleaning of equipment, facilities (production lines), waste from ultrafiltration systems and cleaning of raw material transport trucks(**Khaire, & Gogate, 2018**)

The concentrations of the waste vary in relation to the process and also vary from one installation to another, in which the following factors stand out: degree of optimization of water consumption, cleaning procedures and chemical products used, technology used in operations of consumption ofwater and production change (product to be manufactured)(**Vargas Corredor & Pérez, 2018).**

These waters usually have the peculiarity of high fat content and high nitrogen (hence the need for nitrification / denitrification

processes), and high phosphorus content.In addition to the already known problems of high COD.As in most companies in the agri-food sector, dairy industries consume large amounts of water daily in their processes, ranging from 1,3-3,2 L of water / kg of milk received, reaching values as high as10 L of water / kg of milk received. However, it is possible to optimize this consumption to values of 0,8 - 1,0 L of water / kg milk received using advanced equipment and proper operation. As previously described, the objective of this work is to inquire about tests and investigations carried out that provide a qualitative value of water consumption in the dairy industry.

2. Metodology

For the execution of this study, a type of qualitative research was selected, which by definition "is that systematic inquiry procedure that provides specialized techniques to collect data according to previous research"(**Brugueras et al., 2008**).

2.1.Bibliographic Review

For this review, a total of 72 bibliographic documents were analyzed, of which 34 were used in this writing.These consisted of: 16 scientific articles;12 theses at the undergraduate and graduate level, 6 documents including information brochures, web pages and state databases.

2.2.Development

In order to qualitatively consider or assess wastewater, in the first instance several authors have agreed to create an impact matrix(**Haro-Velasteguí et al., 2017**).

In this sense, it consists of the quantitative assessment of the matrix of activities through the use of qualification criteria (+/-) previously presented and established in different bibliographies, with values between 13 and 100;considering as compatible or negligible those with a rating greater than -25, between -25 and -50 moderate, -50 to -75 severe and less than -75 as critical.The importance matrix is presented below.

Table 1.Impact matrix in the dairy industry

MILK PROCESSING																	
PHASE	CODE	AMBIT	NATURAL SUBSYSTEM							SOCIO-ECONOMIC SUBSYSTEM							
			PHYSICAL CHEMICAL				BIOTIC		PERCEPTUAL	ECONOMIC					CULTURAL		
		ACTIVITIES	SOIL	WATER	AIR	WEATHER	FLORA	WILDLIFE	LANDSCAPE	POBLATION	USE AND [illegible]	TRANSPORT	FAMILY ECONOMY	INFRASTRUCTURE	PATRIMONIAL [illegible]	QUALITY	HEALTH
FUNCTIONING	A1	Reception of Raw Material		X								X	X				
	A2	Pasteurization		X									X				
	A3	Standardized		X									X				
	A4	Storage		X									X				
	A5	Ultra pasteurization		X									X				
	A6	Homogenized		X									X				X
	A7	Packaging and palletizing	X	X					X				X				

	A8	Storage		X									X					
CHEESE PRODUCTION																		
FUNCTIONING	B1	Tempered		X									X					
	B2	Inoculation											X					
	B3	Coagulation		X									X					
	B4	Desuered		X									X					
	B5	Molded and pressed		X									X					
	B6	Salty	X	X									X					
	B7	Packing		X					X				X					
	B8	Storage		X									X					
YOGURT PRODUCTION																		
FUNCTIONING	C1	Tempered		X									X					
	C2	Inoculation											X					
	C3	Incubation		X									X					
	C4	Cooled		X									X					
	C5	Filling / Packaging	X	X					X				X					
	C6	Storage	x	x									X					

X: Negative impacts; X: Positive impacts

3. Results

3.1.Impacts on the dairy industry

In the quantitative assessment (importance), values less than -25 predominated above all in impacts that deteriorate the water, considered among them a physicochemical factor of the natural subsystem(**Godoy, 2019; Prado Farfán, 2013**).

In the graph below we can see that there are activities that influence different form in the final composition of the effluent, especially in those activities that represent a greater consumption of water and discharge of dairy waste to the system such as: milk waste, milk fat and inorganic waste; activities such as standardization and packaging.

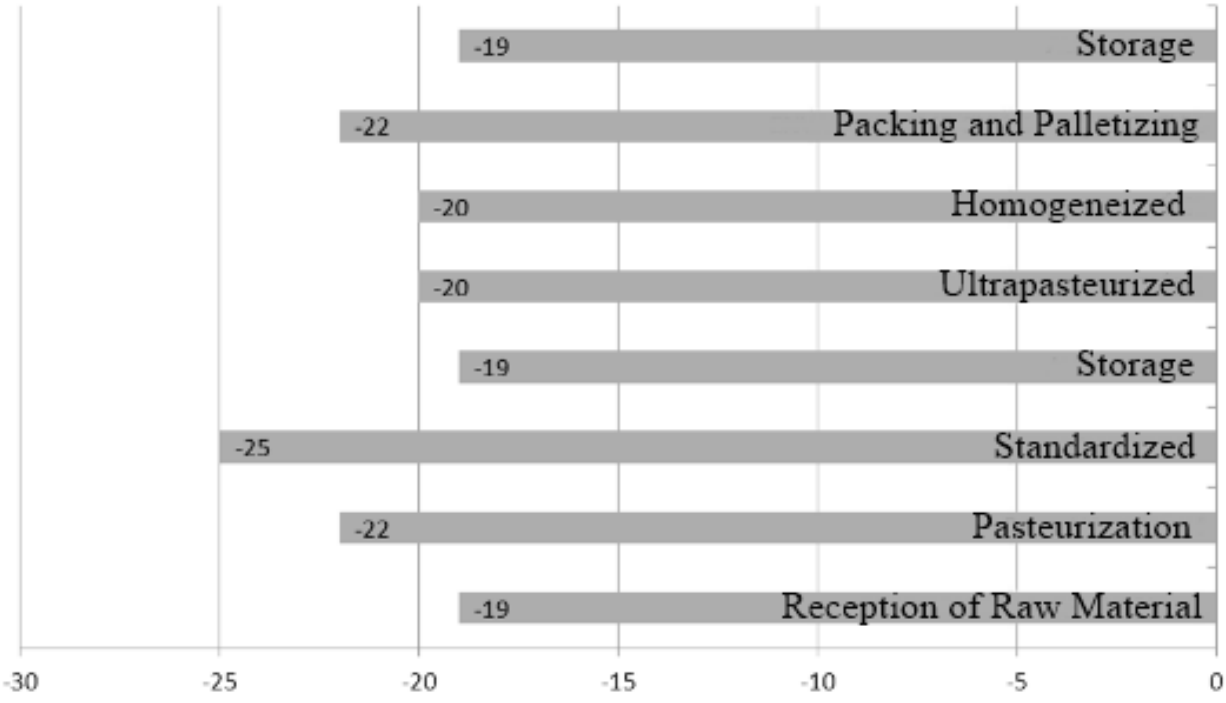

Figure 1.Importance of the impact on water by activity, milk processing

As previously mentioned, whey is one of the main responsible for contamination of the water in processes of cheese making (**Santamaría Freire et al., 2015**).Figure 2

indicates that the dewatering activity obtained an impact importance of -32.

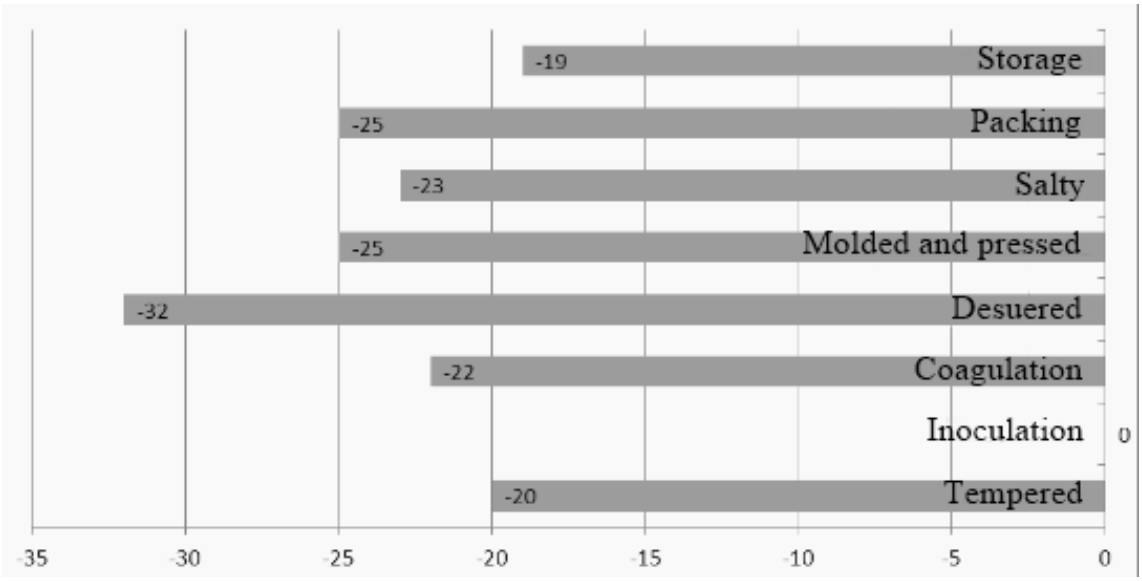

Figure 2. Importance of the impact on water by activity, cheese making

On the other hand, in the production of yogurt a score of -25 is obtained for the filling / packaging activity given that the main wastes correspond to to inorganic solid waste such as packaging plastic and corrugated cardboard to a lesser extent (**Teaga Moran, 2019**).

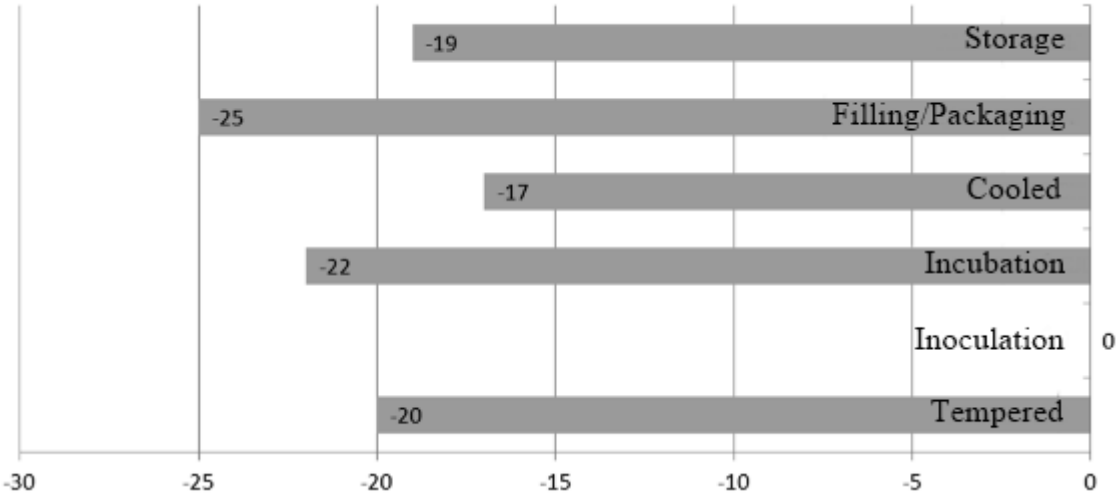

Figure 3. Importance of the impact on water by activity, production of yogurt

3.2.Different alternatives in the biochemical management recommended

After this initial analysis, the different alternatives recommended by some authors can be listed.

Effluent Treatment

In order to express the amount of organic pollutants in the water, use measurement factors such as BOD (Biochemical Oxygen Demand) and COD (Chemical Oxygen Demand)(**Toapanta Molina, 2017; Santamaría Freire et al., 2015**).

Where the BOD: Indicates the content of substances that are degradable by elements biological or OM (Microorganisms) in wastewater.It is expressed in mg O_2 / L or g O_2 / m^3(**Menéndez & Dueñas Moreno, 2018; CONSTECAM, 2016**).

COD: Indicates the amount of pollutants that can be oxidized by oxidizing elements present in wastewater.It is expressed in mg O_2 / L or g O_2 / m^3(**Raffo Lecca &Ruiz Lizama, 2014**).

The BOD / COD ratio indicates how biologically degradable a product is effluent and the use of wastewater treatment systems seeks reduce this load to allowable levels.

For the construction of effluent treatment systems, the help from a professional, including Civil Engineers and architects dedicated to constructions in the health area.

Based on the BOD / COD ratio of the effluent, the size of the water treatment system must be established (**Menéndez & Dueñas Moreno, 2018**).For which, when building these treatment systems, the following aspects must be taken into account:

- They must be modular to avoid the absolute lack of wastewater treatment, this in case of stoppage of one of the units, especially due to failure or maintenance(**Morocho Yascaribay, 2017**).
- Rectangular or triangular weirs, Parshall meter, among others approved by the country's Environmental Control Entity, will be used to measure the flow in channels or pipes.The environmental quality and effluent discharge standard indicates that the conventional treatment for effluents, prior to discharge to a body receiver or sewer system is one that is made up of primary and secondary treatment, includes disinfection(**Cedeño Rodríguez, 2020**).

Primary Treatment.

It contemplates the use of physical operations such as: Sandblasting, mixing, flotation, flocculation, filtration, sedimentation and roughing (mainly screens, meshes, or screens) for the elimination of solids that settle and float present in the wastewater.

Secondary Treatment.

It contemplates the use of biological and chemical processes for the removal mainly of biodegradable organic compounds and suspended solids.Secondary treatment is generally preceded by unit purification processes of primary treatment.The effluent discharge temperature must be close to 20 °C, this to avoid thermal pollution of the water(**Pérez Martín et al., 2016).**

3.3.Treatments at the level of production processes in the dairy industry

Treatment of brines

The brines that have been elaborated should be used to the maximum, this in order to provide desired and controlled concentrations of salt to cheeses of different types.There are several types of treatments to brines that serve to give them greater use and also to reduce the frequency of elimination of these(**Rodríguez Balladares, 2016**).

Among these treatments we have the following:

- Concentration: The main brine degrader is bacterial contamination.When there are concentrations less than 16%, the chances of contamination increase(**Kaminarides et al., 2019**).
- Pasteurization: Pasteurized brine should not be mixed with unpasteurized. • Container materials: Materials such as stainless steel should be used to avoid corrosive effects and exchange of contaminants.
- Chemical additives: Sodium hypochlorite or potassium sorbate are generally used based on the regulations (**Pontín et al., 2017**).
- Microfiltration.Membrane filtration systems allow you to selectively concentrate and separate milk or milk fractions, depending on the pore size of the membrane used.

The types of filtration with membranes, in increasing order according to the size of the pore, are the following: reverse osmosis, nanofiltration, ultrafiltration and microfiltration (Sánchez Paniagua, 2020), the purpose of the filtration is as seen in the figure below

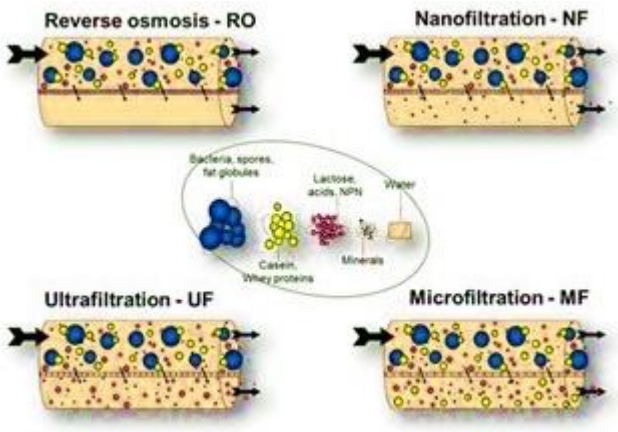

Figure 4. Types of membrane filtration according to pore size.RO / RO: reverse osmosis ; NF : nanofiltration ; UF : ultrafiltration; MF : microfiltration.

- UV light: By exposing filtered brine to UV light, avoid proliferation of OM.

Use of by-products, Whey

It is estimated that for 1 kg of cheese produced, 9 to 10 liters of whey are generated (**Osorio-González et al., 2018**).The world production of cheese whey is around 200 million tons per year (estimated based on total cheese production), of which Europe produces about 50%, the rest distributed worldwide (**FAOSTAT, 2017**).The unfortunate thing about all this is that 50% is still being eliminated as residue. (**Osorio-González et al., 2018**).

Whey contains approximately 95% water, 0,5% protein, 4,8% lactose, and minerals;among the main components (**Parra Huertas, 2009**).Based on its composition, the possibility of its use in certain types of food products is wide and among these are:

- **Making Ricotta Cheese**

It requires more time for its elaboration compared to normal cheese, but it would represent one more item to the company's product portfolio(**Pucha Inca, 2019**).

Figure 5. Making ricotta cheese

- **Manufacture of whey powder**

It would only be possible for companies that do have dairy drying equipment (Spry Dry) (**Poveda, 2013**).

Figure 6. Whey powder

Recovery of lactose and proteins for use as raw materials in the preparation of other types of food, such as pastry, powdered soups, etc.This process requires specific machinery.On the other hand, whey and lactose ingredients will continue to outperform the general food and food ingredient market in terms of volume growth, and the whey and lactose industry will still be able to keep up with the growing demand during the forecast period 2020-2024 despite growing raw material shortages(**Whey Book, 2020**).

- For the preparation of yeast products.
- For the production of fermented and hydrating drinks.
- For animal feed.
- For irrigation of agricultural soils.
- Optimización del uso de agua y energía

Not long ago, the production cycle was based on the quality of the product to be produced, without taking into account the environmental aspect throughout the production process.

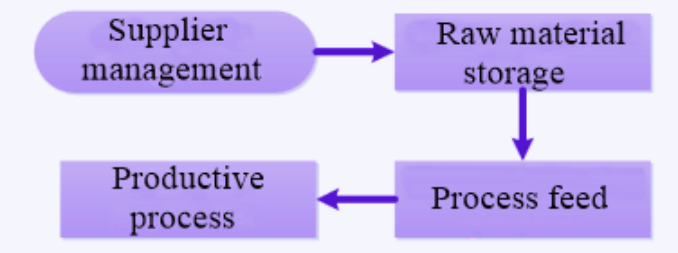

Figure 7. Usual productive cycle

In recent years the global interest in environmental care, competitiveness and national regulations have led the industry to introduce aspects of environmental interest throughout its production cycle (**Muñoz Lucas & Sánchez García, 2018**).

The implementation of Good Practices for the use of resources such as water and electricity is the best option.Obtaining information through indicators of use of water / day or water / liter of milk is very useful for monitoring the results obtained with the implementation of good practices(**Proaño López, 2018**).

3.4. Raw Materials Optimization

Much of the waste production is generated by the incomplete use of direct and indirect raw materials.The result of the incorrect handling of raw materials, generates harmful economic expenses for companies.

The main consequences for mishandling raw materials are:

- RM (raw material) rejected for not meeting the quality specifications of the business
- RM reduced due to losses or spills.
- RM lost due to incorrect transportation.
- RM lost due to process failures.
- RM lost due to incorrect storage.
- RM lost due to inadequate storage conditions.

3.5. Plan, Do, Check, Act.

The company must ensure that its suppliers handle quality procedures in all their activities, this to guarantee that the product received by the company is the best possible quality. Some companies train and encourage their suppliers in the production of a quality raw material. Once the RM is received, the company is solely responsible for its management and use(**Bermúdez Vera &Villegas Ortega, 2020**)

3.6. Equipment maintenance and inspection

The maintenance and calibration of equipment is essential to avoid failures during the process and product losses, which would mean economic losses as well as possible repercussions to the environment.

It is recommended to draw up a preventive maintenance and inspection plan for machinery and equipment.(**Córdova, 2018**).

3.7.Noise

The first option to combat noise is to fix it from your source that is, replace noisy equipment with modern and less noisy or replace parts with quieter ones.

Obviously requires a good investment and in some cases it is not the solution more appropriate. A second option is the use of so-called barriers, which consist of the placement of insulation at the generating points of noise, this if the size and characteristics of the equipment allow it. If none of the 2 above is possible to apply, we go to the third which consists of providing adequate protection and training to the worker (**MBPIL, 2015**).

Conclusion

It can be considered that despite the serious environmental problems caused by the elimination of waste from the dairy industry, there are great alternatives that allow minimizing the environmental impact, including the use of whey in the production of nutritional by-products.

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WORK STRESS OF CLEANLINESS WORKERS OF HEALTHCARE INDUSTRY

R. Vij
College of Business Studies, Vidyajyoti Institute of Higher Education, Derabassi
renuvij@gmail.com

ABSTRACT

Purpose: This study aims to shed light on the phenomenon of work shifts and job stress risks. More precisely, the perception of such risk in the context of the work shifts leads to smoking , tabacco habit affect family and health of workers of private hospitals to be investigated. It is to find how work environment factors leads to stress on cleanliness workers and effects on their health.Design/ Methodology /Approach : Standardized questionnaire is circulated among participants of private hospitals to identify work effect on their health leads to smoking. The data was gathered from 100 cleanliness workers of Private hospitals of tricity Chandigarh (Panchkula, Mohali, Chandigarh).To analyze the relationship between variables included in the study, correlation, chi- square test statistic were used. Practical Implication: A list of risks trigged during the work at work environment of hospitals work shifts presented and suggestions to tackle them are suggested. Furthermore, the findings can contribute to the further development of factors and HR policies to reduce strain. Originality/ Value: The study provides fresh insight to relationship between activities assigned of ignored part of healthcare and the risk associated with the task while considering job factor, health factor , social factor and organization factor as perceived by the workers . Research Limitation –This study merely investigated the component analysis of organization factors, job factors, health factors on job performance. The study is based on selected factors influencing health, whereas rest factors are not considered.

***Keywords**: Stress, Occupational stress, Smoking Motivation, work Stress, Psychological factor, Job security, respiratory diseases.*

Introduction

Job is a business in a society that has planned its tunes as function, arranges and stands to reason for the use of time. It is vital to incorporate everyday life and to facilitate a sense of continuity, to provide funds and contentment for the prosperous human lives and the family. Moreover, it's a boredom and vacuum antidote. Technology has undoubtedly simplified the way our daily activities are performed. Computers can help everyone to get things done quicker, emails and text messages let us always be in touch and we find the answer to any question easily via the internet. But the work is hell for us some time.

During work time, you feel secure, connected at home or office. It also means we never really clock out. It is one thing to pull a long day every once in a while to finish a project or deal with a crisis, but it's another to routinely stay late at the office or work into the night. That is chronic overwork and it can have extremely negative impacts on your health, happiness, and overall quality of life. Though, working overtime for most people has become the norm. The problem is that if a healthy balance is not emphasized, it is not only bad for employees, it is actually bad also for employers. Our health and our performance at work have a bad time in our office, or in our home. Overtime employees have stress impact mental, physical and social effects and on wellbeing (keller,2020).

Substantial properties comprise strain, no time, and improper work-life balance, affect well-being (Karsten, 2016; Conway et al., 2016). Employee performance levels could also be lowered. Long work hours could lead to tiredness, fatigue, and lack of attentiveness (Bryan et al., 2000). As a result, suggestions have been proposed for risk mitigation.Workplace stress leads to pressure of colleagues and interruptions at work (Grebner, 2010; Health and Safety executive,2019).

The well-being and protection effects of overtime work vary widely and much remains unknown (Caruso and Claire, 2004; Dembe, 2005). Several researchers have found many negative health effects, including increased alcohol and tobacco use or other mind altering treatment intoxicating effects. In studies each of them demonstrated a variety of levels of lowered cognitive testing and increased work injury, including work shifts, if exceed 12

hours and work weeks of more than 40 hours. The rate of injury was directly proportional to the working shift length and working week number of hours.

It has been observed that risk is not only with jobs which are perilous but also with those which create fatigue, tiredness and excess work time (Dembe, 2005). Also found that it includes that Heart beat lower in response to stress (Kim,2018) and few study result HF increase due to workplace stress (G,2019).

In pandemic situation puts health care workers at high risk of both infection and mental health problems. It provides the adequate mental health care for health care workers is overbearing. This study aimed to identify the risk. Protective factors for mental health outcomes in health care workers during coronavirus epidemics. Safeguarding mental health of health care workers during infectious disease outbreaks should not be treated as a separate mental health intervention strategy.

Stress response on office tasks (Can,2019) mental effects on workers will vary based upon the work they do, the number of hours they work, and the individual working. A study executed to find the effects of work ,it resulted that 38% work too much, 46% never had time to relax, and 60% of pollers have an unhealthy work-life balance (Karsten, 2016). Another study of workers in Australia conducted,found the satisfaction levels decreased as the number of hours worked increased. It is concluded that these effects could be reduced for those who enjoyed working extensive hours (Matthew et al., 2004).

It has been observed that 48% increased probability regarding mental health decline in those workers working 49–59 hours per week, compared with those under standard working hours (that is, 35–40 hours per week). The probability increased by 53% in those working more than 60 hours a week. They also found a difference by gender; among those working 49–59 hours per week, the SF-36 scores are lower among female than male, indicating worse mental health among female workers (Allison et al., 2015). The overworking style leads to many mental issue including lower working satisfaction, blue mind (mind fullness), stress, depression, mood swing, irritability and anxiety (Virtanen et al., 2011).

Suicidal ideation is another concern for overtime work. Research conducted in South Korea recruited 67,471 samples, and the results revealed 30% higher suicidal ideation among workers having working hours more than 60 hours (31% increase in male workers and 33% increase in female workers). There was also increased suicidal ideation noted among workers working for 51–60 hours per week in both males and females (Chang-Gyo et al., 2015).

Continuous and prolonged working, lack of breaks during the day, and consecutive days of working without a day off lead to decreased efficiency and productivity in workers. The abnormal work and sleep schedules were leading serious health issue. A study was conducted by The University of Texas Health Science Center at Houston shown the link between overtime and the increased risk of cardiovascular disorder (CVD) events (Dembe, 2005). In addition to these other health risks is the correlation between working long hours and the likelihood of individuals smoking, drinking, having a high body mass index (BMI), and being less physically active (Mika et al., 2015). The long-term effects of alcohol consumption include increased on-the-job injuries and loss of productivity, family problems, risk of high blood pressure, stroke, other cardiovascular diseases, and more (Orfeu et al., 2015). The effects of smoking, in addition to similarities of the effects of alcohol, include increased risk of heart attacks, weight gain, obesity, emphysema, and a large amount of cancers(Mika; et al., 2017).

In Osaka, Japan, researchers completed a 5-year study on the effects of long work hours on hypertension at the end of their study, they had surveyed 941 male Japanese white-collar workers are found with elevated level of blood pressure (Nakanishi et al., 2001).

Another study conducted to find an association of developing Type II Diabetes compared to a referent group of workers only working for above 35 hours per week.It was observed that statistically-significant evidence for an association among both variables. The working longer hours had a 29% increased risk of developing Type II diabetes; even after adjusting for physical activity (Mika; et al., 2015).

One large-scale study using data from the Individual-Participant-Data Meta-analysis in Working Population Consortium involving 85,494 workers from several European countries also looked at the effects of long work hours and the association with developing atrial fibrillation (Mika et al., 2015).

Contributing factors stress and variables which mitigated stress. Personal coping strategies and factors that can increase staff's motivation to work during future events of similar nature were also asked. While emotional reactions, managing stress and pressures fluctuate by wellbeing role, insights and reactions among communities are equivalent(Rose,2021).

Work-life balance is a major aspect of employees' lives. Naturally, the more hours someone works, the less time they will have to spend with their family or other leisure activities. In 2007, a study was conducted at Penn State Abington analyzed the tradeoff between working overtime and home and family life activities. A major finding was that workers struggled to take time off for personal or family needs. However, the additional income from working long hours could limit the actual impact of this loss of time (Kenji et al., 2006). More specifically, the impact of having a child exponentially increased the impact of working overtime. Especially at a young age, it is very important in child development for the parents to be involved to provide care and positive experiences. Due to this reason, work-life conflicts arise much more frequently for parents, as stress levels are heightened. These effects are even worse for single parents (Dermot et al., 2013). Another interesting finding of stress, inadequate resources and no career promotion option (Godwine al,2016).A study in ethopia conducted observed age, work load, educational factors are source of work stress (GebeyebuS;Zeleke,2017).Whereas in one of research ,result indicated that gap in work shifts, nature of work are contributors of strain at occupation (Birhanu,2018).

2. Material and Method

2.1 Objective of study

1. To identify the relationship of work-stress factors on health of cleanliness workers of private hospitals of tricity, Chandigarh (India),
2. To discover the impact of the factors of work-stress on social life (smoke habit) of cleanliness workers.
3. To ascertain the correlation in health & social life of cleanliness workers.

Scope of Study

To identify the extent of work-stress on health factors and on social life of cleanliness workers of private hospitals of tricity, and to identify the measures to reduce work-stress to enhance commitment of employees so that those factors can be implemented / focused effectively in cleanliness workers of private hospitals of tricity, Chandigarh India.

Research Methodology

Questionnaire consists of 46 questions divided in 6 factors are used to know the extent of organizational factors affect on personal factor, physical symptoms, behavioral symptom, psychological factor due to stress at work of cleanliness workers of private hospitals of tricity,Chandigarh ,Mohali,Panchkula .Random sample method is used to collect data , in which 130 questionnaires distributed and out of which 120 respondents filled form. Data collected from 100 respondents who are employed in private hospitals of tricity , Chandigarh. The responses have been converted into SPSS convertible data for analysis. Tools such as chi square, correlation were used to identify the most significant strategies that contribute to reduce work stress of cleanliness workers of private hospitals of tricity, Chandigarh.

3. Observations /Results

3.1Sampling and Data Collection

Research Tools such as chi square, correlation test were used to identify the most significant factors that contribute to enhance employee retention in an organization and leads to organization commitment of teachers in Punjab.

Pre-testing of the questionnaire, Bartlett's sphericity test:

Table1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.596
Bartlett's Test of Sphericity	Approx. Chi-Square	270.936
	df	171
	Sig.	.000

Test interpretation:

H0: There is no correlation significantly different from 0 between the variables.

Ha: At least one of the correlations between the variables is significantly different from 0.

As the computed p-value is lower than the significance level alpha=0.95, one should reject the null hypothesis H0, and accept the alternative hypothesis Ha.

The risk to reject the null hypothesis H0 while it is true is lower than 0.01%.

Kaiser-Meyer-Olkin measure of sampling adequacy

3.2 Analysis & Findings

Relation in work schedules and impact on health factors

Table 2: Correlations

		deadline	smoking	Lowimmunity	backpain	Tobacco	lowBP	stiff	insomnia
pulmonary disease	Pearson Correlation	1	.207*	.108	.086	-.065	.163	-.088	-.072
	Sig. (2-tailed)		.029	.256	.368	.493	.086	.356	.454
	N	100	100	100	100	100	100	100	100
smoking	Pearson Correlation	.207*	1	.281**	.125	.091	.032	-.159	-.119
	Sig. (2-tailed)	.029		.003	.190	.343	.740	.094	.213
	N	100	100	100	100	100	100	100	100
lowimmunity	Pearson Correlation	.108	.281**	1	.077	.008	-.024	-.174	.088
	Sig. (2-tailed)	.256	.003		.418	.936	.800	.066	.354
	N	100	100	100	100	100	100	100	100
backpain	Pearson Correlation	.086	.125	.077	1	.196*	.098	-.026	-.044
	Sig. (2-tailed)	.368	.190	.418		.039	.302	.786	.644
	N	100	100	100	100	100	100	100	100
Tobacco	Pearson Correlation	-.065	.091	.008	.196*	1	.057	-.028	-.017
	Sig. (2-tailed)	.493	.343	.936	.039		.550	.769	.858
	N	100	100	100	100	100	100	100	100
lowBP	Pearson Correlation	.163	.032	-.024	.098	.057	1	-.058	-.107
	Sig. (2-tailed)	.086	.740	.800	.302	.550		.547	.262
	N	100	100	100	100	100	100	100	100
stiff	Pearson Correlation	-.088	-.159	-.174	-.026	-.028	-.058	1	.171
	Sig. (2-tailed)	.356	.094	.066	.786	.769	.547		.071
	N	100	100	100	100	100	100	100	100
insomnia	Pearson Correlation	-.072	-.119	.088	-.044	-.017	-.107	.171	1
	Sig. (2-tailed)	.454	.213	.354	.644	.858	.262	.071	
	N	100	100	100	100	100	100	100	100
*. Correlation is significant at the 0.05 level (2-tailed).									
**. Correlation is significant at the 0.01 level (2-tailed).									

4. Discussion

4.1 Correlation effect of work environment on health factors

Significant correlation at the 0.05 level in extended work shifts and low energy is (.207),whereas with insomnia (.171), backpain (.196), stiff(-.058). There is significant correlation at the 0.01 level of Significant at low immunity (.281).

2. Correlation in workplace factor and health factor are

Correlation is significant at .001 leveleffect to health (.260), (-.247) excess work shift affect health, (-.238) role not defined to health, (.394) significant correlation at .001 is (.547) organization policies effect on health smoking habit (.550) tobacco intake, (.196) at significant level at 0.05 level, (.281) smoking, low immunity at .001 level significant, pulmonary disease (.207) at 0.05 level significant.

3. Correlation in health factors and Social life factors

Significant correlation is identified in both factors at significant level among health factors with social life (party time), family life, parks, excursion. It clearly indicates that stress of health factor on social life which leads to Psychological, mental well-being and on their social behavior.

Conclusion

This study finds out that work environment , excess work shifts make inclination of worker to smoking habit , tobacco intake .It is in need to focus while considering the employee retention, improved wage structure can ensure sound health and mind of cleanliness workers of private hospitals of tricity, Chandigarh, Panchkula and Mohali. It is the demand of time to focus on worker recognition , best worker of month, Medical facility, Hygiene training, Timely salary, improved wage structure, rest rooms, Record shift time, adequate leaves, consistent & continuous redressal programs , Stress buster programs,Yoga Programs, Gratuity &safety to reduce the stress at work place.

Recommendations

Healthcare Bodies should set up structures to make sure that employees are so strictly capable of lowering stress and performing their respective roles or responsibilities. The specific focus to be drawn for health care cleanliness workers by framing counselling centers , Rest rooms, Educational workshops , safety measures training sessions, timely biometric to control on excess work shifts.

Given the breadth and scope of the problem, this topic to be further investigated, with a particular core elements to lower the impacts of bully at workplace among victims .This enable to devise measures of effective intervention.

The health units should have policies in place to promote equity and diversity with commitment to fostering a respectful workplace. The strong norms for respect and just and fair treatment with class IV worker at workplace with zero-tolerance policy to stop mistreatment with cleanliness workers to be focused.

Workplace cultures that encourage gratitude and appreciation are pivotal to reducing discrimination at workplace. Develop such environment at workplace which ensures mental wellbeing, work life balance with well sources aura to reduce adverse habit of smoking, tobacco intake and focus on good healthy mind and soul.

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GAMIFICATION: KEY TO EMPLOYEE ENGAGEMENT IN NEW NORMAL

J.R. Mahanty[1] and M.N. Parmar[2]
[1]Faculty of Social Work
[2]The Maharaja Sayajirao University of Baroda, Vadodara

ABSTRACT

The COVID-19 outbreak, certainly proves that unprecedented times require unprecedented actions. This pandemic has robbed the world of its normalcy, freedom, and peace of mind. While engaging the manpower in work at every juncture, right from onboarding to till maturity was equally censorious during the normal days, it has become even more crucial now to keep the workforce happy and productive. As the current turmoil is bound to make employees feel stressed and isolated, Gamification, with its fun element, is a great stress buster. It helps in calming down the nerves and can act an effective remedy in these turbulent times. Gamification is not only a fun way to drive an engagement, but it also helps create a culture of openness and learning! Workforce participation is not just a task at hand, it is a path quantifiable for people to oversee them from time to time, to know organizational stance in terms of its human resources. After all, manpower is the most important resource that can cause a change for the bridge that connects organization with failure and success. Since today's workforce are technological dependent —be it currently updated mobile applications or any amusing games, is it not better to grasp this "element of fun" and anchor their attention? Gamification for an engagement helps achieve both employee goals (fun, team interaction and learning), and the organizational goals (an engagement, the focus of the employee, education, etc.). This paper intends to highlight the correlation between Gamification and Employee Engagement. The authors have based their views on the basis of a small study undertaken to identify the correlation between the aforementioned topics.

Keywords: *Gamification, Employee Engagement.*

Introduction

The idea of Gamification and its strategies in non-gaming conditioned places is a quick arising practice in business. Despite the fact that in its early stages, the elements and strategies have been discovered to be effectively adaptable from their gaming programming courses (software) into the universe of business.

The labor force of an organization is its most significant resource. As indicated by a KPMG overview of corporate managers and business pioneers in a survey, individuals matter more than anything. Persistent globalization has prepared for serious worldwide interest in economies for investments. Notwithstanding, with the battle against Covid-19 giving no indications of relief for the recognizable future, and with the world economy on an edgy post for restoration, the key administration needs to rise above the hindrances to support and resolve the labor force issues and follow reformist steps to provide not just moral support but also ensure to maintain their productivity.

Consequently, it is basic to call for savvy measures to keep the labor force drawn in and involved, giving exceptional consideration to boosting assurance and keeping up significant levels of certainty among workers. Gamification, a moderately new idea in HR, has become an incredible popular expression. It alludes to the way toward streamlining ordinary assignments and circumstances by applying game plan hypotheses. Gamification can likewise be characterized as utilizing game plan methods in a business setting, or some other, non-gaming setting. All in all, the idea stresses effortlessness and upgrading regular schedules and assignments.

Gamification has for quite some time been perceived as an amazing way to tackle social- and wellbeing related conduct issues, with the goal of changing individuals' methods of living. Games have an uncommon capacity to hold singular consideration, create and upgrade inventiveness, and assemble connections between individuals. It is a techniques and a strategic approach to pick up business advantage by pulling in and connecting with customers.

COVID-19 has changed the world. The pandemic has introduced the new conditions for the work such as work from home. Physical meetings has been replaced by virtual

meetings. Over 3 billion people, excluding those in essential services like defense and healthcare, have been pushed to work from home.

There are numerous organizations that have chosen to execute game-based training approaches guided by Game learn, the driving designer of genuine games for corporate preparing. The utilization of game elements to learn helps in developing an aptitudewhich is must for budding HR offices.

Advantages of Gamification

Positively involvement of Learner Engagement Fun activities can change uninteresting substances into the drawing in and intriguing encounters. It supports benevolent rivalry among partners, and give them a feeling of pride in finishing a course after a progression of gamified difficulties and errands. This helps in the physical and mental movement that gives a greater commitment and higher profitability at work.

Fosters Creativity

Inculcating creativity and commitment motivates workers to participate in various programs which will refresh their minds.

Helps in Sharping Specific Skills

Organizations are nowdrawing attention on improving or creating explicit abilities of their groups. Gamifying preparing projects will help to improve the initiativeness , managing stress, communication skill, developing aptitudes for negotiation.

Onboarding of new Employees

Effectively onboarding of new representatives is consistently a test for the any organization. Overdependence on dry, exhausting and instructional meetings are monotonous and leads to dissatisfaction among new joinees. Utilizing gamification in preparing, will add value to this process.

Increase in Productivity

It is rightly said more is the motivated employees more is the productivity of the organization. Utilizing game element helps in expanding the aptitude of representatives. It creates profitability at work and positive work climate.

Provide Instant Feedback

Fun activities gives instant feedback; positive or negative. The activities ranges fromeducational games, which helps in healthy mind and sucheventshelps to improve their performance.

Transmits Corporate DNA

Fun exercises inject corporate DNA across all cadres . Once imbibed, the DNA of an organization, helps employees towards achievement of organization set values mission an vision of the company.

Thus an attempt was made through this study to understand the impact of gamification on the employee engagement.

Research Methodology

The tool of data collection consists of primary data for knowing the current scenario of gamification as well as secondary data collection for getting an idea of origin and practices of gamification as an employee engagement tool.

The population or universe of the study were people working from home during the Covid-19 pandemic whose organization held various recreational activities to boost their morale.

Tool of data is an online structured close ended questionnaire.

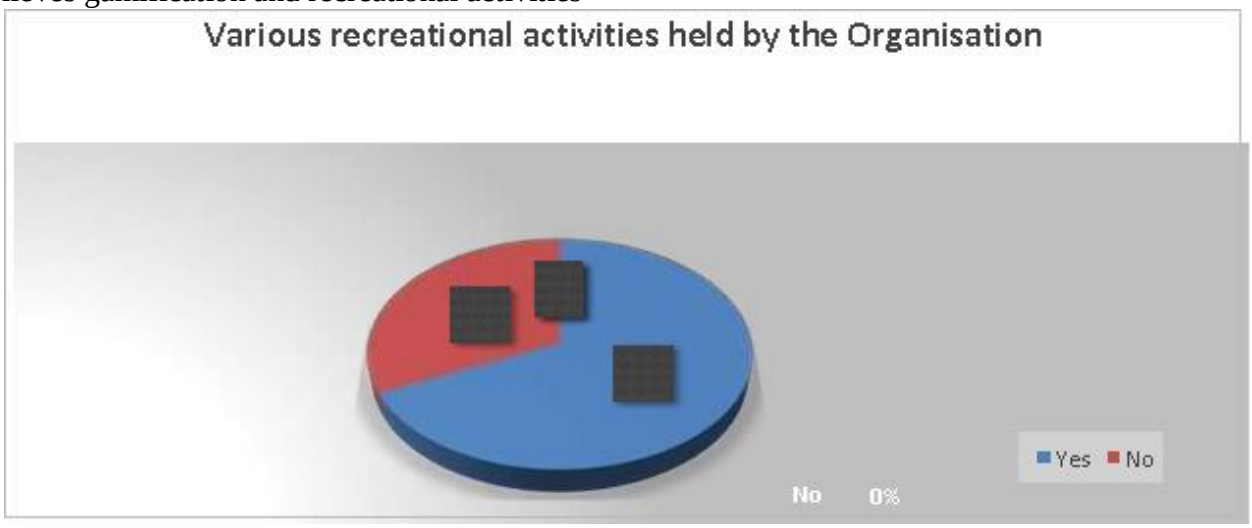
Employees working at home and were connected to the researcher were considered as a sample. The sampling method used was purposive sampling for the study.

Major Findings of the Study

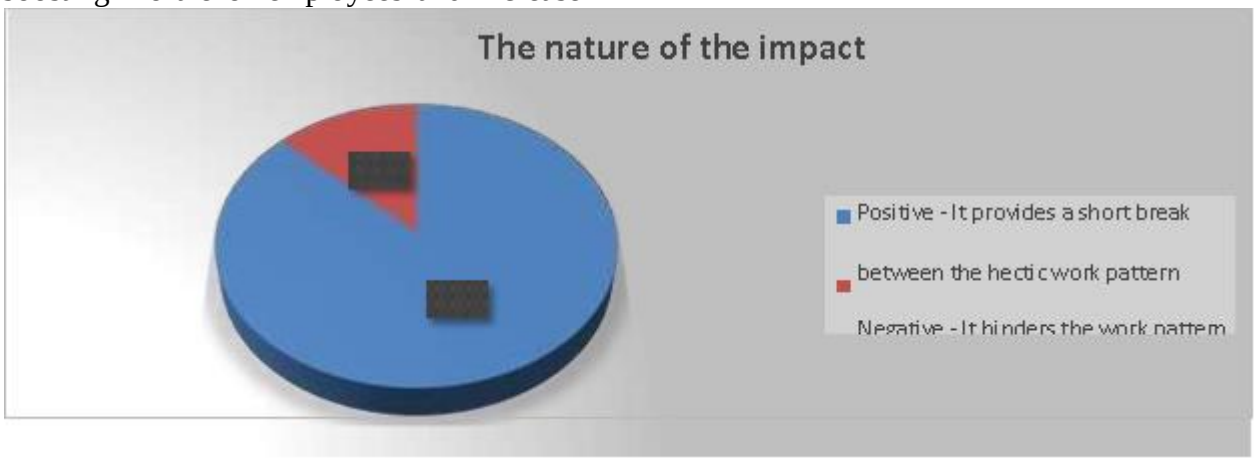
The study depicts that majority of the respondents i.e. 43% belong to the management level of the company, 30% belong to the supervisory level in the company, while 27% belong to the staff/clerical level in the company. 47% have work experience of around 10-15 years,

The pie-chart shows the opinion of respondents on the question of does the organization organize various recreational activities to take a break from routine work and boost morale to work while working from home in this pandemic situation. 68% of respondents agree

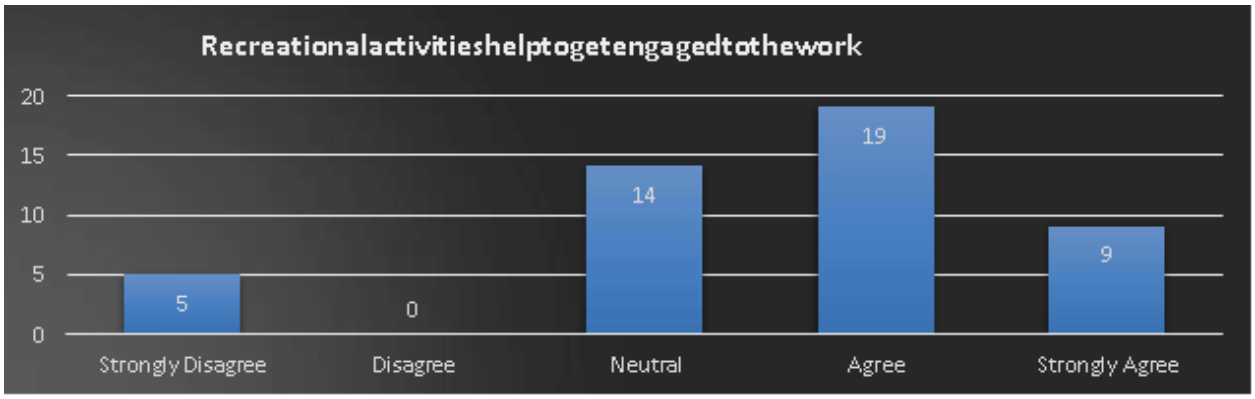
with the statement that their organization believes gamification and recreational activities helps employees to work more productively.



The pie-chart depicts that Gamification have positive impact on work, and it helps in boosting morale of employees and increase in work productivity and provides a short break between the hectic work patterns.



The below graph states that recreational activities help to get engaged to the work.



While analyzing the factors which has an impact of gamification on employee engagement, the following observation were noted.

- The majority of respondents feel that these kinds of recreational activities should be held on weekends.
- Gamification tool helps in relaxation out of busy work schedule.
- Recreational activities help to get engaged to the work.
- Such activities helping team building among colleagues
- Employees feel recognized in the company

due to conduct of such activities.

- Employees Little time is required to get back to work immediately after the activity.

Thus, from the responses received, it can be established that gamification has a direct impact on the Employees Engagement. Positive experience will lead to a motivated and the satisfied work force that will haveled to increase productivity & profitability in the turbulent times.

Based on the responses collected, following suggestions can be drawn:

Arrange Trivia competitions:

A weekly or monthly events with attractive prizes should be organised for employees either as individuals or teams keeping in mind the company's values.

Introduction of the point system:

A point system should be introduced on the organization that rewards employees who meet compliance targets. This is particularly useful for those employees who had a poor outcomes in that area in the past.

Rewards system for employees who achieve their KPIs –

Organisation should introduce the system of incentives for their employees who achieves their KPIs . this will reduce the turnover and boost up their morale. This can be done through online platform where different teams compete for badges. For eg: remembering to turn lights off at the end of the day through to completing monthly expense reports on time.

Use of gamification for knowledge sharing:

Gamification can be used for inculcating the knowledge sharing among the employees. This can be done through point system who answers their colleagues' questions or reviewing of corporate content on blogs on various online forums.

Fostering leadership:

Introduction to various Apps and games that depicts the company's leaders who have excelled in their respective fields and are leading the team. This motivates the employees to take up such positions in future.

Introduction to Raffle tickets:

These tickets could be real or virtual in nature. The organization need to create a bench mark for qualifying for the entry. Here employees will be rewarded for a accomplishment of a set task.

Thus addition to some measures of gaming settings with significant prizes to the everyday exercises assists with making the assignments look more rewarding. This again helps in catching the eye of workers and urges them to put forth a strong effort. Granting exercises in a gamified way encourages workers to learn snappy and simple. This is helpful with regards to causing the newcomers to comprehend their capacities in the association. Additionally, it makes learning fun and diminishes the measure of actual commitment from a businesses' side.

As per the survey done in 2019 on gamification at work, it was found that 89% of employees agreed that fun exercises make them more productive.

A huge lump of the present labor force generally contains millennial specialists. Also, one thing which separates them here is they require appreciation for their work. Participating in fun activities ensures prizes and acknowledgment on the finish. It helps in expanding the degree of commitment and profitability of these representatives at work.

Thus such fun exercises helps the employee to compete with their co-colleague when it comes to achievement of goals. This gives them an insight about their own performance rather than waiting till annual performance review. Also it helps the employees to participate in a positive manner and receive the feedback from the higher management.Thus it assists authorities with carrying a sound change to their organizations as it gives an importance to a errands done by the workers.

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SUPPLY CHAIN MANAGEMENT: AN INNOVATIVE APPROACH

A.V. Giri
Bharatiya Jain Sangathana's Arts Science and Commerce College, Wagholi, Pune
major.dr.ashokgiri@gmail.com

ABSTRACT

Thispaperaimstoanyproductproducedmusteventuallyreachthecustomer.Similarly, the raw material required for production as well as other materials should reach themanufacturer on time. Even if there is no question of producing any goods in the service sector, they feel the need to do something to serve the customers. In order to do all these things, it isnecessary to supply the chain (supply chain) to deliver the product to the customers as well as todeliver the various services to the customers. The specialization of 'Supply Chain Management'includes information on how to implement this supply chain, how to manage it, how to minimizethecost and how to increase theefficiencyof theoverall supplychain.

Keywords: *Supply Chain Management, Logistics Management, Inventory Management, Levels of Stocks, CouncilofSupplyChainManagementProfessionals.*

I.-Introduction

The importance of the supply chain is growing day by day. Due to globalization, the supply chain is not limited to one country. So in many industrial organizations it seems that the purchaseof goods in one country, the production in another country and marketing all over the world. Although this has increased the complexity of the supply chain, it has significantly reduced costs.This has given great importance to supply chain management. In this regard, the following topicsareimportant in this specialization and can bestudied.

Supply Chain Management - Supply chain management is essential in a business, be it in themanufacturing sector or in the service sector. The main purpose of this chain is to deliver thegoods or services it provides to the customers. In addition, the delivery of an item to the final customer requires the help of different intermediaries. This is the type of traditional distribution chain from manufacturers to wholesalers and then through retailers to the end consumer. Inaddition to delivering the goods to the final customers, the distribution chain also handles thedelivery from the manufacturer to the wholesaler and from the wholesaler to the retailer. How tomanage a distribution chain in such a way that goods reach the customer without any hindrancecan be studied through this topic, as well as modern trends in the distribution supply chain, aswell as the impact of technology on the distribution chain, the impact of globalization, etc. Manythings are covered in these topics. Apart from this, different methods of delivery, expectationsfrom the customer's supply chain, planning on how to provide better facilities to the customersandcustomer relationship management areall covered.

Logistic Management

Different means of transportation are required to deliver the goods to the customers. This provides information on how to transport the actual goods to the customers at the lowest cost. To increase the efficiency of the supply chain, it needs to be integrated with different types of transport. Along with the manufactured goods, the subject also contains informationon how to deliver theservices provided.

Planning of goods in the distribution chain: In order for the distribution chain to be efficient, thesupply of goods to this chain must be smooth i.e. without any hindrance. This requires carefulplanning. For this, it is necessary to plan the raw material required for the production and itsdistribution after the goods are ready. Careful planning of the means of transportation is essentialfor the smooth running of both. What are the means of transportation available for this, what istheir comparative cost as well as the time

required for transportation etc. All things considered. Proper management of their storage and storage is essential for smooth supply of goods and rawmaterials. In this regard, design of godowns, storage capacity as well as planning of exactlywhere the godowns should be, whether the godowns should be rented or constructed by thecompany etc. Many things need to be considered. Important issues like packing and materialhandlingarerequired toprotect thegoodsin the distribution chain.

So the supply chain is an important study on how to keep the supply of goods uninterrupted inorderto run efficiently, in additionto helpingto know thedifferent laws that applytoit.

Inventory Management

To make the supply chain efficient as transport is required. Similarly, availability of goods and raw materials is equally important. It is necessary to store the goods sothat this availability is uninterrupted. But just storing doesn't solve the problem. This storage needs to be properly managed. This is called inventory management. Storage management is inventory management. The purpose of this is to prevent stocking of goods beyond a certain limit(overstocking) as well as under stocking, limit the cost of storage, protect the goods properly andmake the goods available at the time of demand. It is a matter of great responsibility to managethe supply chain, tomanage the stockof manufacturedgoodsthatare ready for sale, raw materials and other daily necessities required by the organization. Different techniques for this, e.g. (ABC, Analysis, Maximum Level of Stocks and Minimum Level of Institution (MinimumLevel) etc. are also required. It is important to check the numberof stocksavailable and theactual number from time to time to ensure that no malpractices or errors occur. In this regard, inventory management isan important issue.

II. Supply Chain Management: Concepts and Definition

In the early 1980s, American experts in the field of management and logistics later proposed andappliedtheterm"supplychain/chainmanagement".The Supply Chain is not a business function, it is a network of companies and Supply Chain Management is the implementation ofcross-functional relationships with key customers and suppliers in that network. It is a newbusiness model necessary for an organization's success and every business function needs to beinvolved.

1. The Council of Supply Chain Management Professionals (CSCMP)defines SMC asfollows:

"Supply chain management encompasses the planning and management of all activities involvedin sourcing and procurement, conversion, and all logistics management activities. Importantly, italso includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. Inessence, supply chain management integrates supply and demand management within and across companies."

2. According to Professor Douglas Lambert:

"Supply chain management is the management of relationships in the network of organizations, from end customers through original suppliers, using key cross-functional business processes tocreatevalueforcustomers andother**".**

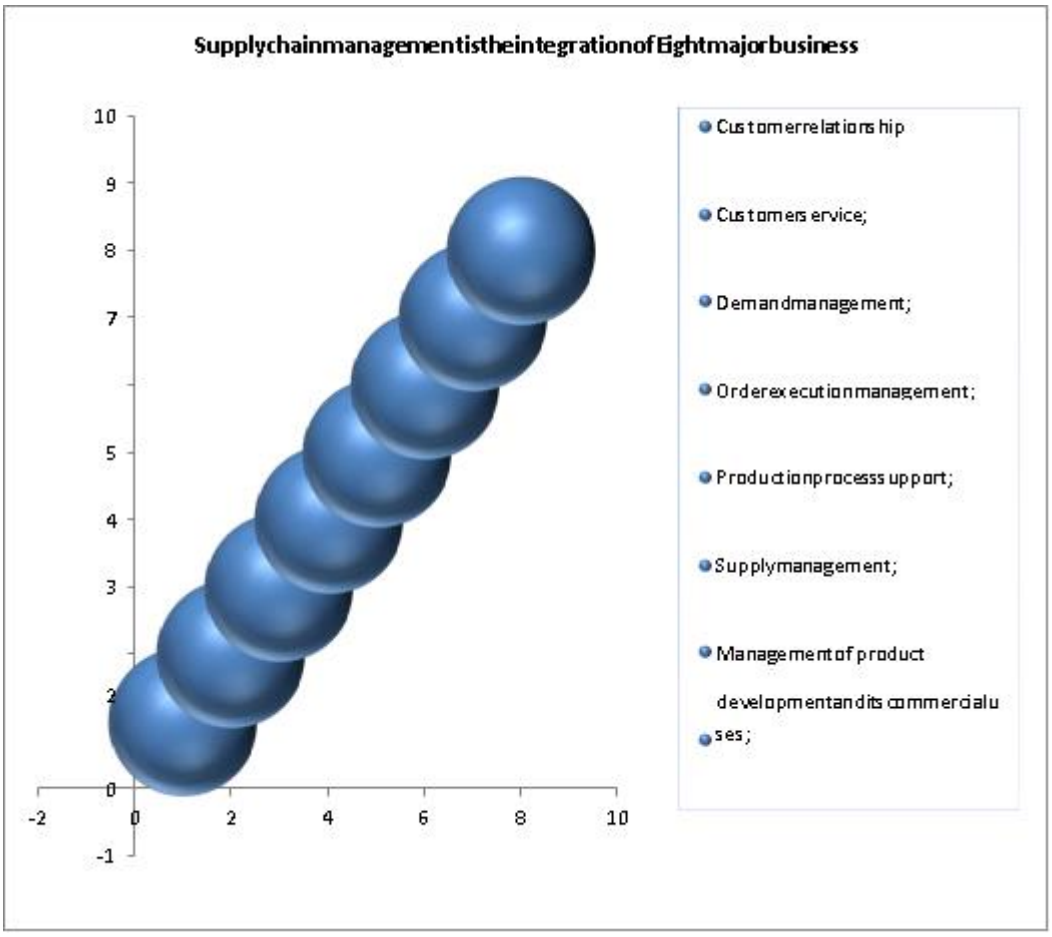
3. According to Ram Ganeshan, Terry P. Harrison

"A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished produc transformation of these materials into intermediate and finished products, and thedistribution of these finished products to customers".

III.Supply chain management is the integration of eight major business processes:

1. Customer relationship management;

2. Customer service;
3. Demand management;
4. Order execution management;
5. Production process support;
6. Supply management;
7. Management of product development and its commercial uses;
8. Retractable content flow management



In commerce, a **supply chain** is a system of organizations, people, activities, information, and resources involved in supplying a product or service to a consumer. Supply Chain activities involve the transformation of natural resources, raw materials, and components into a finished product and delivery to the end customer.

IV. Advantages of supply chain management:

a. Speed of turnover, reduction in inventory in warehouses and total cost of product storage;
b. Increase customer satisfaction with online ordering and product customization;
c. Flexibility of design, as well as high speed of sequencing and product closure in line with custome as well as high speed of sequencing and product closure in line with customer and market requirements;
d. Reducing development time and bringing the product to market, there by increasing the company'smarket share;
e. Maintaining high quality products despite out sourcing a large amount of work.
f. The SCM module is part of the powerful modern integrated corporate management system, especially in the ERPII/CSRP system.

V. Features of Supplychainmanagement

Supply chain management is the management of the flow of raw materials, products and services. The management process is represented by the following features:

1. All stages of the supply chain are documented in the document, which reflects each action-from editing the source material to serving a specific client;
2. The supply chain monitors product development, procurement, production and movement of goods to customers;

3. The supply chain extendsbeyondtheorganizationalboundaries oftheindividualorganization;
4. Regulation of process in the supply chain is based on the uninterrupted functioning of the information management system, to which eachcompany-participant has access;
5. All work on the supply chain is aimed at creating the most favorable conditions for customers;
6. Local goals and participatory initiatives are achieved while all links in the chain are involved inthework;
7. The principle of supply chain management focuses on internal and external processes, involvingall areas of each link in the chain, coordinating and coordinating the efforts of its components toprovidecustomers with all the conditions.

Today it is often believed that the oil and gas industry can enter a period of acute resource scarcity. But in fact, this is not the basis for imposing restrictions on the supply sector - based on their resilience, they remain available. Research in this area has shown that these same oil companies have enough resources to keep production going for at least another 40-50years.

VI. Conclusion

In this paper The Company seeks, develops and uses all logistics skills to meet the needs of itsactual customers at a realistic price. We highly considered, intelligent logistics strategy focuseson the lowest possible level of total cost or the highest attainable level of customer service. Awell-established logistics system is characterized by a quick response to emerging customerrequests, built-in mechanisms for monitoring changes in operationalactivities, and minimalinventory requirements. A reasonable compromise was found between service costs and services. To develop a reliable strategy, the cost of alternative service options is estimated. The supplychain management process is the integration of key business processes and the coordination ofchain equivalents to synchronize all activities performed during production and distribution, which adds value to the enduserandeliminatesall in efficient activities. Supply chain management is not only about increasing the productivity and profitability of the individualbusiness components in the chain, but also about optimizing the entire system to achieve highqualityserviceatan overall cost.

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TOURISM MARKETING IN INDIA – PROSPECTS AND STRATEGY

S. Shukla
Govt. Girls P.G. College, Bilaspur (C.G.)

ABSTRACT

India being a multidimensional country has vast potential for the development of tourism. The main measures that should be adopted for it is to formulate a scientific plan so that antipoverty and area development programmes for backward areas are integrated with tourism development programmes. For the effective development of this sector it is essential that tourism- marketing strategies are made more dynamic especially in terms of speed, innovation, imagination. HRD is required to be assigned due weightage, marketing information system be made more effective. It is essential to project new image of India by means of promotional measures for the growth of tourism.

Modern marketing necessitates two-tier arrangement. First the development of new tourist products in line with changing user's demand and second strengthening of the promotional efforts. While planning new tourist products, it is essential to assign due weightage to the user's discriminating habits so that emerging changes are managed properly. In the product mix the marketers are required to make any decision against the background of behavioural changes. The advertisements and publicity materials should be made attractive so that the potential tourists are motivated and travelling decisions are made possible.

Tourism Marketing strategy of India must aim at the following:-

- *Making India more competitive in the international and national tourism scenario and making it possible for the states to compete more effectively using the internationally available models that are being used by other developing and developed countries.*
- *Making tourism industry a unifying force nationally and internationally fostering understanding through travel.*
- *Bringing socio-economic benefits to the state by expanding the employment opportunities, income generation, revenue and foreign exchange earnings from this sector.*
- *Giving a direction and opportunity to the youth both through domestic and world tourism to conceive hopes and aspirations of others in a right way and motivating them to do creative work.*
- *Strengthening the promotional measures in the face of technological advancements, development of manpower by advancing education and training facilities in tourism.*
- *Private sector participation is increased.*
- *India share in tourism industry must be reached to a level appropriate to its size.*
- *The growth of foreign traffic must provide a more balanced economic benefit to the different regions of the state.*

Introduction

India being a multidimensional country has vast potential for the development of tourism. The main measures that should be adopted for it is to formulate a scientific plan so that antipoverty and area development programmes for backward areas are integrated with tourism development programmes. For the effective development of this sector it is essential that tourism- marketing strategies are made more dynamic especially in terms of speed, innovation, imagination. HRD is required to be assigned due weightage, marketing information system be made more effective. It is essential to project new image of India by means of promotional measures for the growth of tourism.

Modern marketing necessitates two-tier arrangement. First the development of new tourist products in line with changing user's demand and second strengthening of the promotional efforts. While planning new tourist products, it is essential to assign due weightage to the user's discriminating habits so that emerging changes are managed properly. In the product mix the marketers are required to make any decision against the background of behavioural changes. The advertisements and publicity materials should be made attractive so that the potential tourists are motivated and travelling decisions are made possible.

Strategy for the tourism marketing should be based on a comprehensive review of the tourism forecasting literature. Economics of outer recreational resources need to be analysed to compete in the tourism market at par with the international standard. To bring competitiveness in tourist industry must develop futuristic outlook, understand human behaviour and accept all international standards. Marketing is in exciting fast-paced

and contemporary field. It influences us daily in both our role as providers of goods and services and as consumers. It is a management philosophy, which is light of tourist demand makes it possible through research forecasting and selection of tourism products. Tourism Marketing is way of thinking about a situation that balances the needs of the tourist with the needs of the organisation or destinations.

The application of marketing technique to the tourism sector means formulation of marketing mix on the basis of user's behavioural profile. Changing environmental condition influence traditional marketing .A transformation in the attitude ,tastes, desires, needs and expectations of consumer cannot be ignored in the competitive business of tourism .In tourism marketing, due stress, be given to the social considerations since the holistic approach concentrates on sub serving the social interests.

Marketing Concept

Tourism is a service industry. Investments are made in and around a tourist destination in the hope of tourist will visit it. A product is designed and offered to the consumer in the hope that they will buy and derive satisfaction there from. Only then will the investment worthwhile. Tourists have to be persuaded to buy the product. But there is competitions as other destination are also trying to persuade them. Marketing concept dose not consist of advertising, selling and promotion.

It is a willingness to adjust any of the marketing mix elements including, product to satisfy those needs and wants.

Philiphs Kotler has stated that 'Marketing concepts not the art of clever ways to dispose of what you make. It is the art of helping your customer become better off.'' The marketer's watch words are quality, service and value. It is a social process determining, what product and service are needed by consumers and then satisfy there need by a coordinated set of activities at same time allow the organization to achieve their goals as is shown in figure 1 .In attempting to satisfy the tourist business tourism developers, must consider not only the short run immediate tasks but also broad long run desires.

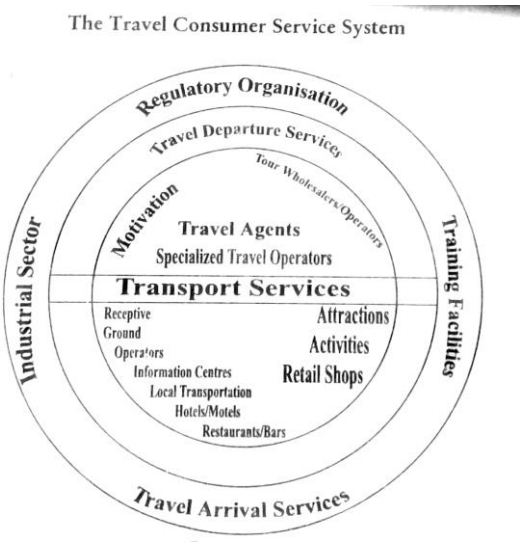

Fig.1

Tourism Marketing- Marketing encompasses all activities involved in anticipating, managing and satisfying demand. It also includes environmental analysis, product planning, distribution planning, promotion planning, price planning, and marketing management as figure 2.

Fig.2

Need For Tourism Marketing- Marketing is essential in every sphere of tourism industry. Marketing principals facilitate a breakthrough in the tourist system. Marketing helps in the supply of the tourist 'product according to the demand and expectations of tourist, by this the tourist organisation are able to establish their product leadership in the market. After the alignment of marketing with services the tourist get can right services, at right prices in the right time, in a right way which will result

in tourist satisfaction Market research and MIS also help to match supply with that of demand.

Tourism marketing ensures optimal utilisation of resources, as all tourist organisations are competing with one another to establish leadership, this can be possible only by optimum utilisation of resources by adopting proper marketing strategy. It helps the suppliers to project better image of their product by utilising effective promotional measures.

Marketing forces bears efficacy of identifying users into actual users. The environmental changes influence the use's expectations etc. hence, suppliers must have the knowledge of these behavioural profiles so that they can supply right product, at right time, at right place paving ways for increased tourist influx.

Signification of marketing in industry can be shown as:-

- It helps an organisation in achieving effectiveness, market leadership and quality.
- It helps in product planning, detecting behavioural profile of users, innovates promotional efforts.
- It simplifies the task of price setting, management of information, matching of demand with supply.
- Improves effectiveness of communication thro better targeting of message.
- Cut costs through proper distribution and improves understanding between marketer and customer.

The Linkages among quality, customer service and marketing these elements are shown figure.3.

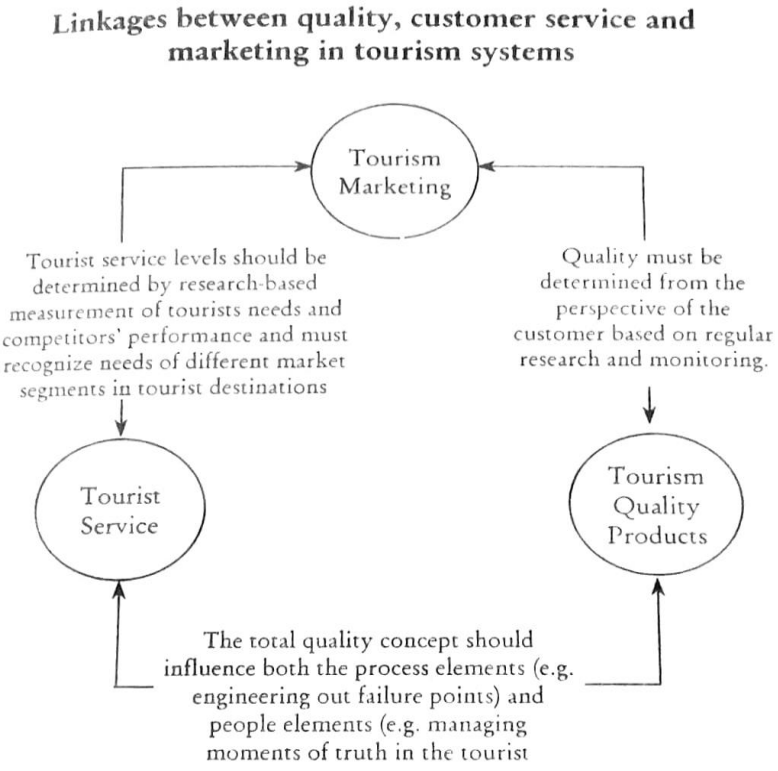

Fig.3

Tourism Marketing In India: An Overview-

In reference to India no policies, strategies and decisions are expected to be positive unless the user's behavioural profile gets an intensive care .This is due to the fact that users are discriminating nature, behaviour as it is natural and that of tourists preferences, needs, tastes, desires are constantly changing. Marketing is concerned with change, adopting to change and creating change. It is a business tool to manage change. Hence, the need of the hour is to analyse the behaviour of users, to asses these element-which motivates the tourists; how they become aware of the product; how their tastes, preferences, attitude are changing; in which ways effective advertisement can affect them. Until now tourist organisations of the state have adopted the sales drive strategies, which

were not fruitful hence, it is essential that market driven strategy be adopted in the state for tourism sector.

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- Private sector participation is increased.
- India share in tourism industry must be reached to a level appropriate to its size.
- The growth of foreign traffic must provide a more balanced economic benefit to the different regions of the state.

Limitation And Difficulties Of Marketing-

The problems of marketing in tourism are somewhat different from the problem of traditional product marketing The differences are the result of the characteristics of tourism supply and demand. In tourism service, production and consumption takes place at the same time therefore cannot be stored for the future.

Another kind of problem is that tourism supply is fixed and the resources and infrastructure of a destination cannot change as quickly as can tourist demand. A second important factor that makes tourism different from other industries is that the service provided is in fact an amalgam of several products and services. Different firms offer these components and they may be marketed directly to the tourists or combined into a package.

Another factor that makes tourism different is the role of travel intermediaries. Most tourist services are located at distance far from their potential customers, specialized intermediaries. The last factor that makes tourism different related to demand. Tourism demand is highly elastic, seasonal in nature and subject to subjective factors such as taste and fashion as well as the more objective factors of demand as price. The various uncontrolled factors in tourism are marketing are explained in figure 4.

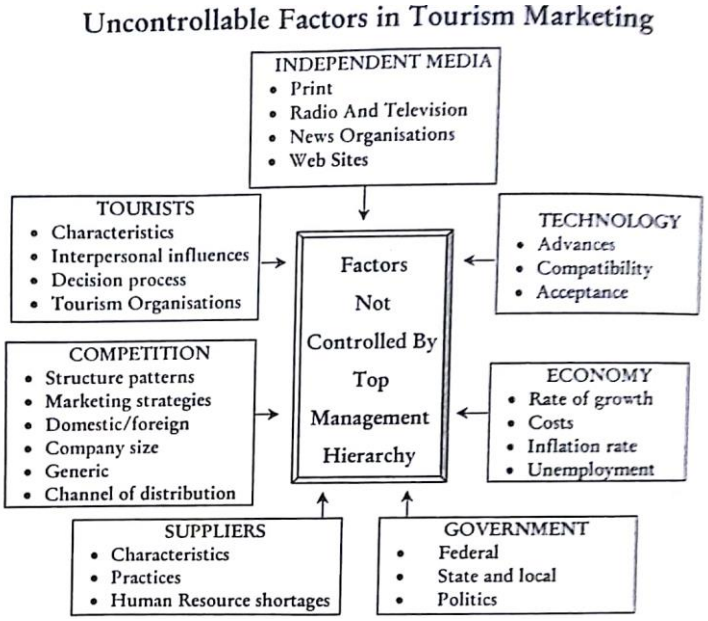

Fig.4

Future Development And Tourism Marketing Strategy In India- After analysing all the important aspect of tourism it is necessary to have an idea of marketing stratigy of tourism in India and prospects for the future development in the state. The marketing policy of tourism in India must be in a direction of:-

- Creating and offering unique selling propositions.
- Aggressive communication at home and internationally jointly within the industry, coupled with competitiveness.
- Contributing selflessly to the expansion of tourism demand base and relevant to specific self- interest.
- Exploiting the dynamics of the industry.
- Tuning the marketing activity of harmonies.
- Broadening the outlook on marketing to its various disciplines and diverse elements and planning activity totality be cut the narrow shackles that presently impede its full benefits.
- Training and developing marketing in general and the necessary specialists in particular.
- Marketing to be done by knowledge based managers.
- Giving marketing a pride of place in the organization that it deserves.

Apart from these future developments and marketing strategy in tourism progressive marketing expectations are also necessary as explained in figure 5.

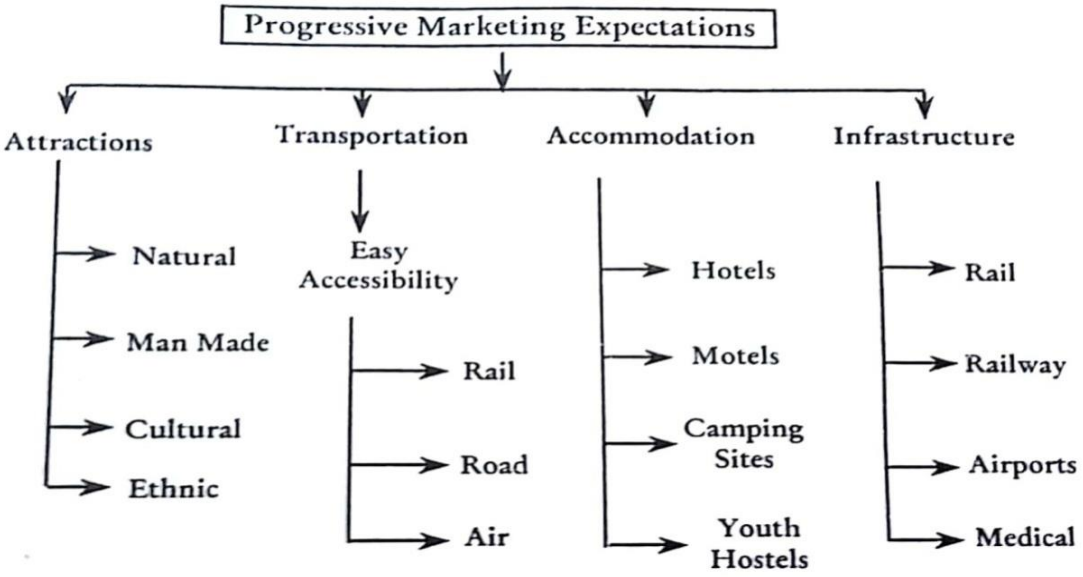

Fig.5

Conclusion

Effective marketing orientation, quality product development, confidence in the product, conductive environment is a pre-requisite for marking of tourism in India .For achieving all these, it is necessary to have an integrated project. Approach towards this sector like time bound implementation of project

Opening of new avenues innovations in tourism products liberal licensing, policy, open sky policy, more private sector cooperation, reduction in taxation, rationalisation and more infrastructural facilities must be added to give the Indian tourism a modern look.

There should be the efforts to create a tourism marketing mechanism professionally directed and funded by the industry. Automation, computerization, Suvidha, Suraksha be promoted widely. Future of tourism in India is bright due to its wide popularity as it is focused on the world map because of its rich heritages, culture, art architecture, fairs and festivals, snow peaks of Himalayas, sand dunes of Rajasthan, beaches of Goa and Mumbai, adventure and tracking, the need to pay attention towards the aggressive marketing of rich and diverse Indian tourism products by adopting the above mentioned strategies..

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VIRTUAL REALITY – A TECHNOLOGY TO FOSTER LEARNERS' LANGUAGE SKILLS

[1]M. Geetha and [2]S.V. Karthiga
[1]Department of English, Easwari Engineering College, Chennai
[2]Faculty of Science and Humanities, SRM University, Chennai
[1]svkarthiga5@gmail.com and [2]unigeet15@gmail.com

ABSTRACT

This paper focuses on teaching language skills using virtual reality and 360-degree videos and images for English as a Second language learners. In this digital age, it is ubiquitous to see many technophiles and inquisitive learners. Earlier, learners learn a language using traditional methods, discussions, activities, images, videos, infographics, social media, etc. for the retention of knowledge and to learn a language. And also different methods and techniques are being adopted to encourage and motivate learners. But in the last few years, virtual reality has been entered the field of education. Virtual Reality (VR) means feeling the imaginary world rather than the real one. The imaginary world is a simulation running on a computer or a mobile phone. The researcher finds virtual reality which brings a real world in front of the learners and truly immerses them in the learning environment. This paper focuses on Virtual reality and its role in English language teaching, and how it helps learners in enriching their skills using virtual reality.

Keywords: *Virtual Reality, 360-degree videos, and images, language skills, Second language learners*

Introduction

Virtual Reality means experiencing things in a three-dimensional computer-generated environment where one can be explored and interacted using special electronic equipment. That person immerses and has a different experience in this virtual world as if they are there. Virtual reality can be defined from the words "Virtual and "Reality" in which the former means near and the latter is what one experiences as a human being. So, the term Virtual Reality means near-reality.

Virtual reality is also known in education as an augmented reality that is characterized by creating a contextual place where different characters can interact within a certain virtual space. Speaking about virtual reality, researchers mean the use of "any simulated, artificial, or synthetic environment that creates a convincing presentation of the desired space" (Kessler, 2018, p. 213). As a consequence, virtual reality has been used not only in fields such as military, tourism, gaming, entertainment, medicine, real estate, automotive but also very important in education where learners get hands-on experience and are highly motivated. The main idea behind virtual reality is the creation of a simulation for learners to contribute to developing practical skills in a particular context (Fowler, 2015).

We hear a lot about Virtual Reality (VR) in recent days but it's not a new impression. The history of virtual reality can trace its origins and there have been many challenges at replicating reality during the late 17th and 18th centuries. Around 1838, Charles Wheatstone recognized that our brain processes a two-dimensional image from each eye into a single and three-dimensional object in depth which is known as Stereopsis. This has become a base for Virtual Reality. In the mid-1950s Morton Heilig developed Sensorama which was intended for the individual to immerse fully in the film.

And also in 1960 Morton invented Telesphere Mask which was the first VR Head Mounted Display (HMD) to provide stereoscopic 3D and wide vision with stereo sound. In 1987, the term "Virtual Reality" become popularized by Lanier. Then enters the first VR games in 1991, where the players wear goggles and immerse in real-time experience in virtual reality games. In 2011, an 18-year old Palmer Lucky makes a prototype of the VR Headset Oculus Rift. Google announces a basic Virtual Reality headset made of Cardboard and named it "Google Cardboard" in the year 2014. And in the same year, Samsung releases the Gear VR

for mobile phones and computers. In 2015, VR takes off and changes the world. Many changes in VR are to be seen in the next few years.

Augmented Reality

Augmented reality (AR) creates an artificial environment by the combination of the digital world and physical elements. Many applications are developed using this technology for mobile phones and special hardware. Arloopa is one of the tools which brings the digital and physical world together which results in an artificial environment. It places virtual content into the real environment and gives interesting experiences. This is the combination of both AR and VR. AR offers personalized learning and it nurtures the learning process. It not only offers innovation but also frequent progress and escalation inaccuracy. Handlers' knowledge and information are increased because of the usage of AR. AR apps are being used in education, games, printing, advertising, and other industries.

The Role of Technology

Learners are comfortable with technology because they grow up with it right from a young age when they started walking and talking to listen to rhymes and games. And also they don't get fear or hesitation to work with current recent gadgets. Earlier, teachers and learners use a blackboard, textbooks, discussion, images, videos, etc. but in recent years technology has takeovers everything. As per a report by Venture Intelligence, the Edtech investments in India made a fourfold jump in 2020, from $409 million in the previous year, as the pandemic pushed users to online education. Further, as per the 'EdTech in India' report by Omidyar Network India and RedSeer Consulting, the Indian Ed-tech sector is expected to grow from USD 735 million markets to an estimated USD 1.7 Billion, by the end of 2020, registering a 120% growth.

Virtual Reality and Augmented Reality in Education

There are many digital tools like Artificial Intelligence(AI), Robotics, Augmented Reality, and Virtual Reality that are creating innovations and catering to the whole field of students and teachers' environments. Virtual Reality has come into the world of education where the new chattels are to be experienced by the teacher and the learner. Students understand much better when they enter three-dimensional environments that educate and entertain them. It helps them to understand complex ideas and subjects in simpler ways. In Education, Virtual Reality upturns students' visualization. They wear the VR headset and goggles to start learning and consequently, they immerse in the virtual environment and that makes students interested in learning. Starting VR classes with 360-degree videos and images from Youtube 360 makes students' classes lively. Some of the roles of these technologies are highlighted as,

1. Immersion in learning
2. Self-learning and web-supported
3. Student-teacher engagement
4. Demonstration of content through 360-degree images and videos
5. Increase in retention

VR and AR Technologies

In this techie world, both AR and VR play a vital role in our daily lives. Already, it has been used in many industries where it comes in very handy and user experience. Let's see some of the fields where it has been used widely.

1. Automobile- helps engineers and designers to do their experiments to build a vehicle.
2. Military-helps soldiers to check their performance
3. Real estate- helps to create visuals
4. Education- helps to learn in an immersive and experimental way
5. Air and Space- helps to fix problems
6. Travel- helps to create travel experience with both digital and physical
7. Game- helps to play with multiplayer
8. Entertainment- helps to view fully immersed 360-degree films

VR and AR are not the only influence in these industries but are also likely to influence the workplace and social life too. There are other fields like news, journalism, arts, sports, recruitment, and others where these two technologies are used widely.

Role of VR in English Language Teaching

Technology has been really important and helpful for teachers to help students progress in language learning acquisition. When we think of VR it is very expensive and not affordable in classrooms. But Google has introduced Google cardboard which is cost-effective because it is made of cardboard material. This cardboard helps the beginners where they use it for entertainment as well as educational purpose. The main purpose of Virtual reality and Augmented reality are to have an immersive experience in the real world and bring virtual elements to create an artificial environment. By this student immerse and learn subjects such as history. Biology and others. When it comes to English, using Google cardboard, students can enhance their communication skills. Though there are different methodologies and techniques, VR plays a different role in the English classroom.

Teachers have to do with the resources available to implement VR in English classrooms. The possibilities are free VR applications, tools, and YouTube videos. Other possibilities are either teacher or student can create 360-degree videos and make use of them in the English classroom. We need to integrate technology to learn and update it now and then. It is important to choose students' paths of learning. If teachers show a photo to students, it is just a glimpse of an image to go beyond that the authentic experiences are needed and Virtual reality fulfills students' expectations and it takes them beyond entertainment. Virtual Reality and Google cardboard satisfy students' and teachers' needs to enhance their communication skills. All they need is mobile phones, VR applications, and Google cardboard.

Earlier, it was restricted to using mobile phones in the classroom. But these days few schools and colleges started using Bring Your Own Device technique which helps learners to enrich their skills. Many foreign schools and universities adopted this technique in their classrooms. They use mobile phones and special computers in their classrooms and language laboratory. Schools and Universities provide necessary resources. The teachers' job is to take handouts and some links to engage the students. There is no additional training is required to handle these gadgets and VR tools. Teachers can begin with basic level and guidelines are available on youtube they integrate virtual reality and augmented reality in their classrooms to enrich students' language skills. This gives more efficient teaching-learning and a unique experience to both the students and the teachers.

VR and Language Skills

VR and AR give a different experience for both teachers and students in Language classrooms. Because it gives some realistic experiences by using google cardboard and VR tools. There are so many tools and applications that are there which is expensive but not all. If we take cardboard which is cost-effective and affordable to teachers and students helps in enhancing students' communication skills, presentation skills and helps in the interview process. Though there are several aspects of VR interest, it plays a vital role in language skills. Some of the practical ideas that VR can be used in Language classroom to enhance students' skills are,

1. Any 360-degree video can be given to students and asked to describe the places they visit, the person they meet, and the experience they feel. This helps students to enhance their speaking skills.
2. There are applications like Google expeditions, where images and descriptions are posted during their visit to a place. This helps them to visit as well as read the passages about the places. It improves their reading skills where they get different exposure.
3. Gap-filling activities and role-plays can be done after watching the videos. For this handouts should be prepared by the teachers before the classroom instructions.
4. Students can experience the interview process before their interview. It helps them to get rid of their fear and gives them the confidence to face it in the future.
5. The virtual presentation can be done on a VR platform and it helps students to remove stage fear and motivates them to upgrade their skills.

Finally, VR and AR are a combination of the virtual and artificial environment presented to one's senses to experience the real world. These technologies have both entertainment as

well as a learning experience. It will take more time to replace VR and AR in enhancing learners' language skills and it will play a vital role in English language teaching. Because when students have a real-time experience they will not forget what they learn. So, motivation is needed to participate and experience in VR and AR so that natural and free-flowing form of communication will be upshot in impressive experience.

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STAGING OF RETINOPATHY OF PREMATURITY (RoP) USING DIGITAL IMAGE DENOISING METHODS ON ULTRASONIC RETINAL B SCAN IMAGES

[1]K.R.N. Aswini and [2]S. Vijayaraghavan
[1,2]Department of ECE, SCSVMV Deemed University, Kanchipuram, Chennai
[1]krnaswini@gmail.com and [2]professorvijayece@gmail.com

ABSTRACT

Eye is the most important sensory organ that is responsible for the perception of vision. The internal structure of the eye is encompassed with several tissues, muscles, nerves, soft jelly substances, blood vessels, etc. Out of all the structures of an eye, retina is the most responsible for quality and clarity in vision. Retinal impairment causes vision-threatening disorders and Retinopathy of Prematurity (RoP) is one of the major causes of artificial blindness in children. To diagnose RoP, the Ultrasonic B Scan is most common and effective too. In this paper, the latest works in the early, effective and accurate diagnosis are analysed. A requirement is found for a novel algorithm, which helps to improve the accuracy through simplified systems, and hence diagnosis can be effective. The abnormality, severity, chronicity of RoP if diagnosed early can prevent major ocular manifestations. A promising system, which caters these needs, will help ophthalmologists for effective diagnosis using hand-held devices.

Keywords: *Retinopathy of Prematurity (RoP), Stages, Ultrasonic B – Scan, Discrete Wavelet Transforms*

Introduction

The eye is the most elementary of the five human senses, since it vitalizes light and permits us to observe and appreciate the amazing world around us. The structure of the eye consists of many different complex structures some of which are surrounded by defensive layers and strong structures and thus are made up of blood vessels, tissues, nerves, as well as other elements.

A. Retina And Its Layers

The retina and its layers, which are structured in the dorsal section of the eye, are sensitive to light and facilitate us to see an object. It is to say, the retinal layers play a prominent part in our vision. Because of its role in providing us with vision, Retina is more vulnerable to a variety of vision-related ailments. Retinopathy of Prematurity (RoP) is an intrinsic disorder affecting preterm children in very formative years and demands testing to minimize the artificial visual impairment.

B. Retinopathy Of Prematurity (Rop)

RoP is an avoidable vaso-proliferative confusion which often concerns neonatal preterms (conceived inside 31 weeks). RoP seems to be more likely to affect kids born with a low birth weight (≤ 1750gms). The B Scan is the most typical, critical examination procedure by an ophthalmologist to diagnose RoP. This study investigates a progression of the most recent procedures and examination apparatus beneficial for simple, accurate, and early screening of RoP and its stages.

C. Ultrasonic B Scan For Rop Diagnosis And Assessment

In association with the prior B scan picture, an algorithm is provided that indicates interest in the methodology to measure the rate deviation in the strength of the retina. It is streamlined for the arrangement of RoP stages given the seriousness, area of anomaly, and age of the patient, which can be seen clearly in Ultrasonic B Scan images. The presented scheme and design offers a potential results in addition to providing a successful system for ophthalmologists for better detection and diagnosis of RoP in newborn infants and, as a result, prevent visual disabilities.

The following is indeed the approach to determine RoP. Three concentric bands on the retina are constructed by considering the optic disc as the centre point, relating three zones. The degree or phase of retinopathy, on the other end, is classified into three categories depending on the dispersion of light across the layers of the retina after traversing the aqueous and vitreous humours. RoP can be divided into three categories for ease of analysis: mild, medium, and severe. The causes for RoP are unknown.

It's certain that a great deal of research has been undertaken all across the nations to have a decent understanding of RoP and analyse its manifestations in the early stages so that adverse complications might be avoided. Below is a section of major perceptions provided by notable researchers in recent times for appropriate analysis of RoP.

Literature Survey

An evaluation of retinal health is done using an automatic image-based technique. The properties acquired are commensurate with clinically evaluated prognosis. The estimated is the convolution of a freely accessible information bank and two other individual information banks. Two enhancements to the widely used Template Disk Method are suggested to improve estimation precision. It has been revealed that a programmed image-based strategy is more productive than other cutting-edge techniques if it refers to vessel convolution and arch non-linearity. [1]

A device is demonstrated that modifies 3D pseudo retinal images, enabling the phase of RoP to be isolated as 1, 2, 3, and 4. Thirty-seven films are tested, containing five healthy eyes. Once the results are analysed, it was found that 95.83 percent of the severity and 96.55 percent of the exactness are achieved. [2]

In contrast to existing methods like as the binocular ophthalmoscope, Newbie technologies; Wide Field Imaging is one of the tools for detecting RoP. This article discusses many studies done and breakthroughs progress in terms of biomedical imaging and instrumentation apparatuses for the earlier observation of RoP. [3]

To select and extract the vein structure from a fundus or B scan, grey image preparation procedures are now used. The vascular structures of the retina are detected by the symbol assigned to a channel, and the vascular distribution can be obtained using the Matched Filter and First Order Derivative of Gaussian procedure (MFFDOG). The grey images of the vessel networks are separated in these proposed methods while using a unique channel for vessel segmentation, which can be fragmented as a twofold image. Matched Filter Hard Kernel (MFHK) thresholding algorithms are being used in combination with channel thresholding. MFFDOG and MFHK were shown to be a viable tool for obtaining RoP in infants by comparing these procedures on 50 images. [4]

The specific identification of variations in the retinal veins, which can be located by evaluating the variants managed to achieve by the computer aided conclusion, can make out the Plus infection on account of RoP evidence. A method is proposed here for differentiating and distinguishing the retinal veins, calculating convolution, and determining on the margins of the eye layers. The clinical assessments and outcomes of the suggested estimate for 110 photos (19 instances of RoP Plus Disease) got evaluated, and affectability and particularity were discovered to be 0.89 and 0.95, correspondingly, showing that this is one of the most preferred for regular applications. [5]

Depending on the aftereffects of programmed convolution estimation, an approach was presented to aid the ophthalmologist in detecting the phase of RoP as gentle, medium, or extreme. The diagram design of the retina is acquired by the use of the gray level, and morphological operations are made to follow out the hubs, branches, terminals, and so on according to the vein structure. The connection of each branch's isolation and pivot operates in a simple repetitive manner. In 25 pictures, portioned vessels are discovered to be suitable for assessing convolution. [6]

By measuring the convolution of retinal veins with a wide field fundus camera, it is to provide quantitative and reliable boundaries to the ophthalmologist. On 20 blunder-free, physically represented images, the convolution boundaries is examined. Different phases of circulatory conveyance and their convolutions are estimated and converged to use a precise approach so that the convolution record can be replicated per the clinical assessments. The manual, unique convolution estimation is monitored by a trained council comprised of 3 clinical graders and 3 retinal image examiners. By presenting a Spearman's link coefficient of 0.95 with ground truth, it can be determined that the technique has planted desired outcomes above clinical findings. [7]

Methodology

The Wavelet Filter order enables us to emphasise or de-emphasize image details in a given spatial recurrence space. Aside from the fact that it deals with visuals, it's similar to a "realistic equaliser" for a sound system. High-recurrence, mid-recurrence, and low-recurrence detail can all be stressed or diminished. In the same way that a Fast Fourier Transform (FFT) divides a sign or image into recurring portions, a Wavelet change does the same. Those sections can be swapped out and back in to create a distinct image. Wavelets have a little edge over Fourier transform in that the wavelet typically covers a small distance, making it possible to reveal fleeting highlights (for example a solitary star). Wavelets are a group of wave shapes that fulfil specific numerical models, instead of just a single definition for their state. Despite the fact that wavelets can be used on any image, they are most commonly used to handle lunar and planetary imagery. Wavelet techniques are extremely effective in signal processing applications like image compression and denoising. The major goal is to demonstrate how wavelet coefficients on a new basis can be used to reduce or eliminate noise from data. Here we used wavelet transform for denoising the original B Scan image for better analysis. [8].

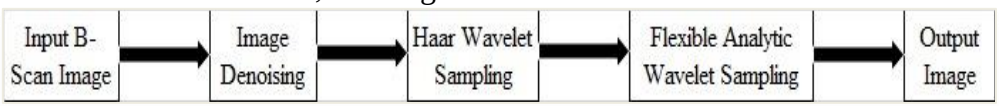

Image 1: Block Diagram of Proposed System

A. Sample Images And Explanation

Ultrasonic B scan is the most widely used medical instrument for analyzing and assessing RoP. Here are a few examples of B Scan radiographs with known RoP patients at different stages. It is possible to see anomalies in the retinal structure. The severity of the problem is determined by the health, growth, and function of the retina, which has an impact on vision quality. The sample B Scan images of the clinically diagnosed RoP are shown in Figures 2 to 5. Marginal retinal traction, inadequate retinal growth, detached retina, and hard exudates in the retina can all be seen in the photos. Right eye is OD (oculus dextrus), and left eye is OS (oculus sinister).

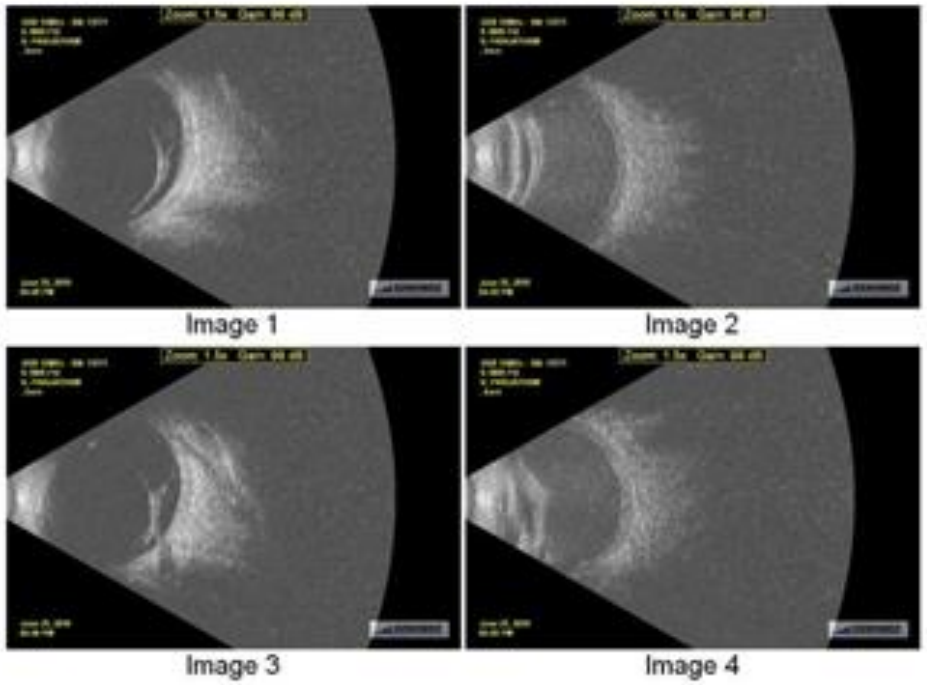

Image 2: Noisy Image: Left Side: In right eye (OD), tractional retinal detachment is noticed. In left eye (OS), total retinal detachment is noticed. (Input Image)

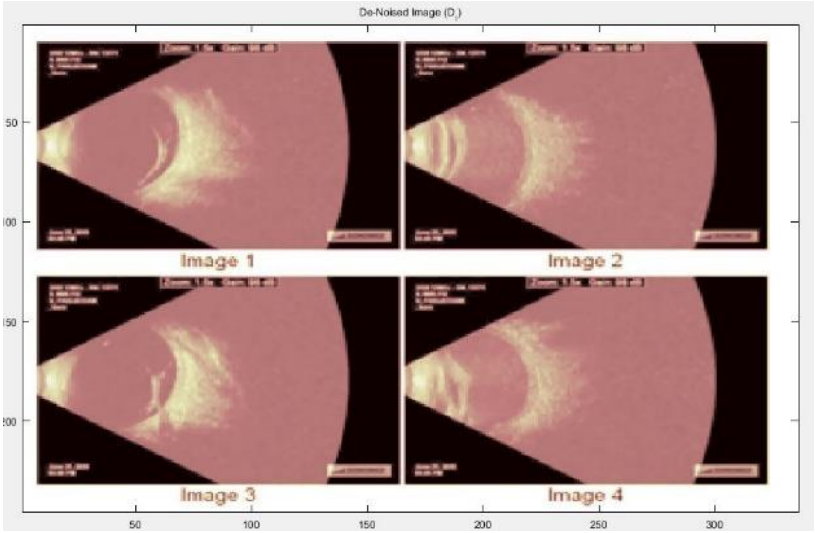

Image 3: Denoised Image: Right Side: The edges are sharp and more visible. Hence, better clarity is achieved with improved resolution & pixel quality (Output Image)

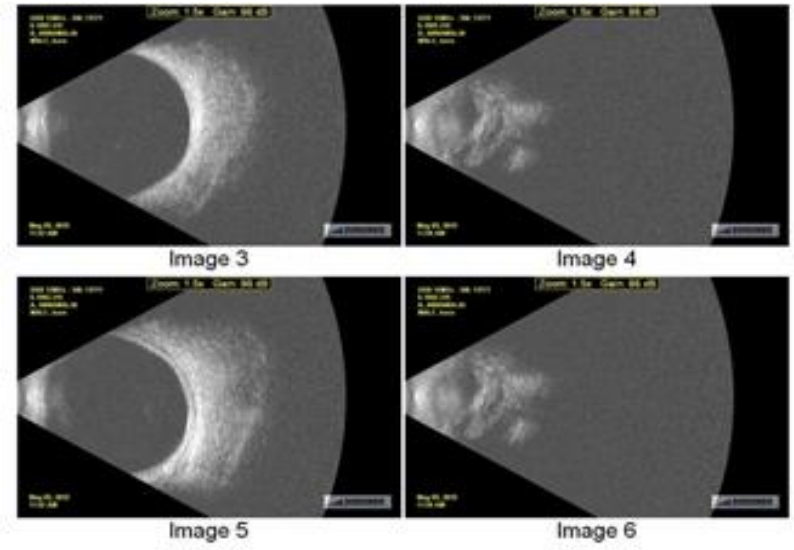

Image 4: Noisy Image: Left Side: Right eye (OD) has normal structure of retina, with a few, mild floaters. In Left eye (OS) the retinal structure is incomplete, with abnormal vitreous chamber (Input Image)

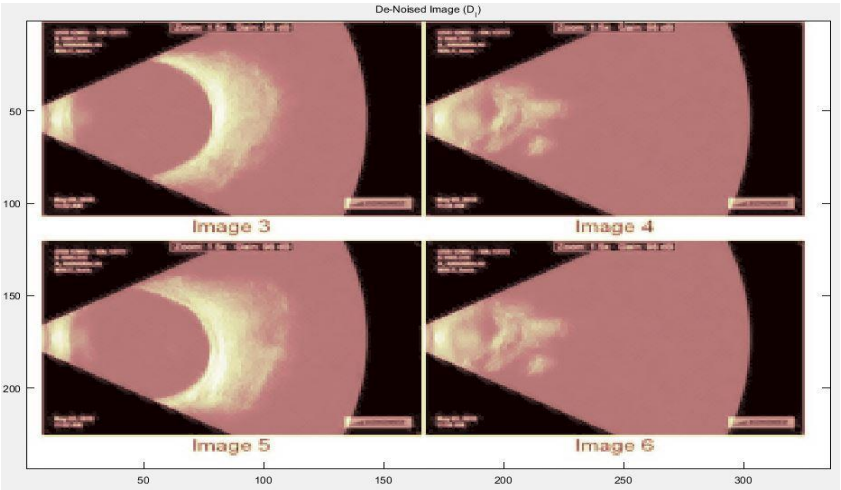

Image 5: Denoised Image: Right Side: The structural abnormalities are seen clearly, with edge clarity and quality through the proposed algorithm. (Output Image)

Conclusion

The image that are used as samples are allowed to go through the stages of the proposed calculation. It is thought that there is a pressing need to complete a meticulous rate deviation of retinal health in reference to the previous ultrasonic B scan image. Furthermore, precise assessment of the RoP situation allows us to understand the location and severity of the condition. Furthermore, the arranging approach takes into account the patient's estimated age. This computation has an extension that reveals a few previously overlooked boundaries in normal assessments.

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IMPACT OF FINANCIAL BRAND VALUES ON FIRM PROFITABILITY AND FIRM VALUE OF INDIAN PHARMACEUTICAL COMPANIES

Niyas N[1] and V Kavida[2]
[1,2]Department of Commerce, Pondicherry University
[1]niyasrcsh@gmail.com, [2]Kavida4@yahoo.com

ABSTRACT

Purpose :The research paper aims to suggest an appropriate financial brand valuation model in the Indian context by conducting an extensive review of literature on various brand valuation models and to gauge the financial brand values of the Pharmaceutical companies in India using the appropriate Financial Brand valuation model in the Indian Context. The study also aims at analyzing the effect of financial brand value and various brand value drivers on firm profitability. The contemporaneous effect of brand values of pharmaceutical companies on firm value is also tested using panel data regression analysis. Design / methodology: The sample consisted of 29 listed pharmaceutical companies in BSE 500 index for a period of 10 years from 2009 to 2018. Panel data regression method is used for the analysis. Financial brand value, Prestige driver, loyalty driver, extension driver, Return on Assets, Return on Equity, Return on Capital, Stock price, and Tobin's Q are the major variables used in the different models developed. Findings: Positive contemporaneous relationship between brand value and profitability (ROA) has been found out. Strong Pharmaceutical Brands are having higher profitability measured in terms of Return on Asset. Brand value drivers (Prestige driver, loyalty driver and extension driver) did not show any significant effect on profitability. Positive contemporaneous relationship between brand value and firm value (Tobin;s Q).Study found insignificant relationship between Brand value and stock price. has been found out. Among control variables, Advertisement spending showed positive effect on firm value. Research limitations/implications – The study focuses only on 29 listed pharmaceutical companies in Indian capital market. In terms of implication, theoretical bases discussed in the literature review and hypotheses development are mostly validated. Practical implications : The findings are providing important practical implications to pharmaceutical firms, different management of the companies, outside investors, investment analysts and managers, the government, and other policymakers. Originality : The study evaluating the financial brand value of a set of companies using an appropriate model suggested by literature for the Indian context is a novice. Although some studies are there abroad that tests the nexus of brand value-profitability and brand value-firm value, all those studies are used top-performing brands. This study used all brands in the industry to ensure a robust result and used multiple performance variables in the case of profitability and firm value. This is the only longitudinal panel data-based study in the field of brand value performance literature as it used the most objective measure of financial brand value from only a finance perspective by avoiding the bias of marketing and customer perceptions

Keywords: *Hirose model, Brand value, Brand Equity, Pharmaceutical brands. Panel data techniques.*

Introduction

A survey conducted by Forbes magazine which studied 3500 top US Companies was able to conclude that intangibles can contribute up to 72 percent of market value. (M. Yeung & Ramasamy, 2008). There is concrete evidence that points towards the ever-widening chasm between market value and the book value of companies in the last four decades and the same gap is due to the presence of intangible assets of the firm (Lagarden, 2012). Brand by nature is an intangible asset (Roberts, 2011).The impact of the brand towards various firm performance metrics has been acknowledged and analyzed deeply in studies that treated a brand performance as one of the major dimensions of marketing (Sucala & Sava, 2015).While coming to the finance perspective of Brand valuation, Statistics like brand value tables, scores, and ranks published by consultative agencies like Interbrand, Brand Finance, and Forbes Magazine throw light on the role of intangibles, especially brands, in the long-term success of financial companies (Salinas, 2009a). The importance of reporting brand value was reiterated by 72 percent of financial analyst respondents in a survey conducted by Brand Finance. Its centrality in value creation was further emphasized by 73 percent of companies that were part of the study (Finace., 2000).

Accenture conducted a survey to examine the importance of intangible assets in determining the success of a firm. One hundred twenty top executives were consulted from around the

world, and 96% of them agreed that intangible assets are central for profitability and success, but only 5% said that they implemented effective measurement tools to assess the same. The study was able to conclude that this negligence can lead to grave consequences for these companies (Accenture., 2003). The probable reasons for companies not disclosing their brand value were studied by Duetsche Bank Research which is: Limitations imposed by accounting regulations, reluctance to disclose technical intricacies and other intellectual capital to competitors, the unavailability and lack of knowledge about apt models and vocabulary to conduct such a research (Hofmann, Schneider, & Walter, 2005). So this implies that the top-level executives, finance, and accounting managers to seriously involve in disclosing and reporting brand value measures in the financial statements of Indian companies. Thus we can conclude that finance executives and accounting managers should acknowledge and act upon the necessity of evaluating and reporting brand value in the financial statement of companies. And also that academic researchers, accounting practitioners, strategic managers, and fiscal authorities have already started studying and assessing the importance of brand valuation (Janoskova & Krizanova, 2017a). Accurate measurement of the objective financial value of brands can be an apt metric for assessing the fulfillment of marketing strategies and decisions made by marketing managers (M. Hasan, Ullah, & Bhattacharjee, 2015), and it is important because effective and successful marketing decisions give rise to firm performance and overall success (Simon & Sullivan, 1993).

Brand value determination will ensure the effective utilization of marketing resources towards enhancing firm value (Dolatabadi, Davood, & Zolfaghari, 2012). The purpose of brand valuation can be either Technical purpose which is Accounting, and transactional purpose (Salinas, 2009a). The transactional purpose that comprises reporting of brand value in balance sheets, Tax planning, and other fiscal requirements and mergers and acquisition is also stated by Mahamudul Hasan et al. (M. Hasan et al., 2015). Technical Brand valuation is inevitable as the brands should be valued at a monetary measurement expression to be used at the time of franchising brands, selling brands, buying brands, and at the time of mergers and acquisition (Majerova & Kliestik, 2015). brand valuation for management purposes comprises valuation for making and restructuring portfolios of brands, creating brand architecture, facilitating marketing strategy and decisions on brand building investments and budget allocation, and reviewing the results of the same (Salinas, 2009a) brand valuation is important as it indicates potential for future growth, reflects and spots the area of business operating well, and decides upon which area of the business is to be developed and repaired. (Salinas, 2009a)

A total sum of 59 Brand value providers, scholars, and authors of commercial brand valuation models, and 39 different proprietary brand valuation models have been identified. (Salinas, 2009a). (Salinas, 2009a) identified three major approaches for Financial Brand valuation. The market approach considers market mechanism and demand driver. The cost approach, which considers the historical costs of a brand-building into account, and finally the Income approach, which takes income and profit-related information from financial statements for brand valuation purposes. The main shortcoming of the Historical cost method is the difficulty involved in recapturing all the historic costs incurred to develop the brand. So this approach is very less in practice (Anson, Suchy, & Ahya, 2014; Hirose et al., 2002). Most of the proprietary and academic brand valuations are coming under the income approach (Salinas, 2009b). found that the Cost approach and market approach are not used in practice because of the unavailability of comparable data. (Haigh, 1997; Boos, 2003)

Brand Valuation Overview

The section has attempted an extensive literature review of existing financial valuation methods. By looking at the merits, limitations, and the general applicability of different models, especially in the Indian context, it tries to uncover the best financial brand valuation model that is applicable to all Indian brands; one that is not dependent on customer perception but can work with publically

available data from financial reports. Gabriel Salinas (Salinas, 2009a)has identified three methods for estimating financial brand value: The Market Method uses market mechanism and demand driver, while the Cost approach takes into account the history of costs used for brand building. The third one is the Income approach which depends on income and profit-related information from financial statements to calculate brand value. Following are some of the major brand valuation methods under the cost approach. Historical cost creation method: Brand value is calculated from the historical costs incurred for creating the brand. This method assures a minimum floor value for the brand but can be used for brands or assets where specific market benefits cannot be identified (Anson et al., 2014). However, this method is not always capable of identifying earning potential and competitive capacity of brands, and there is also the challenge of tracking all the costs incurred to develop the brand. Hence this method is not always considered practical (Anson et al., 2014; Haigh, 1997; Hirose et al., 2002). The replacement cost method uses the current price to calculate the future value of brands. Although the method often provides a floor minimum value of the brand, it is not always accurate in estimating future values as identified in previous studies (Anson et al., 2014; Haigh, 1997; Boos, 2003) and the method is not in practice. In the market approach, the brand sale/transaction method is prominent. Here brand value is calculated by comparing transactions of similar brands in similar market settings but can be useful only when there is enough comparable data. Although there are numerous theoretical models under the Cost approach and market approach of financial brand valuation, the cost approaches none of them are used in practice because of the unavailability of comparable data. (Anson et al., 2014; Haigh, 1997; Boos, 2003).

Proprietary and Academic brand valuations fall under the income approach (Salinas, 2009a). The price Premium method followed under this approach estimates brand value by multiplying the unit price differential of the brand with the volume of sales of a generic product. Then the price premium is calculated statistically using Conjoint or Hedonic methods of analysis. Although this approach is theoretically simple and universally understood, the method is found difficult to value the brands of the companies that sell conglomerate products or services that are not easily comparable with competitor's price (Srivastava, 2019; Boos, 2003; Smith & Parr, 1989; Tollington, 1999). Demand Driver or Brand Strength Analysis makes use of statistical or judgmental analysis to find out the earnings attributable to the brand in consideration using a hidden algorithm that is treated as a "black box." This is the preferred method for many brand valuation consultancies like Brand Economics, Futurebrand, and Interbrand for calculating and reporting financial brand values of world-famous brands without revealing their algorithm of estimation to the public, so that usage of these methods become inaccessible for researchers and academicians for valuation purpose. (Economics, 2002; Brandient., 2004; Interbrand & L., 2004; Kumar & Blomqvist, 2004; Metrics, 2004; Hupp & Powaga, 2004; Sattler, H¨ogl, & Hupp, 2002).AUS Consultants mostly use the gross margin comparison method, which uses the excess sales revenue over the average gross margin of comparable brands as an indicator of brand value. However, it can be over or under-evaluate a brand as it does not take into consideration any variables that can influence the operating margin other than the brand (Smith, 1997). The royalty relief method is a preferred method of agencies like Brandient, Brandfinanace, and Valmatrix. Here brand value is estimated as the license fee to be paid by the company if they did not own the brand; future sales are estimated and multiplied with appropriate royalty rates calculated using scoring techniques, operating earnings excess, etc., to derive the final value of the brand. Researchers like Anup Srivastava (Srivastava, 2019), Weston Anson (Anson et al., 2014), Monica Boos (Boos, 2003), and Gabriela Salinas (Salinas, 2009a) opined that this method is theoretically attractive due to simple estimation technique valuation specific to industries are possible, and it has been accepted by numerous fiscal authorities as a reasonable model, but brands are not comparable. Some authors (Srivastava, 2019; Salinas, 2009a;

Anson et al., 2014; Boos, 2003) believe that it cannot isolate perfectly the brand value as the royalty rates. Due to the complexities mentioned by the previous researchers, the royalty relief method is not widely used for brand valuation purposes by researchers, academicians, and corporates.VALCALC and Baruvh Lev have adopted the excess margin method in which the portion of the excess margin attributable to the brand is calculated to find brand value, the obvious limitation being the subjectivity involved in estimating the required return of brands (Pratt, 2003; Andriessen, 2004). The Marginal Cash Flow Method gauges the marginal cash flow from exploiting the brand name to estimate its value. In concept, the method is consistent with the definition of the brand, but it is almost always difficult to find a comparable brand (Lamb, 2002). The competitive Equilibrium Analysis method estimates brand value by discounting "brand earnings" that are calculated by noting the differential market share resulting from the image of the company. Though this is an objective method of valuation, the limitation stems from the challenge of determining the proportion of market share (Salinas, 2009a). The Customer Lifetime Value (CLV) method applies customer lifetime value attributable to brand individually, and it calculates brand value by aggregating all individual value to all customers (Fischer, 2007). This method is subject to measurement errors, and the trouble of subjectivity occurs (Salinas, 2009b).Damodaran's (Damodaran, 1996) Brand Valuation Model makes us of the differential of price to sale ratio to calculate brand value. The difference between the estimated price to sales ratio for a branded company is compared to the same ratio of a generic brand. The method is not very practical in the Indian context as collecting data about prices and sales of generic products is challenging. (Salinas, 2009a). Stock Price Movements method calculates brand value using an accounting equation that derives share value attributable to each brand. The method is not always accurate because the strong, efficient market it assumes by default is not always the reality (Simon & Sullivan, 1993).

In the absence of a well-established financial brand value measure, the subjective brand value estimates have unclear credibility (Lee, 2012). Though there are many consultative agencies like Interbrand, Brand Finance, Brandient, and Forbes that provide brand evaluation services, the high cost of the services and the inclusion of only top brands makes it inaccessible and less relevant to researchers and academicians who remain in the dark about the methodologies that are kept private by these agencies. (Janoskova & Krizanova, 2017b)Though brand valuation has started attracting the interest of academicians and accounting professionals and many models for evaluation have been developed, most of them lack objectivity (Schroeder, Borgerson, & Wu, 2017). The Income Approach to brand evaluation is considered easily understandable in theory and easily applicable in practice which can be carried out with moderate effort using data already available in the annual publication of firms. Interbrand and Hirose's methods of analysis are considered the most famous Income approach models (Wu, 2009).Yen-Chun (Wu, 2009) had concluded in his study that the Hirose model is more objective than the Interbrand method as it takes into consideration market factors that can influence brand value subjectively. The Interbrand model, however, makes use of market factors like brand strength on the basis of consumer opinion, which is unsuitable for finance research. Hence the Hirose model was the preferred method for Jade Michele Royers (Royers, 2015)as well.

Later many researchers used the Hirose model, which determines brand value drawing on public financial data and is usually more objective than other appraisal methods and the approach conforms to the Financial Accounting Standards, and the formula is distinct and simple (Bagus, Taher, Mangesti, & Firdausi, 2018; Wang, Yu, & Ye, 2012; Wang, Chen, Yu, & Hsiao, 2015; Srivastava, 2019; H. Hasan & Korkmaz, 2017; Majerova & Kliestik, 2015; KALKAN, 2019; Royers, 2015; Ilik, 2014; Hamada, 2008; Eyiler, 2019; Lee, hsin-yen claude,˙ n.d.; Ceylan, 2019; Bayrakdaroglu & Mirgen, 2016; Barajas & P´erez Mantec´on, 2012)

This study extensively reviewed all the renowned brand valuation models developed by academicians, valuation consultancies, and

other researchers. The advantages and disadvantages with practical applicability of each model are discussed in the review chapter followed by this section. After a careful analysis of the practicability of measurement of financial brand value models, This study suggests an appropriate measurement model which very much validates the usage under the settings of the Indian economy and Indian databases. The financial brand values of 29 Pharmaceutical companies in the BSE 500 Index have been valued using the proposed model as the first objective of the study. The estimated value has been used for analyzing the impact of brand value with profitability for the second objective and the Effect of brand value on firm value as the third objective of the study. The paper begins with a brief overview of the major financial brand valuation methods and approaches and a review of pertinent literature surrounding the Brand value – Profitability and brand value-firm value nexus. Thereafter, the nature of the data and methodology is discussed and the results of the panel data analysis are reported. The final section of the paper contains discussions of results, practical implications, and conclusions.

Healthcare Sector in India

This paper evaluates IC–linked performance of large pharmaceutical firms in India. Intrinsically, the pharmaceutical industry distinguishes itself with its knowledge-intensive features. It is considered an innovative and research-oriented industry with due emphasis on quality of HC, R&D activities, product and process innovation, and intellectual proprietorship. All these features make this industry an attractive proposition for research on IC. The pharmaceutical industry in India exhibits similar characteristics with commendable progress in basic infrastructure, range of products, and technological advancement. Aspects such as the implementation of good manufacturing practices, development of low-cost technologies coupled with high-quality products remain the major strengths of this industry. Today, an ever-increasing number of pharmaceutical firms are in the process of seeking drug approvals from regulatory authorities of foreign countries. All these advancements have propelled the Indian pharmaceutical industry into the league of top generic pharmaceutical players in the world. (Vishnu & Gupta, 2014) India is the largest provider of generic drugs globally. Indian pharmaceutical sector supplies over 50% of global demand for various vaccines, 40% of generic demand in the US, and 25% of all medicine in the UK. Globally, India ranks 3rd in terms of pharmaceutical production by volume and 14th by value. The domestic pharmaceutical industry includes a network of 3,000 drug companies and 10,500 manufacturing units. (IBEF, 2021) Pharmaceutical branding currently remains at a nascent stage in its approach to techniques adopted by its FMCG counterpart. Given the high-clutter scenario, companies sense an apparent need to concentrate on branding to improve the brand's mind space and bond emotionally with customers to distinguish the brand, lend competitive edge and enable prescription. There are a number of reasons why pharmaceutical brands have become more important. First of all, one has to create more value from the molecule above and beyond the obvious benefit. Second, one would want to create an entity that is differentiable from the competitors. In addition to that, one has the potential to create a sustainable entity through which it has to leverage the value of your brand. (Panchal, Khan, & Ramesh, 2012)

Review of Literature and Hypothesis Development

Brand Value and firm Performance

The intangible nature of brand attitude warrants a study that goes beyond the immediate results(for example, financial) and covers the benefits of creating and managing a brand name and brand attitude in the long run and the effect that it will have on overall brand performance (Aaker & Jacobson, 2001). Traditional theories on brand values were formulated by keeping in mind the positive impact the former can have on firm performance in the long run: strong brands acquire higher benefits in the form of customer loyalty, better price advantage, improved scope for brand extension, higher profit margins, smoother crisis management etc. (M. Yeung & Ramasamy, 2008)Research

in the nexus between brand value and firm performance can be from two dimensions based on data. (M. Yeung & Ramasamy, 2008). the nexus between brand value and firm performance can be studied using data at two levels. Using primary data collected from customers and their perceptions, the brand equity value is estimated. One method is to use the primary data collected from customer perceptions to estimate the brand equity value. (Madden, Fehle, & Fournier, 2006). While researchers who studied financial brand valuation used firm-level data published in the form of annual reports and financial statements marketing researches were based on customers' opinion or perception, The marketing decisions of a company can have serious implications on the company's operational and financial performance (Dolatabadi et al., 2012). The intangible nature of brand attitude warrants a study that goes beyond the immediate results(for example, financial) and covers the benefits of creating and managing a brand name and brand attitude in the long run and the effect that it will have on the overall brand performance of the firm (Aaker & Jacobson, 2001). The second category uses secondary data from accounting and financial reports for calculation of brand value or depends on the scores provided by third party brand consultancies like Interbrand (Barth, Clement, Foster, & Kasznik, 1998; Madden et al., 2006); Brand Finance, Forbes etc. (M. Yeung & Ramasamy, 2008). As mentioned earlier, this research belongs to the second category purely from a financial perspective. The financial perspective is based on the excess of incremental discounted cash flow of branded products over generic or unbranded products (Simon & Sullivan, 1993). The impact of financial brand value was studied by Matthew Yeung et al. (M. Yeung & Ramasamy, 2008)using data provided by business week top 100 brands using firm performance metrics of ROA, ROI, Net Profit Margin, Pretax Margin, and Net Margin. The panel data framework used by the researchers revealed significant positive effects that financial brand value can have on all profitability measures. Between 2000 and 2005, a staggering 822 million was the average yearly growth of the selected 50 US companies, which meant 0.62 million of return on investment to each company each year. The study aimed to analyze both the immediate and long-term effects of brand value on profitability and arrived at the conclusion that the nexus between Brand value and profitability is both significant and positive in the short-term scenario. The study somehow failed to establish a successful GMM model to demonstrate the lagged brand value effect on profitability. A later study by Feng Jui Hsu et al. (Hsu, Wang, & Chen, 2013) revealed that brand value estimates yield stepped information regarding firm profitability and performance, which can be useful in decision making for marketing management and brand investments. An analysis of the relation between brand value and corporate performance was carried out by comparing Interbrand Global Top 100 brand scores to the CAR and BHAR values calculated to measure the return, and it was discovered that the investors prefer to hold shares in highly branded companies. Thus, Brand value can act as an important tool for management, assessing corporate performance, and managing risk.

(Wang et al., 2015) studied the impact of financial brand value on Returns and assets used quantile regression and SEM to analyze the relationship between the aforementioned variables. The Hirose method was used to calculate the brand values of Taiwanese High-Tech companies during the 2010-2013 period. Results from quantile regression showed that the prestige driver had a positive impact on the price premium or price advantage for all quantiles through profitability measures of return on assets. Further, overseas presence and internationalization powers of the brand, as indicated by the brand extension drive, were revealed to have a favorable effect on profitability in higher quantiles, which means-internalization of brands can improve profitability. The study also revealed some negative correlations between brand loyalty and profitability, but SEM results were suggested a positive relationship between calculated Hirose brand value and the Return of assets of these Taiwanese companies. Sangeeta Arora and Neha Chaudhary (Arora & Chaudhary, 2016) study of financial brand values used the data from top 10 Indian banks published by Brand Finance inc. Between 2009

and 2014. Regression analysis was used to assess the impact of brand value on profitability in terms of Returns of Assets, Return on Equity, and Return on Investment and concluded that the negative nexus might be a result of the marginal decline of the returns of the banks' brand advantage. Bagus Wardianto (Wardianto, Alhabsji, Rahayu, & Nuzula, 2018) focused on the effects of brand value on ROA and ROE. Using the Hirose method, he arrived at the conclusion that high brand value can increase profitability from loyal customers. Erem, Ceylan (Ceylan, 2019) The brand values of 100 Turkish companies listed in Brand Finance top Turkish brands were used by Ceylan Eram to study the causality relationship between financial brand value and profitability. The Hirose method was applied to study the data between 2008 and 2018, and the empirical results proved that a unidirectional causality relationship exists between brand value and return on assets. (Mohan & Sequeira, 2016) H1: There is a significant relationship between Brand value and ROA. H2: There is a significant relationship between Brand value and ROE.

H3: There is a significant relationship between Brand value and ROC.

Prestige Driver

Firms with successful brands can often charge higher prices than rivals do (Persson, 2010). 58.3% of the respondents of the study by Emmanuel Agbaeze et al. (Agbaeze, Chiemeke, Ogbo, & Ukpere, 2020) strongly agreed that when a product has a higher quality in comparison with competing products, it reflects in their pricing of the product. Customers are willing to pay more price for the superior brands of which naturally the brand values are higher (Chang, Wang, & Arnett, 2018). Hence it is only natural for consumers to assume that a consistently discounted product has low brand quality. This was proved again in a study in Nigeria by Agbaeze et al. (Agbaeze et al., 2020) who concluded that the customers are willing to pay a higher price for a quality product which proves that pricing strategies by management helps in increasing brand value and profitability. Empirical evidence from studies conducted by Boonghee Yoo Boonghee Yoo (Yoo, Donthu, & Lee, 2000) indicates that frequent price promotions leave a negative impression of brand quality and brand prestige on consumers. The prestige driver of brand value has been proved to have a significant and positive effect on the return of assets; in a study conducted by Wang (Wang et al., 2015) Structural Equation Modeling and regression analysis were used to study the effect of brand loyalty on firm performance. Hirose method was used to analyze the ROA of Taiwanese high-tech companies between 2010 to 2013, and the above conclusion was reached.

H2:There is a significant relationship between Prestige driver and ROA. H3:There is a significant relationship between Prestige driver and ROE.

H4:There is a significant relationship between Prestige driver and ROC.

Loyalty Driver

Using Structural Equation Modeling and Quantile regression analysis Wang (Wang et al., 2015) Studied the effect of brand loyalty, measured in terms of Loyalty Driver of Hirose method, on Firm performance measure of ROA of Taiwanese high-tech companies over the period 2010–2013. The findings indicate that the prestige driver of brand value is positive and significant with return on Assets for all the quantiles. Customers convinced of the brand quality often tend to purchase repeatedly from the same brand (Kim & Kim, 2005). And the company enjoys a higher level of customer retention vis-`a-vis brand loyalty. Then a small change in prices will not make the customer want to switch to a rival brand's products (Bowen & Shoemaker, 2003). A high, significant, and positive correlation was found between Brand loyalty and profitability by previous studies by Bijuna C Mohan et al. (Mohan & Sequeira, 2016). Brand loyalty found loaded highly towards constructing brand value (Kim & Kim, 2005). No single purchase by a customer can improve brand value and profitability (Kim & Kim, 2005), but

a repeated purchase can improve both (Mohan & Sequeira, 2016). Brand-loyal customers are unlikely to respond unfavorably to promotions and can still be satisfied, intend to visit again and recommend the brand to others as the customer's perception of the brand comes from various other factors too, like their experience of the services, word-of-mouth reports from other customers and recollections from earlier advertisements and promotions. (Kim & Kim, 2005).

Literature on the nexus between brand loyalty and profitability is scarce, and the few that exist have contradictory findings. Brand loyalty was not found to have a positive relationship with firm performance of fast food brands as concluded from the studies of Hong-bumm Kim and Woo Gon Kim (Kim & Kim, 2005), but the opposite was true for luxury hotel brands where brand loyalty proved to have a significant bearing on performance as found through stepwise regression analysis (Kim & Kim, 2005). Using Structural Equation Modeling and Quantile regression analysis Wang (Wang et al., 2015) Studied the effect of brand loyalty, measured in terms of Loyalty Driver of Hirose method, on Firm performance measure of ROA of Taiwanese high-tech companies over the period 2010–2013. The findings indicate a significant negative effect on firm performance for the brand loyalty driver.

H5:There is a significant relationship between Loyalty driver and ROA.

H6:There is a significant relationship between Loyalty driver and ROE.

H7:There is a significant relationship between Loyalty driver and ROC.

Extension Driver

Brand extensions have also been found to have a positive impact on firm performance; it enables the firm to expand their customer base and exploit opportunities in other product markets and strengthens the direct impact of brand logo benefits on the performance of the firm (Park, Eisingerich, Pol, & Park, 2013; Aaker & Keller, 1990). Poorly planned or inappropriate brand extension strategies can have a negative impact on firm performance (Aaker & Keller, 1990). However, in reality, most brands make well-planned extensions which include internationalization which improves the overseas sale of the brand and the firm performance in general. This is reemphasized in the study of Evelin Hinestroza (Hinestroza, 2017) which threw light on the increased profitability of multi-purpose arenas where the extended offerings will bring in an increased range and number of buyers and hence more revenue. Later Raife Y Eyiler (Eyiler, 2019) found a degree of internationalization has a positive effect on brand value. Using Structural Equation Modeling and Quantile regression analysis Wang (Wang et al., 2015) Studied the effect of brand loyalty, measured in terms of Loyalty Driver of Hirose method, on Firm performance measure of ROA of Taiwanese high-tech companies over the period 2010–2013. The findings indicate that the brand extension driver provides a significant positive effect at the higher quantiles of firm performance.

H8:There is a significant relationship between Extension driver and ROA.

H9:There is a significant relationship between the Extension driver and ROE.

H10:There is a significant relationship between the Extension driver and ROC.

Brand value and firm valuation Tobin's Q (Firm value)

Bagus Wardianto (Wardianto et al., 2018) studied the effect of the brand value estimate, calculated with the Hirose method, on firm value measures of the market to book ratio (MBR) and Tobin's Q. The research result found that high brand equity is able to assure the consumer of the product quality they bought. This can sustain the stability of the sales and eventually increase profitability. High profitability causes cash flow to progress towards the owner, and the operating result of the company will increase. The increment of the cash flow will eventually increase the firm value.

H11: There is a significant relationship between Brand value and Tobin's Q.

Stock Price

Customer satisfaction is a direct driver of companies' profitability and stock performance

(M. C. Yeung, Ging, & Ennew, 2002; M. C. Yeung & Ennew, 2000) . By using the brand value data provided by the Equi-Trend database David A Aaker and Erich Joachimsthaler (Aaker & Joachimsthaler, 1999) found that companies with higher brand value enjoy an increase in stock returns up to an average of 30 percent and an average of 10 percent fall in the stock return has been reported from companies with lower brand values. Most importantly, they reported a strong positive relationship between brand value and stock.

A significant positive relationship between brand value and the market-to-book ratio has been noted in the study of American consumer goods companies by Roger A Kerin et al. (Kerin, Mahajan, & Varadarajan, 1990). More studies were undertaken in later years to understand the relationship between intangible assets and stock market performance. The link between brand value and firm value was tested in a study by Mary E barth et al. (Barth et al., 1998) where a sample of 1,204 brand value estimates collected from FW's annual survey of brands between 1991 and 1996 was used to reach the finding that brand valuations estimated and published by independent agencies reflect on the firm's share and brand value has a positive relation to market shares. The link between branding and firm value was the focus of the study by Thomas J Madden et al. (Madden et al., 2006) as well in which brand value estimates and monthly data stocks between 1994 and 2000 provided by Interbrand was analyzed. This was reiterated in studies by Matthew Yeung and Bala Ramasamy (M. Yeung & Ramasamy, 2008), he stated that on average, each dollar increase in brand value would drive up the stock price by 4 cents, but it has no effect on stock return. By analyzing the brand value of 50 US companies between 2000 and 2005, they established and proved a positive and significant nexus between brand value and stock price. Feng Jui Hsu et al. (Hsu et al., 2013) demonstrated a positive correlation between brand value and stock performance using data from the 100 Global Brands annual ranking from 2001 to 2010. The same sample period was studied by Colleen P Kirk et al. (Kirk, Ray, & Wilson, 2013) using Interbrand top 100 brands. The relationship was analyzed on the basis of firm types- Consumer firms and Industrial firms. The link between stock price and brand value was found to be a positive one in the case of consumer firms and a negative for industrial firms. The study covered both lagged and immediate positive correlations between brand value and stock price over a period of one year.

The study by Rofhiwa Razwiedani et al. (Razwiedani et al., 2014) assert that brand indicators have a favorable impact on share price, and hence brand measurements are imperative to stock analysis and sharing the future performance of company share prices. This was proved again by Yusuf Volkan Topuz and Nazlı (Topuz & Ak¸sit, 2016) who studied the contemporaneous and lagged effects of brand value on stock price based on data from "The Best 100 Brands" provided by Interbrand Inc. for the period 2001-2012. The findings indicated that brand value has a positive and statistically significant impact on stock prices both in the current and long-term contexts.

H12: There is a significant relationship between Brand value and Stock Price.

3.3 Lagged effect of Brand value on firm performance and firm value

Research methodology

The Hirose Brand Valuation model

The Hirose model was developed by a committee (Hirose et al., 2002) formed by the Japanese government in 2002 chaired by professor Hirose, school of commerce- Waseda University, supported by 28 specialist researchers, academicians, industry experts from banking and business, Lawyers, and professional accountants. Hirose believed that the brand value is formed out of the increase in the present and future cash flows out of competitive advantage. He assessed present and future cash flows with three factors, i.e., price advantage, high degree of customer loyalty, and brand expansion strengths. These three factors were designed as the three key drivers in Hirose's model; prestige drive (PD), loyalty driver (LD), and expansion driver (ED). According to Hirose, Brand value is the function of Prestige driver, loyalty driver, and expansion driver adjusted with risk-free rate.

The breakdown of the entire formula is presented below.

Brand Value

$$BV = f(PD, LD, ED, r) = \frac{PD}{r} + LD + ED$$

BV: brand value, PD: prestige driver, LD: loyalty drive. ED: extension driver. r = risk-free interest rate.

Prestige Driver (PD)

The prestige driver focuses on the price advantage enjoyed by a particular brand over a benchmark brand. PD presents the cash flows from the price premium of the companies for charging higher prices for their brands. The way to choose the benchmark company is defined as the company with the lowest sales per unit cost of sales for the same industry.

$$PD = \frac{1}{5}\sum_{i=-4}^{0}\left\{\left[\frac{S_i}{C_i} - \frac{S*i}{C*i}\right] * \frac{AD_i}{O_i} * C_0\right\}$$

PD = prestige driver, S = sales of firms, C = cost of sales of firms,

S* = sales of a benchmark company,

C* = cost of sales a benchmark company, AD = advertising expense and promotion cost, OE = total operation expenses.

Loyalty Driver

Loyalty driver assumes stability of sales for a long time must be on account of customer retention and customer loyalty. The model shows the stability of the cost of sale as a sign of customer retention and customer loyalty. The closer the value of LD gets to 1, the more stable the loyalty driver is. LD can measure customer loyalty which is very much important for building brand value.

$$LD = \frac{\mu_c - \sigma_c}{\mu c}$$

LD = loyalty driver μc = the five-year average of firms' cost of sales σc = five-year standard deviation of firms' cost of sales.

Extension Driver

ED is calculated by the average growth rate of overseas sales and the growth rate of sales in the non-core segment of the company. If there is no growth rate in the overseas sales and non-core business sales, the expansion driver is not contributing to the brand value. Thus it can be set as one as the default value.

$$ED = \frac{1}{2}\sum_{i=1}^{0}\left\lfloor \frac{SX_i - SX_{i-1}}{SX_{i-1}} + 1 \right\rfloor$$

ED = Extension driver

SX = Sales from non-core and overseas business

Data and Sample

The sample consists of 26 FMCG companies listed in BSE 500 index, India. It covers almost all the companies in the sector. The data required for the calculation of financial brand value and other dependents, independent and control variables data for ten years from 2009 to 2018 has been collected from Bloomberg database, Thomson Reuters Eikon, and CMIE Prowess database. The statistical analysis soft wares like MS-Excel, Eviews, Stata, and Gretl has been used for data analysis.

Dependent Variables

For analyzing the impact of Brand value on profitability, Various profitability measures have been chosen from existing literature. Return on Assets (ROA) is chosen as a profitability measure inspired from the studies by (M. Yeung & Ramasamy, 2008; Simon & Sullivan, 1993; Eng & Keh, 2007)Return on Equity (ROE) was chosen as a profitability measure inspired from the studies by (M. Yeung & Ramasamy, 2008; Simon & Sullivan, 1993; Eng & Keh, 2007; Arora & Chaudhary, 2016) Return on Capital (ROC) IS chosen as a profitability measure inspired from the studies by (Arora & Chaudhary, 2016; M. Yeung & Ramasamy, 2008). All these variable data have been collected from the Bloomberg database and CMIE prowess.

Independent Variables

Financial brand value calculated under Hirose method along with brand value drivers. Prestige Driver (PD), Loyalty Driver (LD) and Expansion Driver (ED) has been also used by most literatures before. (Bagus et al., 2018; Wang et al., 2012, 2015; Srivastava, 2019; H. Hasan & Korkmaz, 2017; Majerova & Kliestik, 2015; KALKAN, 2019; Royers, 2015; Ilik, 2014; Hamada, 2008; Eyiler, 2019; Lee, hsin-

yen claude, n.d.; Ceylan, 2019;˙ Bayrakdaroglu & Mirgen, 2016; Barajas & P´erez Mantec´on, 2012)

Control Variables

Environment Social Governance Score has been used as a proxy for Corporate Social Responsibility (CSR) used in the studies by (Wang et al., 2015; Fahad & Nidheesh, 2020). Advertisement spending is chosen as a control variable (Eng & Keh, 2007). The natural logarithm of sales is chosen as a proxy for the size of the firm (Fahad & Nidheesh, 2020; Eng & Keh, 2007; Arora & Chaudhary, 2016) and finally, total years of company establishment is chosen as the age of the firm as a control variable (Fahad & Nidheesh, 2020; Eng & Keh, 2007; Arora & Chaudhary, 2016).

Model Development

$$ROA_{it} = \alpha + \beta_1 BV + \beta_2 Advertisement + \beta_3 CSR\epsilon_{it}\beta_4 SIZE + \beta_5 AGE + \epsilon_{it}$$ (Model 1)

$$ROE_{it} = \alpha + \beta_1 BV + \beta_2 Advertisement + \beta_3 CSR\epsilon_{it}\beta_4 SIZE + \beta_5 AGE + \epsilon_{it}$$ (Model 2)

$$ROC_{it} = \alpha + \beta_1 BV + \beta_2 Advertisement + \beta_3 CSR\epsilon_{it}\beta_4 SIZE + \beta_5 AGE + \epsilon_{it}$$ (Model 3)

$$ROA_{it} = \alpha + \beta_1 PD + \beta_2 LD + \beta_3 ED + \beta_4 Advertisement + \beta_5 CSR\epsilon_{it}\beta_6 SIZE + \beta_7 AGE + \epsilon_{it}$$ (Model 4)

$$ROE_{it} = \alpha + \beta_1 PD + \beta_2 LD + \beta_3 ED + \beta_4 Advertisement + \beta_5 CSR\epsilon_{it}\beta_6 SIZE + \beta_7 AGE + \epsilon_{it}$$ (Model 5)

$$ROC_{it} = \alpha + \beta_1 PD + \beta_2 LD + \beta_3 ED + \beta_4 Advertisement + \beta_5 CSR\epsilon_{it}\beta_6 SIZE + \beta_7 AGE + \epsilon_{it}$$ (Model 6)

$$Tobin'sQ_{it} = \alpha + \beta_1 BV + \beta_2 Advertisement + \beta_3 CSR\epsilon_{it}\beta_4 SIZE + \beta_5 AGE + \epsilon_{it}$$ (Model 7)

$$StockPrice_{it} = \alpha + \beta_1 BV + \beta_2 Advertisement + \beta_3 CSR\epsilon_{it}\beta_4 SIZE + \beta_5 AGE + \epsilon_{it}$$ (Model 8)

Results and Discussions

Results of Brand valuation

Table 1: Top 10 pharmaceutical companies in terms of financial brand values

Company Name	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg	RANK
Cipla Ltd.	5839.90	5152.51	7833.55	6993.28	5048.66	6251.59	7096.94	7470.09	7470.09	13242.12	6938.36	1
Dr. Reddy'S Labo-ratories Ltd.	4511.74	4491.39	7654.27	6910.63	5480.51	5793.71	6079.93	6595.58	6595.58	10845.96	6158.36	2
Aurobindo Pharma Ltd.	3495.32	3875.75	4517.40	4306.84	4661.12	6031.52	6965.02	7634.38	7634.38	13639.37	5874.32	3
Lupin Ltd.	3077.70	3043.48	5324.11	5093.39	4792.56	6435.89	7055.41	8266.01	8266.01	11104.09	5839.84	4
Apollo Hospitals Enterprise Ltd.	1807.74	1467.47	2716.72	2200.45	2283.15	3789.71	4517.00	4106.01	4106.01	7685.38	3239.42	5
Cadila Healthcare Ltd.	2143.95	1733.07	2828.34	1596.90	1264.93	3450.37	4989.44	2086.36	2086.36	6576.88	2725.18	6
Torrent Pharma-ceuticals Ltd.	1723.04	1481.10	2148.65	2092.41	2191.75	1991.13	4674.17	3310.75	3310.75	5717.85	2683.43	7
Sun Pharma-ceutical Inds. Ltd.	1355.33	1608.54	2695.84	2188.51	1676.84	1229.10	1403.77	2514.13	2514.13	7873.16	2408.83	8

Jubilant Life Sci-ences Ltd.	2530.25	1869.15	3935.69	2747.64	2053.06	1892.53	1761.73	1822.07	1822.07	3584.40	2348.02	9
Glenmark Pharma-ceuticals Ltd.	795.98	870.94	1553.84	976.73	704.26	2405.99	3136.61	4576.63	4576.63	5568.10	2338.73	10
Industry Average	1577.75	1342.77	2167.5	1754.3	1428.95	1911.29	2290.3	2493.88	2493.88	4327.44	2178.806	

Referring to Table 1, Cipla Ltd. Placed at the first Rank with a ten-year average brand value of Rs. 6938.36. (Million) followed by Dr. Reddy'S Laboratories Ltd (Rs.6158.49 m) and Aurobindo Pharma Ltd. (Rs.5874.32 m) in the second and third ranks, respectively in the pharmaceutical sector. Glenmark Pharmaceuticals Ltd ranked at the 10th position with a brand value of Rs. 2338.73 (million) from the overall list of 29 companies in the pharma sector. The average Brand value of the pharma sector for a ten-year period (2009-2018) is Rs. 2178.80 million. Brand values of all the top ten pharma companies are higher than the industry average and which infers that all these companies are engaged in brand building activities comparing to other companies in the pharma sector in India. Cipla Ltd. enjoys the highest Price advantage, followed by Lupin Ltd. And Dr. Reddy'S Laboratories Ltd.

Table 2: Top 10 pharmaceutical companies in terms of financial brand value drivers

Companies	Prestige Driver Value (10 YR AVG)	Rank	Companies	Loyalty Driver Value (10 YR AVG)		Rank	Companies	Extension Driver Value (10 YR AVG)	Rank
Cipla Ltd.	61939.23	1	F D C Ltd.	87.72%		1	Astrazeneca Pharma India Ltd.	130%	1
Lupin Ltd.	54507.77	2	J B Chemicals & Pharmaceuticals Ltd.	87.10%		2	Alembic Pharmac euticals Ltd.	129%	2
Dr. Reddy'S Laboratories Ltd.	53403.89	3	Glaxosmithkline Pharmaceuticals Ltd.	85.37%		3	Glenmark Pharmaceuticals Ltd.	126%	3
Aurobindo Pharma Ltd.	53215.03	4	Wockhardt Ltd.	84.37%		4	Fortis Healthca re Ltd.	124%	4
Sun Pharmaceutical Inds. Ltd.	34166.89	5	Jubilant Life Sciences Ltd.	84.00%		5	Strides Pharma Science Ltd.	123%	5
Apollo Hospitals Enterprise Ltd.	33256.77	6	Sanofi India Ltd.	83.80%		6	Natco Pharma Ltd.	123%	6
Cadila Healthca re Ltd.	25745.03	7	Astrazeneca Pharma India Ltd.	83.50%		7	Ajanta Pharma Ltd.	121%	7
Glenmark Pharmaceuticals Ltd.	25107.84	8	Biocon Ltd.	82.25%		8	Piramal Enterprises Ltd.	121%	8
Torrent Phar-maceuticals Ltd.	23516.23	9	Alembic Pharma ceuticals Ltd.	82.06%		9	Torrent Pharmac euticals Ltd.	120%	9

Divi'S Laboratories Ltd.	22264.44	10	Dr. Reddy'S Laboratories Ltd.	81.52%		10	Shilpa Medicare Ltd.	119%	10
Industry Average (29 Compa-nies)	19659.45			76.75%				115.39%	

Referring to Table 2, the Prestige driver or price advantage is having a decisive role in creating brand value as the companies with higher prestige driver has higher brand value In the pharma sector. F D C Ltd. showed the highest Customer Loyalty value, followed by J B Chemicals & Pharmaceuticals Ltd and Glaxosmithkline Pharmaceuticals Ltd. Cipla Ltd. had the highest price advantage, but the company is not placed in the ten positions in the customer loyalty score. The inference is that while the company charges a higher price the customer retention is affected. The companies placed in the top 5 with respect to brand value are showing lower positions in Expansion Driver. The inference is that the companies with lower brand values needed to expand more to create brand value than the already established brands.

Results of Panel Regression analysis

Levin Chun Unit root Test is used for checking the stationarity of data. All the variables were found stationary at the level. BKW (Bersley 1980) Collinearity Diagnostic Test is used for multi co-linearity test. According to BKW Bersley 1980., cond ¿= 30 indicates "strong" near-linear dependence, and cond between 10 and 30 is "moderately strong." Variables with multi co-linearity issues have been removed from the model wherever the problem occurred The Panel data analysis should always test to choose the best estimator over OLS, Fixed effect, and Random effect using Breuch Pagan LM Test and Hausman test (Yeung & Ramasamy, 2008).All the models being run in the OLS and subjected to Breuch Pagan LM Test statistics to assess the suitability of OLS. LM Test assumes OLS as an appropriate model as the null hypothesis. If the p-value of the test statistic is significant, it suggests going for the Hausman test to decide upon FE or RE. If not significant, meaning that OLS is appropriate.

Table 3: Summary of panel data regression testing the nexus between financial brand value and profitability

MODEL	1	2	3
DV		ROA	ROE	ROC
Constant	Co-efficient	17.8	3.3	25.2
LNBV	Co-efficient (Prob)	4.88**	0.086	0.00075
LNAD	Co-efficient (Prob)	-1.38	0.24***	-1.08
ESG	Co-efficient (Prob)	0.22	-0.010	0.19
LNTA	Co-efficient (Prob)	-6.45**	-0.10	-4.12*
LNAGE	Co-efficient (Prob)	9.13*	-0.21**	10.80**
F-Stat (Prob)		3.5***	14.4**	3.85***
R2		0.33	0.42	0.33
LM		2.452***	76.72***	2.32***
Hausman		71.9***	6.35	66.4***
Pooled/Fixed /Random		Fixed	Random	Fixed

N		290	290	290

*,** and *** show significance level at 10%, 5% and 1% respectively

For models 1,2 and 3 reported in Table 3, all the LM statistics were significant at the 1 percent level, which implies that panel data estimations are preferable over OLS. Hausman test statistic is used to decide over Fixed effect or Random effect model. All models suggested from the LM test for the Hausman test are being run firstly in Random effect estimation. Then the Hausman test is run in the Eviews software. Hausman assumes a Random effect estimator as appropriate as the null hypothesis. If the p-value of the test statistic is significant, the model should be run in Fixed effect or in random effect. For Model 1, and 3 the null hypothesis (RE is preferred over FE) is rejected at the 1 percent significance level, suggesting that the fixed effects procedure is more appropriate for the estimations. Model 2 ran in the Random effect estimation technique. The coefficients of brand value are statistically significant (p ¡ 0.05), with Return on Asset confirming the presence of a contemporaneous positive relationship between brand values and Return on Assets. Brand value did not show a statistically significant relationship with any other profitability measures. Among control variables, Advertisement expenditure showed a statistically significant and positive relationship with Return on Equity. The result is in consonance with(Eng & Keh, 2007). The Size variable showed a negative relationship with ROA and ROC. The result is in consonance with (Arora & Chaudhary, 2016). This negative relationship must be because of diseconomies of scale. Age showed a positive relationship with Return on Asset and Return on Capital but a negative effect on Return on equity.

Table 4: Summary of panel data regression testing the nexus between financial brand value drivers and prof-itability

MODEl	4	5	6

DV		ROA	ROE	ROC
Constant	Co-efficient	-16.08	5.22	4.216
LNPD	Co-efficient (Prob)	0.49	1.78	0.17
LD	Co-efficient (Prob)	2.6	-3.19	-1.46
ED	Co-efficient (Prob)	10.86***	15.4**	8.68**
LNAD	Co-efficient (Prob)	-1.77	-1.33	1.2
ESG	Co-efficient (Prob)	0.244	0.31	0.06
LNTA	Co-efficient (Prob)	-1.44	-2.85	-1.30
LNAGE	Co-efficient (Prob)	9.29**	5.3	1.81
F-Stat (Prob)		3.4***	4.5***	6.4***
6j-R2		0.32	0.38	0.54
LM		2.62***	84.63***	56.491***
Hausman		77.93***	8.04***	11.3
Pooled/Fixed /Random		Fixed	Fixed	Fixed
N		290	290	290

*,** and *** show significance level at 10%, 5% and 1% respectively

Model 4, 5, and 6 examine the effect of prestige driver, loyalty driver, and expansion driver on each of the profitability measures, and the result showed no significant effect for any drivers of brand value on profitability except Expansion Driver. Expansion driver showed a statistically positive relationship with all profitability measures. This might be due to the exorbitant export strength and overseas presence of health care and pharma products from India.

Table 5: Summary of panel data regression testing the nexus between financial brand value and firm value

MODEL	7	8
DV		TOBINSQ	Stock price
Constant	Co-efficient	-4.11***	0.52
LNBV	Co-efficient (Prob)	0.11**	-0.09
LNAD	Co-efficient (Prob)	0.27***	0.32***
ESG	Co-efficient (Prob)	0.0007	0.004
LNTA	Co-efficient (Prob)	0.0114	0.22***
LNAGE	Co-efficient (Prob)	0.61***	0.47***
F-Stat (Prob)		25.9***	20.39***
Adj-R2		0.77	0.25
LM		463.7***	0.989731
Hausman		16.5 ***	–
Pooled/Fixed /Random		Fixed	OLS
N		290	290

*,** and *** show significance level at 10%, 5% and 1% respectively

For Model 7 reported in table 5, the null hypothesis (RE is preferred over FE) is rejected at the 1 percent significance level, suggesting that the fixed effects procedure is more appropriate for the estimations. Model 7 examined the effect of Brand value with control variables on firm value measure of Tobin's Q. Model 8 examined the effect of Brand value with control variables on firm value measure of stock price. Based on the LM and Hausman directions, both models ran in the fixed effect estimation technique. The result of panel regression analysis showed a significant positive relationship between Brand value and firm value measured in Tobin's Q of Healthcare companies in India. The analysis of the nexus between Brand value and stock price did not show any significant results. Among control variables, Size and age showed positive effects on firm value. The advertisement showed a positive effect on the stock price. CSR did not show any effect on the firm value of Healthcare companies in India.

Discussion of results

Brand value and profitability

Results of Model 1,2, and 3 show the effect of financial brand values on profitability measures (ROA, ROE, and ROC) of Indian pahrmaceutical companies. Brand value shows a significant positive effect on Return on Asset. The result is in consonance with the previous studies (Eng & Keh, 2007; Simon & Sullivan, 1993; M. Yeung & Ramasamy, 2008)but in contrast with Sangeeta Arora and Neha Chaudhary (Arora & Chaudhary, 2016).Brand value did not show any statistical significance towards the performance measured in ROE and ROC. There are no previous studies that analyzed the effect of Brand value on Return on Capital, and this study failed to find a significant effect of brand value on Return on Capital.

Brand value drivers and profitability

Results of Model 4, 5, and 6 show the effect of brand value drivers (PD, LD, and ED) on profitability (ROA, ROE, and ROC) of FMCG companies. Prestige driver and Loyalty Driver did not show any significant relationship with any of the profitability measures. The result is contradictory to the findings of Han-Min Wang et al. (Wang et al., 2015). Extension driver showed a significant positive relationship with all the profitability measures collectively. The result is contradictory to the findings of David Han-Min Wang et al. (Wang et al., 2015). The price advantage and Customer loyalty of pharmaceutical brands do not impact company's profitability.

Brand value and firm value

Results of Model 7 and 8 show the effect of financial brand values on firm value (Tobin's Q and Stock Price) of Pharmaceutical companies. Brand value shows a significant positive effect on firm value measures in Tobin's Q at 5 percent significance level with

77 % of explanatory power from the independent variables used in the models. A positive effect of Brand value to Tobin's Q is in line with the study by Bagus Wardianto (Wardianto et al., 2018). The brand value showed no significant effect on the Stock Price of the Pharmaceutical companies in India. The result is in contradictory to the findings of previous researchers studies the same nexus. (M. Yeung
& Ramasamy, 2008; Hsu et al., 2013; Kirk et al., 2013; Razwiedani et al., 2014; Topuz & Ak¸sit, 2016)

Research implications

Corporate implications

Earlier researches have unveiled the interest among firms to publish brand value measures in financial reports. This has been common practice in Holland and UK for decades, where firms evaluated and reported financial brand values in public financial statements. These developments indicate that top-level executives, finance, and accounting managers in India should also consider disclosing and reporting brand value estimates. This study intends to pave a path towards understanding why estimating and disclosing brand value is important and identifying the best methods for measuring the brand value of Indian companies based on available data. It also aims to report the yearly brand value data for ten consecutive years, which can be useful for future researches on brand value measurement, especially in the healthcare industry. Deviating from previous studies that focused on brand values of top brands listed by valuation agencies like Forbes, Interbrand, and Brand Finance, only the present study uses the most objective method to include both brands which are identified as best and weak in the industry so that the findings are more accurate, relevant and unbiased.

Managerial implications

Public, students and entrepreneurs operate under the assumptions that advertising and promotion of a product iv=increase brand value and hence profitability. This notion has been taught over and over by marketers and marketing researchers. However, this belief is only theoretical and is based entirely on the results of biased primary surveys of customer perception, which yield only relative, subjective and qualitative expression of brand value whose effect on profitability is then studied. This notion is still central in theoretical literature despite a lack of financial evidence to back the claim. Linking financial brand value to profitability and firm value continues to be a challenging task to marketing managers owing to the complexities involved in identifying, calculating, and developing financial models needed to prove the nexus between the two. This study provides an extensive analysis of the measurement models of financial brand value models developed across the world by researchers and consultant agencies. After a detailed review, the study was able to come up with the most apt brand valuation modal, exclusively from a financial standpoint, that can be used to test most of the data available in literature form. It uses accounting and mathematical equations to test publically available data and can easily be understood by students, teachers, and even laymen. The findings of the study confirm the positive effects of advertisement and promotion expenses on firm profitability and value. These results have ample practical implications for marketing managers since it informs them how to control brand value elements like advertising spending, CSR spending, and other brand-building investments that can improve stock price and increase profitability. The study also focuses on brand value drivers- Prestige driver scores influence the price advantage enjoyed by brands in the form of premium prices. The top five companies with the highest brand value in the pharma industry were the top five brands with the highest Price advantage. (Prestige driver value), However, the companies that had the highest price advantage were not placed in the first ten positions based on loyalty scores. Hence, we can infer that a higher price can affect customer retention of a company. Then the marketing department should come up with a careful pricing strategy that balances price premium and customer loyalty in order to increase brand value and thereby profitability and firm value.

Implications to Investors

The importance of intangible assets in contributing towards firm value and profitability is already agreed upon, but it is the lack of models to evaluate these assets that discourage experts and professionals from using them to improve firm value and profitability. In a 2002 survey conducted by Howrey, 100 fund managers, investment managers, technical analysts, and venture capital analysts were approached, among whom 89% agreed that they took into consideration intellectual properties and brand value of companies while making investment decisions, but the only 33% of them made any formal attempt to evaluate and measure these intangible values. More than half of those surveyed opined that intellectual property could not be calculated due to a lack in the availability and awareness of both models and data. Over two-thirds said they had to depend on subjective assessments with primary data collected from investors. The present study seeks to address this crisis and encourage investors to adopt a feasible model for evaluating the brand value and analyze formal objective values of brands in order to make better investment decisions. The study has also found that higher brand values lead to higher profitability and stock prices in Indian pharma companies. These findings indicate that investors should make decisions and portfolios after considering strong brands in the industry. Further, they can do investment analysis using the brand value scores estimated in the present study as it has attempted to cover brands of all ranges in the sector and not just ones identified as 'best.'

Conclusion

In the present study, we successfully advocated an appropriate brand valuation model in the Indian context that can be used for academic and technical purposes by conducting an extensive literature review of brand valuation models developed by academicians and researchers around the globe. The estimated brand values of Pharmaceutical companies are very useful for various management and stakeholders of the companies. The study also aimed at analyzing the contemporaneous effect of financial brand value on firm profitability and firm value of pharmaceutical companies in India by using the estimated value gauged using the brand valuation model seemed appropriate from the detailed analysis of literature. The contemporaneous relationship between brand value and profitability measures is being tested with a panel data regression model along with control variables in the model. Even after controlling some variables towards profitability brand value showed a positive relationship towards the profitability measure of Return on Asset. The study revealed that strong brands are highly profitable. The study also tested the impact of various brand value drivers on profitability measures to see specifically the impact of price advantage, Brand loyalty, and brand extension capability on the profitability of pharmaceutical brands in India, The study found no significant relationship between these drivers and any of the profitability measures. The contemporaneous effect of brand value on firm value is being studied and the result showed a positive effect on the firm value measure of Tobin's Q and The stock price and brand value didnot show any significant relationship in the case of Indian pharmaceutical companies The finding of the study is useful for investors, Managers, Government and investment analystsin various aspects. The study is not free from limitations. The study has included only brands in the pharmaceutical sector. The nexus of brand value to profitability and firm value in other sectors are also to be tested. An economy specific (All brands in BSE 500 index, India) is also to be conducted for generalizing the results

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EVALUATION OF AN ADAPTIVE POTENTIAL OF COLD RESISTANCE OF WILD AND SEMI-CULTURED SPECIES OF TOMATO

Svytlana Shokh[1], Vitalii Zhemoida[2], Andrii Pavlichenko[1], Olena Hryshchenko[3], Lidiia Shubenko[1], Serhii Kots[4], Nataliia Bashkirova[2], Alla Zhemoida[4], Roman Spriazhka[2] and Lesia Karpuk[1]

[1]Bila Tserkva National Agrarian University, Soborna sq. 1/8, Bila Tserkva, Ukraine
[2]National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine
[3]Soil Conservation Institute of Ukraine**,** Kyiv, Ukraine
[4]Institute of Plant Physiology and Genetics, NAS of Ukraine**,** Kyiv, Ukraine

ABSTRACT

The paper reveals the research results concerning a cold resistance potential and adaptability of wild and semi-cultured tomato species. The research was carried out in field and laboratory conditions to determine the level of a general and specific adaptive ability, homeostatic by a complex of signs which define cold resistance. Valuable forms with a high level of cold resistance and adaptability, determined by a complex of signs under study, were singled out. The highest cold resistance was shown by L. esc. var. racemigerum, var. pruniformeand wild species Lycopersiconcheesmaniitypicuwith the highest indicators and signs of cold resistance – seed germination, an increase of a plant height and a rate of growth resumption in laboratory conditions and the duration of a sowing-germination period, an increase of a plant height in field conditions.

Keywords: *wildspecies, semi-culturedspeciesspecies, coldresistance, adaptiveability, homeostatic, rate of growth resumption, low-temperature stress.*

Introduction

According to some researchers, the use of wild species is a promising technique to create tomato forms the seeds of which germinate fast at low temperatures. When some species as mother forms are used, the hybrids, which seeds germinate faster than cultured forms but slower than mother forms, are received (ZhuchenkoA.A., 1973; VenemaJ.H., 2001; FoteievYu.V., Ignatova S.I., 1991).

The research carried out by Yu. I. Avdeiev (1989) at ВНДІОБ showed that a seed size of wild species had an impact on a germination rate. The pollen of wild tomato species was characterized by a better growth at low temperatures as compared with cultured forms.

The duration of a seed germination period of various tomato cultivars and their hybrids with a wild form was studied by W. J. Whittington, P. Fierlinger (1972) who found out that this sign was inherited adaptively. Despite their small mass, seeds germinated very rapidly. When a wild species as a mother form was used in hybridization with cultured cultivars, hybrid seeds, which germinated earlier than the seeds from reciprocal crossings, were received.

The hybrids of the first generation from hybridization of tomato cultivars with semi-cultured species inherited the ability to germinate at low temperaturesin an in-between and dominant regime which proved the utility of the use of semi-cultured forms in heterosis breeding (Shokh S. S.,2002).

To sum it up, the use of wild forms for the development of cold-resistant tomatoes, the seeds of which can germinate rapidly at low temperatures, is obviously promising.

Analysis of the latest Researches and Publications

Wild species have a large number of valuable genes, the ones which were lost in cultivated cultivars. The use of wild species can increase tomato gene pool; they are very useful as a source of genetic variability in breeding programs. Tomato has a narrow range of optimal temperatures for its cultivation and experiences a low-temperature stress. The cultivation of tomato plants at lower temperatures than this optimal range has a negative impact on the plant growth and development (ZhouR. etal. 2018, Bolgeretal, 2014, Caoetal, 2015, ZhouR. etal, 2016).

A larger difference in resistance to abiotic stress was recorded betweenS. Lycopersicum and wild species. The plants of wild species

grown at low temperature 12^0C and high temperature 33 ^{0}C were compared. The genotypes of wild forms were more resistant to a cold stress than cultured ones (ZhouR.etal., 2018).

Wild tomato species have higher cold resistance than cultured tomato cultivars which is seen in their better adaptation to a low-temperature stress at various phases of the development (ChenH. etal, 2015). Cold resistance of tomatoes was studied when they were treated with low temperatures during a week without any separation for day or night temperatures (Caoetal, 2015, VenemaJ., 2002), which does not exist in the climate of Ukraine. Plants were studied at a seedling stage at low temperatures 4^0C during day and night within 8 days; damages caused by hypothermia were determined (CaoX. etal, 2015).

S. habrochaites is among the most studied wild species, whereas other species were less studied (NematiZ. etal. 2020).Most of the works which dealt with cold resistance of wild species were aimed at studying the response of tomato plants to a cold stress at temperatures 10-14^0C. (HeidariP. etal. 2021, ZhouR. etal. 2018, Driedonks N., et al, 2018, Rajametov S. et al, 2019). Low temperature is a limiting factor for tomato growth and propagation. The effect of lower temperatures has not been studied enough yet, the response of plants to such stress has not been identified comprehensively (HeidariP. etal. 2021 c. 10). 40-day old plants tolerated a low temperature stress at 10^0C; three days later cold resistance was determined.

Instead of a long cold stress at 4^0C, a technique to study cold resistance at a short cold stress can be used for fast screening of tomato plants as to their resistance to cold. Two levels of a cold stress –0 and 2^0C, as experimental factors, were included in the research for a short period of time (NematiZ. etal. 2020).

The purpose of the research consisted in identifying the response of wild tomato genotypes to a low-temperature short stress (their cold resistance was not studied enough) and singling out low-temperature resistant genotypes for their further use in breeding.

Methods

During our two-year research we studied wild species from the collection of the National center of genetic resources of plants of Ukraine as well as breeding samples, developed on their basis and given for the research by professor, doctor of sciences (Agr) V. A. Kravchenko.

To evaluate tomato cold resistance, seeds underwent a low-temperature stress at variable temperatures to simulate natural conditions. Moist seeds were kept in Petri dishes at variable temperatures in a refrigerating chamber. The mode of variable temperatures is the following: 12 hours at 0^0Cand the following 12 hours at + 15 – 16^0C. The germinated seeds were calculated during 20 days with a 7-day interval. A plant height increase was determined in percents in 7 days of germination. The rate of growth resumption was determined 3 days after the plants were treated with variable low temperatures.

ResearchersL. M. Polesskaia, A. G. Zhakote, M. E. German, V.G. Harti point to the sign of “the rate of growth resumption” which characterizes tomato cold resistance. We considered it to be expedient to use this sign in our research and to express it in percents of a plant height increase 3 days afterthe effect of lower temperatures (Polesskaia L. M. et al, 1991).

In field conditions cold resistance was evaluated by the duration of a “sowing-germination” period and a plant height increase was determined at low temperatures ranging from + 1to + 12^0Cduring 10 days. .

The research was carried out in compliance with the cooperation agreement with BNAU in the fields of Kyiv research station of the institute vegetable and melon production of UAAS, situated in Polissia area. The climate of the area is temperate continental with cold winters, temperate warm summers and sufficient precipitation amount. A long frost-free period on the average 199 – 202 days has a sum of temperatures 2650 – 2800^0C. The amount of precipitation is sufficient for tomato cultivation. Unfavorable climatic conditions are the following: short reverse frosts after seedlings were planted in the open soil, reduction of a frost-free period to 154 days in some years. The soils in the trial were

chornosemopodzolic, low humusand coarse-dusty-light loam.

A generally accepted tomato production technology for Polissia area of Ukrainewas applied. Field trials were carried out in a grain-vegetable crop rotation system.

To set up trials, to keep records and observation – all this was done according to the main methodological recommendations in tomato breeding research and statistical data processing in the trial.

To study the response of the genotypes to variable environmental conditions, the evaluation of an adaptive ability and homeostatic was made using the techniques of O.V. Kilchevskyi, A. V. Khotyliova (1985) andV. F. Pyvovarov (1985).

Results and discussions

As a result of ourresearch we found out thatin laboratory conditions the effect of low temperatures on the seeds of wild and semi-cultured species was clearly seen in the varietal difference as to the low temperature resistance. The seeds of cold-resistant plants germinated rapidly, they had a considerable increase of a plant height under the effect of low temperatures.

Among the studied samples species Lycopersiconesculentumvar. racemigerum, var. pruniformeandcheesmaniitypicushad the highest seed germination–16.0-24.7 %, a larger increase of a seedling height – 68-76% and a high rate of growth resumption after a cold stress – 11-21 % in laboratory conditions (Table 1).

High cold resistance of wild and semi-wild specieswas recorded both in laboratory and field conditions. In field conditions species Lycopersiconesculentumvar. racemigerum, var. pruniforme, cheesmaniitypicus had a "sowing-germination" period which lasted for 16-18 days, plant seedlings germinated rapidly and an increase of a plant height was equal to 81-90 %(Table2).

Table1: Homeo static and adaptive ability by the feature of cold resistance of wild species and semi-cultured tomato species in laboratory conditions (average for 2 years)

Cultivar samples	Feature											
	seed germination				increase of plant height				rate of growth resumption			
	%	HOM	3A3i	σCA3i	%	HOM	3A3i	σCA3i	%	HOM	3A3i	σCA3i
Lycopersicon esculentumvar. pimpinellifolium	10.1	0.01	-3.5	0.1	40	0.43	1.9	2.0	7.5	0.08	-6.2	6.5
Lycopersicon cheesmaniitypicus	20.1	0.01	-3.5	0.1	68	0.47	1.9	2.0	11.3	0.14	-2.2	6.3
Lycopersicon esculentum var. pruniforme	16.0	0.13	-2.0	0.5	75	0.88	-1.6	1.5	18	0.54	4.8	4.6
LineR.c. 124*	10.3	0.10	-3.5	0.2	53	0.82	0.9	3.0	12.7	0.18	-7.2	3.2
Lycopersiconesculentum var. racemigerum	24.7	2.80	6.5	1.0	76	0.89	-1.6	1.5	20.1	0.85	6.8	3.5
West Virginia700- st	16.8	0.27	6.0	4.5	70	1.21	-1.6	1.5	14	0.23	3.8	7.4
HIP_{05}	4.21				15.0				2.0			

Note. * - Linewascreated with Lycopersiconesculentumvar. Cerasiforme

The evaluation of cold resistance and the effect of lower temperatures by the growth and development of seedlings and seeds cannot characterize this physiological peculiarity of tomato plants to a full extent. Which is why, we made the evaluation of cold resistance in a further period of the growth and development of tomato plants.

Those seedlings, which showed high cold resistance in laboratory conditions at the phase of a first true leaf, were exposed at temperature + 2^0Cduring 12 hours. The temperature ranged within ± 1^0C. The plants of cultivar West

Virginia 700 and species *Lycopersiconesculentum var. racemigerumvar. pruniforme, cheesmaniitypicus* were not damaged by a low-temperature stress at + 2^0C; they tolerated short stresses well at +2^0C, a resistance point was 4.0- 4.8. In the period of reproductive organ functioning plants of these forms endured variable lower temperatures and maintained pollen viability at the level –54-79 % (standard is 51 %) and formed fruits at first tassels –63-80 % from the number of flowers (Table 3).

Also, the above-mentioned forms had higher homeostatic indicators, and this confirmsthe appearance of a more stable feature in variable environmental conditions. In laboratory cool conditions species *Lycopersiconesculentumvar. pruniforme, var. racemigerum*andWestVirginia 700 had indicators HOM = 0.13- 2.80by the feature "seed germination". The feature "an increase of a plant height" had high homeostatic –HOM = 0.88-1.21. In laboratory cool conditions the feature "a rate of growth resumption" of these species also had high homeostatic –HOM = 0.23-0.85, as compared with other forms.

Table 2: Development of cold resistance and adaptability in wild and semi-cultured specie s of tomato in field conditions (average for 2 years)

Cultivar samples	Growth period, feature							
	sowing – germination				increase of a plant height			
	days	HOM	3A3i	CA3i	%	HOM	3A3i	CA3i
Lycopersiconesculentum var. pimpinellifolium	15	0.64	0.3	1.0	76	1.41	-0.1	0.6
Lycopersicon cheesmaniitypicus	17	0.30	0.2	3.5	81	2.84	-0.2	0.5
Lycopersicon esculentum var. pruniforme	18	0.58	0.3	1.2	90	2.01	0.5	0.1
LineR.c. 124*	18	0.55	-2.2	1.4	86	1.67	-0.7	0.1
Lycopersicon esculentum var. racemigerum	16	0.77	5.3	1.2	83	2.84	6.2	0.6
West Virginia 700- st	16	0.35	8.3	2.0	85	2.01	4.1	0.7
HIP_{05}	2.8				7.8			

Note. * - Line was created with Lycopersicon esculentumvar. cerasiforme

Table 3: Development, homeostatic and adaptive ability of cold resistance in wild and semi-cultured species of tomato (average for 2 years)

Cultivar samples	Feature											
	cold resistance of seedlings				pollen viability				fruit-budding			
	point	HOM	3A3i	CA3i	%	HOM	3A3i	CA3i	%	HOM	3A3i	CA3i
Lycopersiconesculentum var. pimpinellifolium	4.0	0.12	0.1	1.1	50	1.07	-31.3	2.5	48	0.92	2.0	17.5
Lycopersicon cheesmaniitypicus	4.0	0.31	0.1	0.6	54	0.69	4.2	25.0	73	2.23	7.5	4.0
Lycopersicon esculentum var. pruniforme	4.5	0.53	-0.3	0.6	61	1.13	14.2	27.0	80	2.71	-0.5	5.0
LineR.c. 124*	3.7	0.31	0.9	0.2	36	0.34	-11.8	16.0	78	4.11	2.5	1.0
Lycopersiconesculentum var. racemigerum	4.8	0.46	-0.1	0.7	79	1.17	21.2	5.0	63	3.06	-2.5	13.0

West Virginia 700- st	4.0	0.23	-0.5	0.3	51	0.54	4.2	24.0	75	1.48	-9.0	13.5
HIP_{05}	1.20				10.5				19,3			

Note. * - Linewascreated with *Lycopersiconesculentumvar. cerasiforme*

In field conditions species Lycopersicon esculentumvar. pruniforme, Lycopersicon esculentumvar. Racemigerumhad high homeostatic by the feature a "sowing-germination" period – 0.58 and 0.77 (standard is 0.35) and by the feature "an increase of a plant height" – 2.01and 2.84 (standard is 2.01).

Besides, such forms as Lycopersicon esculentumvar. pruniforme, Lycopersicon esculentumvar. Racemigerum and LineR.c. 124 had the highest homeostatic by the feature "cold resistance of seedlings", "pollen viability" and "fruit-budding". They had the following indicators: by cold resistance of seedlings –HOM = 0.31-0.53, by pollen viability – HOM = 0.34-1.17, by fruit-budding –HOM = 2.71- 4.11.

An important characteristic of a genotype is an adaptive ability which shows an adaptive potential of the feature and defines the ability of some genotypes to give stable yields in various environmental conditions. We singled out species Lycopersiconesculentumvar. racemigerumand cultivar WestVirginia 700, developed with the participation of a semi-cultured form, among wild and semi-wild species by a general adaptive ability. As compared with other samples, a high adaptive and specific ability by several elements of cold resistance in laboratory conditions at variable lower temperatures was typical for these samples: "seed germination" – 3A3i= 6.0 and 6.5, a specific adaptive ability = 1.0 and 4.5, "an increase of a plant height" 3A3i= - 1.6 and a specific adaptive ability = 1.5 and a general adaptive ability of the feature "a rate of growth resumption" 3A3i = 3.8 and 6.8 andCA3i = 3.5 and 7.4 (Table 3).

Forms Lycopersiconesculentumvar. pimpinellifoliumandLycopersiconcheesmaniity picusLycopersiconesculentumvar. pimpinellifoliumandLycopersiconcheesmaniity picusshowed a high specific adaptive ability by the features "an increase of a plant height" – CA3i– 2.0 and "a rate of growth resumption"after the effect of a cold stress – CA3i– 6.3 and 6.5, as compared with other semi-cultured species and forms, developed with their participation.

Similar results were received in field conditions, where a "sowing-germination" period at lower temperatures as well as the feature "an increase of a plant height" in a period of a cold stress in species Lycopersiconesculentumvar. racemigerumand cultivarWestVirginia 700 l were characterized with high indicators. The indicators were 5.3-8.3 by a general adaptive ability and 1.2- 2.0 by a specific ability(Table 3).

Studying plant cold resistance during a period of flowering, we found out that by the features "cold resistance of seedlings", "pollen viability" and "fruit-budding" wild species Lycopersiconcheesmaniitypicus, var. racemigerum, var. Pruniformeshowed a high specific adaptive ability at the level – 0.5-27.0, whereas for a standard cultivar – CA3i – 0.3-24.0 (Table 3).

Conclusions

1. Species Lycopersicon esculentumvar. pruniforme, Lycopersicon esculentumvar. racemigerumand wild speciesLycopersiconcheesmaniitypicushad the highest indicators of cold resistance; they were the most promising ones for the development of initial lines to get early-ripening cold resistant heterosis hybrids $F_1$of tomato.
2. Otherwildformsalsoshowedgoodresultsbyso meindicatorsofcoldresistance. In breeding itis advisable totakeintoconsiderationacomplexoffeatures, which is why we think it is expedient to include into the research the forms which showed average indicators of cold resistance.

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IMPACT OF WORKING CAPITAL MANAGEMENT ONFINANCIAL PERFORMANCE: INDIAN PHARMACEUTICAL SECTOR

A. Dave[1], A. Parwani[2], T. Dave[3] and A.B. Joshi[4]
[1,3,4]School of Liberal Studies, Pandit Deendayal Energy University, Raisan, Gandhinagar, Gujarat, India
[2]Gujarat Technological University, Chandkheda, Ahmedabad, Gujarat, India
[1]ashvin_dave25@yahoo.co.in, [2]parwaniashwin84@gmail.com, [3]tejas.dave@sls.pdpu.ac.in,
[4]ashish.joshi@rediffmail.com

ABSTRACT

This Paper examines the impact of Working capital management on the financial performance of the India pharmaceutical companies listed on National stock exchange of India for the period of 10 years from 2011 to 2020. The independent variables studied were Account Receivable Period, Inventory Turnover Period, Avg Accounts Payable Period, Debt and Current Ratio, Size Of the company and Sales Growth. The dependent variable i.e profitability measure is taken Return on Assets. In order to determine the influence of these factors on profitability, descriptive statistics, correlation analysis and regression analysis were employed in this study. The result of the study shows that ROA has negative relationship with Inventory Conversion Period, Average Payment Period and Company Size while ROA has positive relationship with Average Collection Period, Debt Ratio, Current Ratio and Sales Growth. As a result, the goal of this article is to give some valuable recommendations for those in charge of managing this industry. This study also lays the groundwork for future research in this field of business.

***Keywords** : Working Capital, Profitability, Return on Assets, Pharmaceutical, India*

Introduction

Management of working capital is an essential corporate finance element. It is the interaction between current assets and current liabilities. Working capital management is critical for a company's day-to-day operations. The goal of working capital management is to guarantee that a company's operations run smoothly and that it has enough money to cover both maturing short-term debt and impending operational costs. It is primarily concerned with the administration of inventory, accounts receivables, accounts payables, and cash. Working capital management's key idea is to offer enough support for the smooth and effective operation of day-to-day company activities by striking a balance between the three proportions of working capitali.e. liquidity, profitability, and risk.

About Pharmaceutical

India is the world's leading provider of generic pharmaceuticals. The Indian pharmaceutical sector satisfies more than 50 % of global consumption of different vaccinations, 40percent of total of drugs for treatment in the U. S., and 25percent of overall medicine in the Uk.India is third in the world in terms of pharma production by quantity and 14th in terms of value. The domestic pharmaceutical sector is comprised of 3,000 pharmaceutical firms and 10,500 production units.India holds a significant role in the global medicines industry.The country also boasts a big a collection of a collection of engineers and scientists that have the potential to catapult the industry to new heights.

Literature Review

(Galih Wicaksono, 2020) has examined the role of working capital management on profitability after tax of automotive and allied products firms of Indonesia for 65 observations. The dependent variable of the study were Return on Investment (ROI), while the independent variable were Working capital turnover, Liquidity, Cash turnover, Receivable turnover, Inventory turnover, Cash to total assets. Based on the study's findings and discussion, it is possible to infer that only the turnover of working capital and liquidity have a substantial influence on profitability, though in a negative direction. Profitability is affected by the turnover of working capital, liquidity, cash receivables, inventories, and cash against total assets all at the same time. (Thiago Alvarez, 2021) has analysed the Argentine manufacturing SMEs for the time period of 3

years from 2016 to 2018 of 177 SMEs. The predictor variables used wereROA and ROE and the independent variables were inventory turnover ratio, Account receivable, Account Payable, Cash conversion cycle, current ratio, size and total debt-total assests ratio. The statistical tool used for the study was fixed-effects regression model. The findings revealed a favourable and statistically significant connection between all working capital and profitability components, implying that a rise in each variable taken into account determines a performance improvement in terms of ROA and ROE. In contrast, leverage has been found to have a statistically significant negative connection with profitability, implying that increasing debt has a detrimental influence on business performance. (Muhammad Ahsan Kabir, 2020) examined the WC's link to the Karachi Stock Exchange through the size and benefit of firms in four particular key areas, namely Petroleum Limited, Engineering Works, Textile Mills, and Garment Manufacturers. The information was gathered by identifying the 40 tested organisations out of the total in the relevant components, such as 185, which covered the years 2016-2019.The variables taken for the study are working capital, ROE, ROA, Total sales, Total assets and firm size. The relationship between WCM and Size found to be negatively associated. (Rimsha Khalid, 2018) The goal of this study is to find out how management of working capital affects profitability. Profitability is determined by the return on assets. This research also takes into account the firms' current ratio, debt to equity ratio, operational profit to debt ratio, and inventory conversion period. From 2007 through 2012, a six-year span,supplementary data from electrical equipment manufacturers on the Karachi stock exchange was collected. Regression analysis was performed on the data. The normal and linear tests also were employed. The results were overwhelmingly good. Working capital management, it is determined, has a positive substantial influence on company profitability. (Hassan Ghodrati, 2014) investigates the link between management of working capital and performance of Tehran Stock Exchange-approved firms.Over the years 2008-2012. Based on the Cochran algorithm and simple random selection, the research chose 66 businesses as a statistical sample. Variables such as the average duration of collecting accordance, periods of inventory circulation, the average period of loan payment, and the cycle of cash conversion on factory operational profits are investigated in this study. The research technique is utilised, and data collecting is done using the Pierson and Regression Solidarity. The factors of capital investment management and profitability were shown to be in direct opposition. When the period of collection agreement, timeframe of debt payment, period of inventory circulation, and cycle of cash conversion all increase, the timespan profitability decreases, and the manager can reduce the duration of debt payment, time frame of cash conversion to the smallest amount of positive significance for associate. (Enisan, 2019) examines the relationship between working capital and company profitability is investigated empirically. It uses vector autoregressive (VAR) to analyse data at the company level in Nigeria. Over the years 1999-2007, sixty-six (66) publicly traded companies were purposefully chosen for the study. By permitting endogenous interaction among variables in the system, the VAR method allows researcher to solve the endogeneity problem. The findings confirm the idea that working capital has a detrimental impact on a company's profitability. Working capital indicators, with the exception of the cash conversion cycle (CCC), respond favourably to profitability. The findings also suggest that the size of a company has a favourable impact on profitability. The findings demonstrate that reducing the cash conversion cycle improves a company's profitability. (Jakpar, 2017) has analysed the impact of working capital management on the profitability of Malaysian firms for the period of 2001 to 2011 taking the variables Cash conversion cycle, average collection days and inventory conversion cycle. The statistical tool used for the study were Panel regressionand Pearson correlation. The findings of the study shows that CCC has no impact on firmsfinancial performances. (Iqbal, 2014) has analysed the effect of WCM on the profits of the 50 firms of Pakistan for the year 2009. The variables considered for the study

were Operating profit, cashconversion cycle, average collection period, inventory turnover days, averagepayment period. The statistical method employed for the study was OLS regression. The findings of the study indicated that there was a significant association between WCM and Profitability. (Pouraghajan, 2012)has examined the relationship of WCM with profitability of 400 firms of Iran for the time 2006 - 2011. The predictors taken for the study were ROA, return on invested capital, cash conversion cycle, current ratio, debt to total assets ratio. The statistical measures used for the study were correlation and OLS regression. The findings of the study reflect that profitability was impacted negatively by cash conversion cycle. (Kabir Md Ahsan, 2020) Has analysed the impact of WCM on the organisation's liquidity as well as its productivity. Researcher chose a case of 20 Pakistani businesses Karachi Stock Exchange listed for a duration of decade, from 2010 to 2019. Researchers looked at the impact of several working capital organisation factors such as the Typical combination time span, Stock turnover in days, regular part period, and Cash change cycle on Pakistani businesses' net working advantage. Control elements include current extent, effect, firm size (measured by the fundamental logarithm of arrangements), and improvement. The statistical tool used for the study was pooled least square. The findings of the study show that there was negative relationship between WCM& efficiency of the firm. It indicates that as the liquidity change cycle lengthens, the firm's advantage decreases, and that managers may create a positive motivational factor for speculators by shortening the cash change cycle to the shortest feasible length. Researchers also discovered that the size of the company has a negative relationship with its efficiency. There is also a significant adverseassociation between the company's commitment and its financial perfromance. (Santiago Hernandez, 2021) evaluated data in the context of a rising economy from a sample of manufacturing businesses in the Santiago metropolitan area, chile. Researcher Studied the link between working capital and profitability. The information was gathered via a questionnaire and covers the years 2016-2018. The variables taken for the study were ROA, Inventory turnover period, Account receivable, account payable, CCC, firm size, current asset/current liability and Asset turnover ratio. The statistical tool regression model was used for the analysis and found that WCM have a significant negative impact on profitability. The Cash Conversion Cycle shows that businesses who can shorten the cycle are more profitable. Also added that expansive working capital practises are beneficial until the business achieves its ideal size.

Hypothesis Development

In view of literature review mentioned above the following variables have been considered :

1. Average Collection Period (ACP)
2. Inventory Conversion Period (ICP)
3. Average Payment Period (APP)
4. Debt Ratio (DR)
5. Current Ratio (CR)
6. Company Size (SIZE)
7. Sales Growth (GROWTH)

The hypothesis developed are:

1. Ho: ACP does not impact ROA
   Ha: ACP impacts ROA
2. Ho: ICP does not impact ROA
   Ha: ICP impacts ROA
3. Ho: APP does not impact ROA
   Ha: APP impacts ROA
4. Ho: DR does not impact ROA
   Ha: DR impacts ROA
5. Ho: CR does not impact ROA
   Ha: CR impacts ROA
6. Ho: SIZE does not impact ROA
   Ha: SIZE impacts ROA
7. Ho: GROWTH does not impact ROA
   Ha: GROWTH impacts ROA

Research Methodology

Research Objective

This research paper has the following objectives:

(1) To understand the relationship of ACP, ICP,APP, Debt Ratio, CR, SIZE andSales GrowthwithReturn on Assets of the business enterprise.

(2) To comprehend the extent to which ACP,ICP, APP, Debt Ratio, CR, SIZE andSales Growthinfluence the Return on Assets.

Research Techniques

In this study the researchers have considered only Indian Pharmaceutical sector companies. The variables taken into account are ACP, ICP,APP, Debt Ratio, CR, SIZE andSales Growth.These are taken as independent variables. The ROA is considered as measure of profitability as dependent variable. Thevoluminous and historical data was collected for a decade and analyzed with appropriate numericaltechniques.

Results and Discussions

1. Table 5 depicts the standardised regression co-efficients of independent variables with associated values. As mentioned in this Table-5, the standardized β (ACP) + 0.094suggests that ACP has positive relationship with ROA. And its significance level of 0.381makes it technically irrelevant. The statistical evidences, therefore suggest that null hypothesis H0(ACP) be accepted and alternate Ha (ACP) be rejected. This clearly means ACP does not impacts ROA.
2. Table 5 depicts the standardised regression co-efficients of independent variables with associated values. As mentioned in this Table-5, the standardized β (ICP) - 0.046suggests that ICP has negative relationship with ROA. And its significance level of 0.597makes it technically irrelevant. The statistical evidences, therefore suggest that null hypothesis H0(ICP) be accepted and alternate Ha (ICP) be rejected. This clearly means ICP does not impacts ROA.
3. Table 5 depicts the standardised regression co-efficients of independent variables with associated values. As mentioned in this Table-5, the standardized β (APP) - 0.023suggests that APP has negative relationship with ROA. And its significance level of 0.803 makes it technically irrelevant. The statistical evidences, therefore suggest that null hypothesis H0(APP) be accepted and alternate Ha (APP) be rejected. This clearly means APP does not impacts ROA.
4. Table 5 depicts the standardised regression co-efficients of independent variables with associated values. As mentioned in this Table-5, the standardized β (DR) +0.002suggests that DR has positive relationship with ROA. And its significance level of 0.982makes it technically irrelevant. The statistical evidences, therefore suggest that null hypothesis H0(DR) be accepted and alternate Ha (DR) be rejected. This clearly means DR does not impacts ROA.
5. Table 5 depicts the standardised regression co-efficients of independent variables with associated values. As mentioned in this Table-5, the standardized β (CR) + 0.326suggests that CR has positive relationship with ROA. And its significance level of 0.002makes it technically relevant. The statistical evidences, therefore suggest that null hypothesis H0(CR) be rejected and alternate Ha (CR) be accepted. This clearly means CR impacts ROA.
6. Table 5 depicts the standardised regression co-efficients of independent variables with associated values. As mentioned in this Table-5, the standardized β (SIZE) - 0.636suggests that SIZE has negative relationship with ROA . And its significance level of less than 0.001 makes it technically relevant. The statistical evidences, therefore suggest that null hypothesis H0(SIZE) be rejected and alternate Ha (SIZE) be accepted. This clearly means APP impacts ROA.
7. Table 7 depicts the standardised regression co-efficients of independent variables with associated values. As mentioned in this Table-7, the standardized β (GROWTH) 0.184suggests that GROWTH has positive relationship with ROA. And its significance level of 0.024 makes it technically relevant. The statistical evidences, therefore suggest that null hypothesis H0(GROWTH) be rejected and alternate Ha (GROWTH) be accepted. This clearly means Growth impacts ROA.
8. The result stated in Table- 4 points out that F= 12.289with significance level of less than 0.001 having df (7,92). This suggests that all regression coefficients will be not non-zero.

9. The matrix of co-efficients of correlation placed at Table -2 and VIF statistics given in Table -5 have been used to verify the presence of multicollinearity amongst the independent variables. No independent variable has value larger than ±7.0. In addition each of the VIF is far less than 10 and each VIF centers around its mean. This points out absence of multi collinearity.
   The results mentioned at point no. (8) and (9) give substantial dependability to the results obtained. The mathematical model emerges as under:
   ROA = 0.781 + 0.094 (ACP) -0.046 (ICP) - 0.023 (APP) + 0.002 (DR) + 0.326(CR) -0.636(SIZE) + 0.184(GROWTH)
   The coefficient of determination i.e. adjusted $R^2$is 0.444. This points out that the above stated model can justify 44.4 % variations in ROA.
10. In Table-3 The Durbin-Watson statistic is less than two this indicates a positive correlation.
11. Table 3 mainly shows R-square values as 0.483 and is explained by Predictors: (Constant) ,GROWTH, DR, APP, ICP, SIZE, CR, ACPwhich are the independent variable used for this study. The R-Square results suggest that there may be a lot of variables other than the GROWTH, DR, APP, ICP, SIZE, CR, ACPthat might have an influence on profitability.
12. Table-2 provides mean and standard deviation of all the variables. The above model may give better predictive value if the enterprises to be analysed have similar data

Table 1 Descriptive Statistics

	Mean	Std. Deviation	N
ROA	0.2098	0.1061	100
ACP	94.63	41.692	100
ICP	76.7317	23.7814	100
APP	70.06	24.377	100
DR	0.3217	0.2918	100
CR	1.6653	0.6167	100
SIZE	8.7764	0.8734	100
GROWTH	17.5682	26.4184	100

Table – 2 Correlations

	ROA	ACP	ICP	APP	DR	CR	SIZE	GROWTH
ROA	1.000							
ACP	-0.300	1.000						
ICP	-0.095	0.188	1.000					
APP	-0.196	0.523	-0.086	1.000				
DR	-0.051	0.006	-0.149	0.030	1.000			
CR	0.276	0.081	0.371	-0.053	-0.544	1.000		
SIZE	-0.609	0.559	0.231	0.294	-0.183	0.005	1.000	
GROWTH	0.141	-0.245	-0.233	-0.122	0.005	-0.205	-0.052	1.000

Table 3Model Summary

Model	R	R Squ.	Adjus. R Squ.	Std. Error of the Est.	Change Statistics					Durbin-Wat.
					R Squ. Change	F Change	df1	df2	Sig. F Change	
1	0.695[a]	0.483	0.444	0.07916908	0.483	12.289	7	92	<0.001	1.148
a. Predictors: (Constant), GROWTH, DR, APP, ICP, SIZE, CR, ACP										
b. Dependent Variable: ROA										

Table 4 ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regre.	0.539	7	0.077	12.289	<0.001[b]

1	Resi.	0.577	92	0.006		
	Total	1.116	99			
a. Dependent Var.: ROA						
b. Predictors: Constant, GROWTH, DR, APP, ICP, SIZE, CR, ACP						

Table 5 Coefficients[a]

	Unstand. Coeff.		Standardized Coeff.		Signif.	95.0% Conf. Interval for B		Colli. Stats.	
Model 1	B	Std. Err.	Beta	t-test		Lower B.	Upper B.	Tol.	VIF
Constant	0.781	0.106		7.363	<0.001	0.570	0.992		
ACP	0.000	0.000	0.094	0.881	0.381	0.000	0.001	0.491	2.038
ICP	0.000	0.000	-0.046	-0.531	0.597	-0.001	0.001	0.748	1.337
APP	-9.851	0.000	-0.023	-0.250	0.803	-0.001	0.001	0.688	1.453
DR	0.001	0.034	0.002	0.022	0.982	-0.068	0.069	0.625	1.599
CR	0.056	0.017	0.326	3.257	0.002	0.022	0.090	0.561	1.783
SIZE	-0.077	0.012	-0.636	-6.513	<0.001	-0.101	-0.054	0.590	1.696
GROWTH	0.001	0.000	0.184	2.291	0.024	0.000	0.001	0.867	1.154
a. Dependent Variable: ROA									

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DETERMINANTS OF WORKING CAPITAL MANAGEMENT: EVIDENCE FROM PAHRMACEUTICAL COMPANY OF INDIA – CIPLA

A. Dave[1], A. Parwani[2], T. Dave[3] and A.B. Joshi[4]
[1,3,4]School of Liberal Studies, Pandit Deendayal Energy University, Raisan, Gandhinagar, Gujarat, India
[2]Gujarat Technological University, Chandkheda, Ahmedabad, Gujarat, India
[1]ashvin_dave25@yahoo.co.in, [2]parwaniashwin84@gmail.com, [3]tejas.dave@sls.pdpu.ac.in,
[4]ashish.joshi@rediffmail.com

Introduction

Control of working capital is the lifeblood of most organisations and It needs thorough, real-time and constructive management. For their corporate activities, all finance divisions need to retain adequate working capital while retaining the flexibility to sustain their company's corporate priorities and development targets (Dave Fellers, 2019). The control of working capital is a crucial parameter for business decision making, influencing different business conditions as well as profitability and liquidity. WCM serves as a key business mechanism and has a vital role to play. In the company's strategic decision-making and even in the financial decision-making process (Iman Soukhakian and Mehdi Khodakarami, 2019). The money available for a corporation can be categorized under two key categories, i.e. Fixed and Operating Capital. For its establishment and to carry out its everyday operations, any company needs funds for these two purposes. Long-term funds are required to build manufacturing facilities by buying fixed assets such as plants and equipment, land, construction, furniture, etc. Investments in these investments reflect the portion of the capital of the company that is indefinitely or fixedly blocked and is called Fixed Capital. For short-term reasons, funds are often needed for the procurement of raw materials, the paying of salaries and other day-to-day expenses, etc. Such funds are considered Working Capital. Working capital, in plain terms, refers to that portion of the capital of the company that is needed to fund short-term or current assets such as currency, marketable securities, debtors and inventories. Funds thus spent in capital assets continue to revolve rapidly and are continuously being exchanged into currency, and in return for other current assets, this cash flow, flows out again. It is thus assumed to be rotating or circulating capital or short-term capital.

"Working capital is the amount of funds necessary to cover the cost of operating the enterprise" (Gupta, 2008). "Circulating capital means current assets of a company that are changed in the ordinary course of business from one form to another, as for example, from cash to inventories, inventories to receivables, receivables to cash" (Sharma, 2008).

Indian Pharmaceutical Industry

The pharmaceutical sector is one of India's success stories, ensuring that important medicines of high quality are made available at affordable rates for the country's large population as well as Competing in the world marketplace among some of the biggest brands. The sector is an intellectual industry and ranks first among the science-based sectors of India with R&D spending and wide-ranging expertise in the diverse area of drug production and technology. In the World,Indian pharmaceutical industry ranks third in production of drugs by volume More than 50 percent of the global market for different vaccines is supplied by the Indian pharmaceutical industry, 40 percent of the generic demand in the US and 25 percent of all medicines in the UK. The nation also has a wide pool of scientists and engineers with the capacity to drive the industry forward to higher heights. Currently, Indian pharmaceutical companies supply over 80 percent of the antiretroviral medicines used internationally to treat AIDS (Acquired Immune Deficiency Syndrome). It is estimated that the Indian pharmaceutical industry will grow to US$ 100 billion, while the demand for medical devices is expected to grow to US$ 25 billion by 2025. Exports of pharmaceuticals from India stood at US$ 20.70 billion in FY2020. Exports of

medicinal products include bulk medications, intermediates, combinations of drugs, biological products, Ayush and herbal products, and surgical products. India's biotechnology sector, consisting of biopharmaceuticals, bio-agriculture, bio-services, bio-industry and bioinformatics, is projected to grow to US$ 100 billion by 2025 at an annual growth rate of about 30 percent per year. India's domestic sales on the pharmaceutical industry hit Rs 1.4 lakh crore (US$ 20.03 billion) in 2019, up 9.8% y-o-y from Rs 129,015 crore (US$ 18.12 billion) in 2018.(IBEF Report , October 2020)

The drugs and pharmaceuticals sector attracted cumulative FDI inflow worth US$ 16.50 billion between April 2000 and March 2020 according to the data released by Department for Promotion of Industry and Internal Trade (DPIIT).

India's medicine spending is expected to rise by 9-12 percent over the next five years, making India one of the top 10 medicine spending countries.

In the future, stronger growth in domestic revenues will also rely on the willingness of firms to match their product portfolio with increasingly chronic medications for diseases such as cardiovascular diseases, anti-diabetes, anti-depressants and anti-cancer drugs.

In order to lower prices and minimize healthcare expenditures, the Indian Government has taken several steps.The fast penetration of generic products into the industry has remained in sight and Indian pharmaceutical firms are expected to gain.Moreover, for pharmaceutical firms, the emphasis on rural health programs, lifesaving medicines and preventive vaccinations is also nice.

Company Profile – CIPLA

Cipla is a major Indian pharmaceutical firm with a presence worldwide.It was founded as Chemical Industrial & Pharmaceutical Laboratories Ltd in 1935 and renamed in 1984 to its current name.With over 1,500 products on the market, the company has a large portfolio.The sector of the group is split into three structural units: APIs, Cipla Global Access and Respiratory.India, followed by Africa and North America, is the main market. In FY20, the overall sales of the company crossed Rs. 17,132 crore (US$ 2.43 billion). With Clocip, a skin infection treatment, Cipla announced its entry into the anti-fungal medication group in FY20.Cipla launched Cipremi, an experimental anti-viral pharmaceutical medication with Emergency Use Authorisation (EUA) for adult and pediatric patients hospitalized with presumed or laboratory-confirmed COVID-19 infection Clearance obtained for its Abbreviated New Drug Application (ANDA) for AlbuterolSulfate Inhalation Aerosol 90 mcg (base)/actuation. In order to improve its women's health division, it purchased four main brands from Wanbury for up to Rs. 89 crore (US$ 12.73 million).

Literature Review

LalitK.Joshi, S.ghosh (2012)had examined the working capital performance of Cipla Ltd. for the period 2004-05 to 2008-09. In calculating the efficiency of working capital, financial ratios are applied and mathematical as well as econometric methods are used to determine the behavior of the chosen ratios. The ratios which are taken into consideration are Current Ratio, Quick Ratio, Absolute Liquid Ratio, Inventory Turnover Ratio, Debtors Turnover Ratio, Working Capital Turnover Ratio, Current Assets Turnover Ratio. In addition, over the years under review, the company has demonstrated considerable progress in its liquidity status. Also the working capital turnover ratio and the existing asset turnover ratio are very low, suggesting low working capital usage over the years under review.The company's efficiency is not acceptable in terms of total liquid ratio.The inventory turnover ratio and the turnover ratio of the debtor indicate acceptable results.Hoang (2015) examined the effects on firm profitability of the different components of working capital management, namely the average collection Period (ACP), the average inventory period (AIP), the average payment period (APP) and the CCC of 98 manufacturing companies for the period 2009-14 listed on the Ho Chi Minh City Stock Exchange. The techniques used were Pearson'scorrelation and fixed effects multiple regression analysis and the findings suggest that management of working capital

plays a constructive role in growing shareholder equity by making a business more profitable by reducing CCC and Net trade cycle(NTC).Joseph Mbawuni, MercyHawaMbawuni, Simon Gyasi Nimako (2016) has analysed Ghana's 5 petroleum retail companies for 2008-13. The techniques used were Multi level mixed-effects linear regression models and correlation and concluded that return on assets (ROA) was found to have a significant relationship with average days payable but negligible cash conversion time relationships, average inventory days and average days receivables.Basman Al Dalayeen (2017) examined the impact of management of working capital on the profitability of selected 3 Jordanian real estate firms for the period pf 15 years from 2000-2015. ROCE is used as dependent variable and CR, ITR & DTR are used as independent variable The data analysis found that only the turnover ratio of debtors in the case of Jordan Decapolis Properties and the current ratio in the case of Al-Tajamouat are positively correlated to the profitability ratio of Jordan Decapolis Properties and it is also found that their impact is significant. The stock turnover rate has also been found to be very low in all industries. In the case of Al-Tajamouat for Touristic Ventures, the current ratio is found to be important with ROCE and is positively associated at a modest level in the remaining two firms, but has an insignificant association with the profitability of the chosen companies.

Rejaul Karim, Md. Abdullah Al-Mamun, Md. Tota Miah (2017)examines the impact of the productivity of working capital management on the performance of Bangladesh's two leading pharmaceutical firms - Square Pharmaceuticals Limited (SPL) and Beximco Pharmaceuticals Limited (BPL) and compares financial effectiveness for these two companies for the period of ten years from 2006 to 2015 by applying correlation, t-test, and different profitability, liquidity and solvency ratios and found that there was a significant relationship between variables. The study also indicates that Square Pharmaceuticals Limited's financial condition and operating efficiency is greater and more effective than Beximco Pharmaceuticals Limited in almost all situations with different ratios and different conversion times in the manufacturing cycle.

Pinku Paul, ParomaMitra (2018)has investigated the effect of the control of working capital on the profitability of 35 Indian steel companies by taking Return on total assets as dependent variable and current ratio, quick ratio, Debtors turnover ratio, finished goods ratio as independent variable to create a relationship between the management of working capital and the profitability of the steel industry in India by means of panel data regression for the period of 17 years i.e 2000-2016 and found that QR and the DTR have a significant impact and are of statistical importance to the ROA. In addition a strong relation between profitability and the day of the debtors, however in comparison to the optimistic correlation between profitability and days of inventory. The findings of the study show that the effect of the management of working capital on the profitability of Indian steel companies has been significant.AhmYeaseen Chowdhury, Mohammad ZahedulAlam, Sabiha Sultana, and Md. Kaysher Hamid (2018)has examined nine Pharmaceutical companies listed on Dhaka Stock exchange for the period of 15 years i.e 2001-2015. Return on investment, return on equity and earnings per share were used as profitability metrics.The independent variables of working capital management were the average processing time, average payment period, inventory turnover period, cash conversion cycle, and investment in marketable securities. Statisticals techniques regression and correlation analysis were used and found significant positive relationship of APP with Return on investment and significant negativerelationship with average collection period, inventory conversion period, and cash conversion cycle. However, the highest number of variables (80 percent) has demonstrated substantial relationships with ROA between five independent variables, which is a more robust variable compared to ROE and EPS.

Tabular presentation of Literature Review

Sr. No.	Researchers	Company/firm	Time period	Impact of working Capital on Profitability
1.	Lalitk.Joshi, S.ghosh	Cipla Ltd	2004-05 to 2008-09	inventory turnover ratio and the turnover ratio of the debtor indicate acceptable results.
2.	Hoang	manufacturing companies	2009-14	management of working capital plays a constructive role in growing shareholder equity
3.	Joseph Mbawuni, Mercy HawaMbawuni, Simon Gyasi Nimako	petroleum retail companies	2008-13	return on assets (ROA) was found to have a significant relationship with average days payable
4.	Basman Al Dalayeen	Real Estate Firms	2000-2015	positively correlated
5.	Rejaul Karim, Md. Abdullah Al-Mamun, Md. Tota Miah	Pharmaceutical Firms of Bangladesh	2006-15	significant relationship between variables.
6.	Pinku Paul, ParomaMitra	Indian Steel Companies	2000-2016	optimistic correlation between profitability and days of inventory
7.	AhmYeaseen Chowdhury, Mohammad ZahedulAlam, Sabiha Sultana, and Md. Kaysher Hamid	Pharmaceutical companies listed on Dhaka Stock Exchange	2001-2015	80% variable show positive relationship with ROA

Research Methodology

The present study analyzed the financial data of Pharmaceutical company(Cipla) based on NSE. The necessary data has been obtained fromsecondary sources; annual reports of the Cipla from the *Capita-line Database* for the period of 2011-2020. The market capitalization of Cipla as on December, 2019 was stood at Rs. 34,103.75 Crores. Thedependent variable was return on net worth (RONW) as a measure ofprofitability while study used six independent variables. These variablesinclude:

Predicted Variables	Symbols
Dependent variable: 1) Return on net worth = Net income/ Shareholders' equity	RONW
Independent variables: 1) Inventory turnover ratio = Cost of goods sold/ Average inventory 2) Debtors' turnover ratio = Net credit annual sales/ Avg. trade debtors 3) Interest coverage ratio = EBIT/ Interest expenses 4) Debt equity ratio = Total liabilities/ Total equity 5) Fixed assets turnover ratio = Net sales/ Fixed asset – (accumulated Depreciation) 6) Current ratio = Current assets/ current liabilities	 IR DR ICR DER FATR CR

Hypothesis

The following hypothesis have been formed:

(1) H0: IR has no influence on RONW
Ha: IR has influence on RONW
(2) H0: DR has no influence on RONW
Ha: DR has influence on RONW
(3) H0: ICR has no influence on RONW
Ha: ICR has influence on RONW
(4) H0: DER has no influence on RONW
Ha: DER has influence on RONW
(5) H0: FATR has no influence on RONW
Ha: FATR has influence on RONW
(6) H0: CR has no influence on RONW
Ha: CR has influence on RONW

Analysis and Interpretation

(1) The standardized regression co-efficients of the independent variables with their respective direction, values and significance level are stated in the Table- 1. The regression co-efficient of IR is + 0.657suggesting out that IR has positive relationship with RONW and its significance level of 0.038suggests that it is moderately important. Hence the hypothesis H0 (IR) be rejected and the alternate hypothesis Ha (IR) be accepted.It shows that IR has some influence on RONW.

(2) The regression co-efficient of DR as given in Table -1 is + 0.781 and has significance level of 0.089. This shows that that DR has positive but not significant relationship with RONW. Hence the hypothesis H0 (DR) be accepted and the alternate hypothesis Ha (DR) be rejected. It shows that DR does not influence RONW.

(3) The regression co-efficient of ICR as given in Table -1 is + 0.511 and has significance level of 0.126 . This clearly shows that that ICR has positive but veryinsignificant relationship with RONW. Hence the hypothesis H0 (DR) be accepted and the alternate hypothesis Ha (DR) be rejected. It shows that ICR has no influence RONW.

(4) As given in Table -1the regression co-efficient of DERis + 2.091 and has significance level of 0.023 . This clearly shows that that DER has strong positive and significant relationship with RONW. Hence the hypothesis H0 (DER) be rejected and the alternate hypothesis Ha (DER) be accepted. It shows that DERhas considerable influence onRONW.

(5) Table -1 further shows the regression co-efficient of FATRat- 0.679with significance level of 0.025 . This aptly shows that that FATR has negative but significant relationship with RONW. Hence the hypothesis H0 (FATR) be rejected and the alternate hypothesis Ha (FATR) be accepted. It shows that FATRhas considerable influence on RONW.

(6) The regression co-efficient of CR as given in Table -1 is + 2.152 and has significance level of 0.015. This shows that that CR has strong and positive as well as very significant relationship with RONW. Hence the hypothesis H0 (CR) be rejected and the alternate hypothesis Ha (CR) be accepted. It shows that CR considerable on influence RONW.

(7) The analysis of variance in Table – 2, shows F = 11.112 at a significance level of 0.037 with df (6, 3). This suggests that possibility of all regression co-efficients being zero is remote.

(8) The VIF (Variance Inflation Factor) valuesin Table-1 suggest that majority of them are closer to 10 and their average being less than 10 multi collinearity does not pose much problem.

The Multiple Regression Model is brought out as under:

RONW = – 63.772 + 0.0657 (IR) + 0.781 (DR) + 0.511 (ICR) + 2.091 (DER) – 0.679 (FATR) + 2.152 (CR)

(9) The adjusted R2 i.e. the co-efficient of determination stands at 0.871meaning thereby that the equation can explain 87.1 % variations in RONW and for the remaining variations some other variables are responsible.

(10)The descriptive statistics given in Table -4 states mean and standard deviation of respective variables and point out that applicability of regression model is better if mean and standard deviation of other company' data are similar.

Conclusion

Considering the analysis and interpretationmentioned above DER, FATR and CR have substantial influence on RONW. IR has moderate influence on RONW. However, DR has no influence on RONW. This research study thus suggests that DER, FATR and CR are very important variables from view point of the profitability of the company and should be given more importance by managers of the company. IR deserves only moderate attention. The management control systems and performance appraisal parameters may be tailored accordingly.

Table No: 1: Regression Co-efficients , Significance Level & VIF - CIPLA

	Standardised Regression Co-efficients (Beta)		t	Significance Level	Collinearity Statistics VIF
	Direction	Value			
Constant	-	63.772	- 3.750	0.033	
IR	+	0.657	+ 3.555	0.038	2.378
DR	+	0.781	+2.478	0.089	6.913
ICR	+	0.511	+2.104	0.126	4.114

DER	+	2.091	+4.306	0.023	16.420
FATR	-	0.679	- 4.187	0.025	1.831
CR	+	2.152	+5.051	0.015	12.652

Independent variables= IR, DR, ICR, DER, FATR and CR
Dependent variable= RONW N= 10 Adjusted R square= 0.871

Table – 2: ANNOVA - CIPLA

Model	Sum of Square	df	Mean square	F	Significance
Regression	76.211	6	12.702	11.112	0.037
Residual	3.429	3	1.143		
Total	79.640	9			

Table – 3: Descriptive Statistics - CIPLA

Parameters	Mean	Standard Deviation
RONW	13.3510	2.97472
IR	3.9390	0.21424
DR	5.0680	0.75222
ICR	67.0200	54.12529
DER	0.0540	0.04115
FATR	1.9900	0.22808
CR	2.2300	0.43094

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AMBEDKAR AND IYOTHEE THASS; TOWARDS THE CONSTRUCTION OF DALIT PRINT CULTURE IN COLONIAL INDIA

Srutheesh S
Department of Electronic Media & Mass Communication, Pondicherry University, Puducherry
srutheeshkannadi@gmail.com

ABSTRACT

The history of press has played a crucial role in the community formation of Dalits and in the construction of the epistemological and cultural spheres. The Dalit community, which has been excluded from public discourse and rights over resources, has made possible a new cultural movement by making active use of the press. This paper is a study of the journals Mooknayakand Tamilan, started by Ambedkar and IyotheeThass respectively, which made significant contributions to such socio - cultural movements in colonial India. This paper analyses the political content and nature of these journals, which have strengthened anti - caste discourses and initiated community formation during colonial period.

Keywords: *dalit, press, caste, ambedkar*

Introduction

The history and development of printing are allied to the evolution of human civilization, various stages of renaissance, institutionalisation of power, and domination. The role of print is very significant in establishing the dominance of upper caste/class societies and state authorities in India. But it will be a matter of historical significance to examine how the development of printing has led to the community formation of Dalits and 'lower' castes in the nation.Charles D Kleymer states that, at the regional level, we can strengthen cultural organizations and build community using cultural traditions. Enabling a common sense of identity can motivate people and improve their lives through collective action. When people become proud of their culture, they can make more changes by organizing with each other. Organized on the basis of cultural identity, they are able to identify their problems and come up with solutions relatively quickly (as cited in Gold, 2005).

For the lower castes, who were alienated from the concepts of public spheres and public affairs, the press was a powerful weapon that enabled them to construct an independent space for themselves. The Dalit press led to the unification of Dalit communities and the construction of a new political discourse that transcended sub-caste divisions. This study discusses the journals Mooknayak and Tamilan started by Dr. BR Ambedkar and IyotheeThass respectively, who played an important role in the anti-caste discourses. History has shown that Ambedkar'sMooknayak was instrumental in the community formation of Dalits who were excluded and kept unaddressed by the nationalist discourses of colonial India. IyotheeThass' Tamilan has made a similar subversive political intervention in Southern India. Studies by J Balasubramaniam (J, 2014) and others have argued that the activities of Tamilan with an emphasis on self-esteem and identity consciousness have contributed to the political awakening and community empowerment of the Dalits in colonial Madras and other Tamil speaking regions. The study primarily examines the political significance of Mooknayak and the Tamilan, which are considered to be the earliest interventions in the history of the Dalit press in India, and the underlying discourses that made it possible.

Methodology

The paper analyses the data collected through desk research. Various studies, which are considered as secondary sources, have been analysed and summarized for the completion of this paper.

Research Questions

1. How did the Dalit print culture contributed for the community formation of Dalits?

2. Was the print culture constructed by Mooknayak and Tamilan able to challenge the dominant public discourses?

Discussion

Mooknayak

The history of the Indian press is the history of anti-colonial nationalism and renaissance movements led by the Indian upper caste/class communities. For the Indian upper caste/class communities who were the proponents of nationalism, the press was a powerful weapon to construct their societal and political interests and transform it as the collective conscience of the country itself. But the fact is that the renaissance views and struggle for independence put forward by the Indian nationalist leaders were incompatible or neglected to address the large population who were oppressed for centuries by the caste-centric Indian social structure.

It seems that we need to understand the socio-political role of the Mooknayak newspaper, which was started by Dr. B.R Ambedkar, in the political context of this historical expulsion of the lower castes in India. Ambedkar started the newspaper Mooknayak, which means the leader of the voiceless, on January 31, 1920. The Marathi language newspaper was published twice a month. PandhurangNandramBhatkar, a social activist, was the first editor of Mooknayak. Later, in July 1920, DnyandevGholap has been appointed as the editor of the newspaper instead of Bhatkar. (Pol, 2020).

Mooknayak played a crucial role in the construction of the Dalit political sphere and was able to accelerate the community formation of the underprivileged people. Mooknayak's publication has contributed to the Dalit political assertion and the formation of social-democratic imaginations by confronting the mainstream public discourses. Through his newspaper, Ambedkar made possible a new world of political imagination of awakening by deconstructing the hegemonic social discourses and putting the dominant caste communities in crisis.

In an editorial in the first issue of Mooknayak, Ambedkar wrote, "…….Hindu society is like a building. Every caste has a floor in it. But the feature of this is that this building has no steps. So we can't go from one floor to another. Those born on each floor must die on the same floor. If a person is from the ground floor, no matter how qualified he is, he cannot enter the upper floor. No matter how unworthy a person on the top floor is, no one can bring him down" (Maitreya, 2020).

Mooknayak began its publication by attacking the caste structure and the exercise of power, which are the characteristic of the Hindu hegemonic society. Although Ambedkar himself wrote all the editorials for the short-lived newspaper, it was actually published under a pseudonym as he was a government official at the time (Maitreya, 2020). The Rs. 2500 donated by ShahuMaharaj of Kolhapur also played a significant role in facilitating the publication of the newspaper. The price of a copy was 2.5 anas. Initially, it had 700 subscribers, but over the next two years, the newspaper gained 1000 subscribers (Pol, 2020). In those days, when new newspapers started publishing, it was common for existing newspapers to advertise for it. However, the Kesari newspaper run by BalGangadharTilak was not ready to advertise the publication of Mooknayak, according to an article written by Prabodhan Pol on The Wire (Pol, 2020). Even though Ambedkar was willing to pay for the advertisement, Thilakan refused to publish the advertisement of Mooknayak. This incident illustrates the common discriminatory attitude of the Brahmin-owned press in colonial India towards the subalterns and their efforts.

The most important feature of Mooknayak was the letters of the Dalits and other oppressed communities which were constantly published in every issue. The newspaper published letters of Dalits from different parts of the country. These letters clearly reflected the problems they faced, such as discrimination, poverty, oppression and social boycott etc. It can be said with certainty that the continuous publication of such letters has enabled the Dalit people, who were geographically, socially and culturally scattered, to develop a community consciousness and be united to emerge as a single community (Pol, 2020).

The politics of such letters have enabled the construction of a Dalit epistemology and envisioned a self-organized Dalit community

by asserting their own agency. Mooknayak has undertaken the arduous task of constructing an imagined community of the scattered people, as conceptualised by Benedict Anderson. Mooknayak has made possible a subaltern counter-culture in print by questioning the elite interests of the emerging print culture in colonial India and the upper caste/class agenda envisioned in it. Through Mooknayak, Ambedkar worked to organize the marginalized people, who were excluded and otherised in the mainstream public, for a political and social revolution grounded on self – esteem, identity assertion and democratic values. Various articles published in the newspaper shows that Mooknayak was constructing a new philosophical and political consciousness in a country like India where caste values were interpreted and justified as moral values to be followed by the Indian public society.

Mooknayak was known for publishing controversial articles on various political issues of the time. It can be seen that such articles have played a crucial role in ideologically strengthening anti-caste political discourses. The anti-colonial discourses created by the upper caste/class communities became dominant in the public sphere and this led to the invisibilization of the interests and political issues of the Dalit community. This political exclusion of Dalits has led Ambedkar to be critical towards the concept of nationalism as defined by the anti-colonial leaders of India. Ambedkar pointed out that the politics of anti-colonial nationalism is to obscure the underlying questions of caste and reject internal confrontations and power structures existing in the country (Pol, 2020). Mooknayak also marked the Dalit discourses and questioned the contradictions of non-Brahmanical politics in a political space that sought to question Brahminical supremacy only through non-Brahmanical discourses. Mooknayak's publication has been able to politicize the Dalit identity, construct Dalit epistemology and to develop the concept of Dalit print culture in counter to the dominant public discourses in India.

Tamilan

'Oru Paisa Tamilan' was a Tamil weekly started by PanditIyotheeThass that has played a unique role in strengthening anti-caste discourses through alternative history writing. The weekly, which was started on June 19, 1907, was renamedTamilan a year later. Tamilanwas published from Royapettah, Chennai, initially printed by a Buddhist press but later shifted to the Gautam Press owned by the weekly itself. The Tamilan had reclaimed the remnants of Buddhist history and imaginatively constructed a new social order based on equity while upholding its value system to the Tamil people. The fact is that perhaps even before Ambedkar, it was IyotheeThass and his Tamil weekly that strengthened anti-caste politics among the Dalits through a Buddhist perspective. The weekly was published every Wednesday in tabloid form. The circulation of the 4 page weekly at that time was 500(J, 2014). Tamilan has consistently published numerous writings that have been sharply critical of the forms of power and graded inequalities created by Brahminical hegemony. The social, cultural and political impetus of the Paraya community, which inhabited most of the southern districts of colonial Tamil Nadu, played a significant role in the publication and advancement of Tamilan (Aloysius, 2010, p. 10).

When the caste-centric social system distorted the Indian nation itself into a repressive system, the Tamilan made enough political interventions to structurally introduce and develop the idea of democracy in the society. The Tamil weekly was rich in writings on the assertions and empowerment of the Dalits and the other lower castes people. The weekly put forward a new politics by revisiting the constructions of Tamil history, religion and literature against the oppressive socio-cultural discourses that prevailed at that time. At the same time, it is worth mentioning that Tamilan was able to break out of the religious notions of Buddhism and offer a new philosophical consciousness. The weekly was able to find new roots of social democracy in colonial India and to build new hopes of renaissance and anti-caste politics among the Tamil society.

It is right to say that Tamilan was a powerful force in the history of the Dalit print culture in India. IyotheeThass' media intervention has had a significant impact on the dynamic and ideological reconstruction of the Dalit print discourses. AshishJiwane says that CME Murthy, SwapneshwariAmmal, TC NarayanaPillai, AP PeriyaswamyPulavar and other prominent socio-political figures of the time wrote articles in Tamilan (Jiwane, 2015).

By the second half of the nineteenth century, colonial rule had given rise to new fields of occupations in India. Plantation labour, the mines and the army came up in India as part of this. The Dalits and other lower castes, who had hoped to build a new standard of living by moving away from the agricultural sector, which had played a significant role in perpetuating the caste, were rapidly entering this new field of occupations. A large section of the readers of the Tamilan Weekly was the later generations of the Dalit community who entered the new workplaces made possible by the colonial rule in the hope of liberating themselves from the caste system produced by the agricultural sector. Modern workplaces allowed workers to a certain extent to find time to read and think, and this gave the oppressed masses an opportunity to construct political imaginations about community formation (J, 2014). In this way, Tamilan has played a commendable role in developing an innovative political consciousness of assertion and self-respect among the Dalit communities of colonial Madras.The Tamil Weekly was established as a result of the efforts of the Paraya community, who were liberated from the traditional agricultural slavery system and worked in the Kolar Gold Fields.

The first phase of the publication of the weekly came to an end with the untimely demise of IyotheeThass on May 5, 1914. Later, on June 17, the weekly was re-launched under the editorship of his son Pattabhiraman, but in 1917 the activities of Tamilan ceased again due to unclear reasons. However, the weekly was re-launched in 1921 under the editorship of Gabriel Appaduraiyar and VPS Moniyar as the Publisher. It was made possible by the persistent efforts and community consciousness of the Paraya society who were working at the Kolar Gold Fields. But within a year, the weekly again ceased to function. However, as a result of the relentless work and political convictions of the Paraya community, the press was re-established at Kolar Gold Fields as Siddhartha Publishing House and resumed operations. This process continued for several phases by resuming and ceasing the publication but finally came to an end in 1935 with the complete closing down of Tamilan (Aloysius, 2010, pp. 11-12).

It is noteworthy that the weekly was able to construct the broader political imagination to pave the way for community formation, just as the community contributed to the establishment of the weekly. Community is a term with very complex meanings. Traditionally the term refers to locality, groups, unity, shared identity, groups formed for specific reasons, groups with particular morals, faith, race, and groups with historical continuity etc (Plant, 1978).Referring to the words of Plant, it is the historical continuity of caste-slavery that made theParaya community more assertive and led to sow the seeds for the non-Brahmanic discourses in colonial Madras. The publication of Tamilan was based on the firm consciousness that Dalits and other oppressed communities should get equal socio-political status by constantly criticizing and deconstructing the social system that produces the Brahmanical hegemony.

Tamilan wrote and interacted in a way that reflected the identity consciousness of the oppressed people in their minds. Such writings were able to deconstruct the perspective of Brahminical discourses on Dalit communities and to inspire the oppressed to establish their own agency over and above the stereotypical paradigms. IyotheeThass' socio-cultural-press intervention has also contributed to the popularization of terms such as Adi-Tamilar, Tamilan, Buddhist, which promotes self-esteem and an independent political identity to address the untouchables (J, 2014). It should be noted that the various columns that appeared in the weekly were able to build community consciousness, unite with different sections of the society, as well as intervene in liberal democracy and enable a new sphere of knowledge to empower the Dalits and other marginalised.

Conclusion

The Dalit print culture puts forward different narratives about the life and struggle of the lower castes and the constant conflicts they have with the mainstream public domain. The Dalit community was forcefully entered into the print culture, the product of modernity and enabled the construction of independent identity and the formation of subaltern public spheres. The Dalit press was introducing a new cultural public sphere based on morality to the Indian caste society which produced graded inequality among the public.

The people who were made invisible by the hegemonic cultural society have put their political questions about civil liberties before the colonial government and the Indian dominant communities through their own press.Clearly, before we are able to speak of community, or of commonality, significance, fraternity and then on, there should be associate intention among the members of a bunch to act in bound ways in which toward each other, to retort to every alternative specifically ways in which, and to value everybody as a member of the cluster (Plant, 1978).In this way, the Dalit print culture is decisive in history through criticisms and deconstructive readings raised by the Dalit community, transcending social, cultural and geographical differences. It was at this stage that the collective expansion of Dalit epistemology and print culture took place. The Dalit epistemological system developed through print was a severe blow to the sense of Brahmanical morality and the caste system that otherised the oppressed masses for centuries. This intervention, which challenges the caste-centric social system, jeopardizes the very concept of the public sphere within the Indian nation-state.

The print was the most important weapon used to assert power, status, etc. during the colonial period (Antony &Skariah, 2016, p. 22). Identifying the significance of these features of the press, initiatives like Mooknayak and Tamilan was emerged in a way to reflect the political and social problems of the lower castes at various levels of power. Historically, we can see that Ambedkar and IyotheeThass made some constructive negotiations with the colonial regime. Ambedkar was able to present the problems of the untouchables in India before the Simon Commission and his participation in the round table conferences on behalf of the untouchables are historic moments that were made possible by those constructive negotiations. The subaltern philosophers and their press gained mobility by confronting and embracing power exercised by the state. In that sense, even when Mooknayak and Tamilan were geographically in two places, it is certain that their discourses on community formation have played a crucial role in the political movements of the oppressed masses who have been excluded by the mainstream public sphere. The cultural capital attained by the Dalit community through the press by conceptualizing the notions like literacy, reading and print had a large impact on the anti-caste discourses of the time. While Mooknayak directly opposed Brahmanic hegemony and challenged the structure of Indian societal relations, Tamilan sought to reconstruct and revise the history, culture and society within the Dravidian political arena, thereby asserting the Dalits as independent identities. Undoubtedly, Mooknayak and Tamilan had the most decisive interventions in the formation of the Dalit print culture. It is a historical fact that the subaltern public spheres constructed through print culture were made possible by the efforts of various anti-caste philosophers such as Ambedkar, IyotheeThass, JyotiraoPhule and Ayyankalietc, paving the way for further study.

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WOMEN EMPLOYEES IN SALEM DISTRICT BPO SECTOR: STRESS DETERMINANTS AND REMEDIES

Sathish.V[1], Selvavinayagam. K[2]
[1]Department of Management Studies, Sona College of Technology, Salem
[2]Periyar University Constituent College, Dharmapuri

ABSTRACT

Stress has indeed become common among the employees irrespective of gender. Changing economic trends, market prices, family situations, and technology have compelled women to work. Women employees are equally contributing and taking crucial responsibilities in all the sectors. Ultimately, women employees face pressure due to an imbalance between managing the home and workplace activities. The intention of this research paper is to highlightt the countless pressures that women employees accost in the Business Process Outsourcing (BPO)services sector. This paper is based on a sample study of 256 working women from different BPOs in Salem district who were having more than one year of experience. This study will be supportive in bringing the vital changes that the BPO services sector must explore to manage stress among its women employees.

***Keywords**: Stress Management; Women employees; Work pressure; Work stress*

Introduction

In India, the Business Process Outsourcing (BPO) services have been flourishing in myriad areas and have become an asset to many firms who are desirous of becoming turning agile organisations [1-2]. BPOs have been offering tremendous job opportunities for women in recent years. It attracts women workers with a lucrative salary, benefits and huge privileges. Women employees are ready to take up jobs to meet the growing needs of their family and personal well-being. BPO sector plays a vital role in employing women and transforming their dreams in certain aspects. Though the BPO sector provides a huge salary for women employees, the job satisfaction level remains a question mark.Stress is the inevitable term which women employees experience a lot in the BPO industry. This stress affects their behaviour, relationships, and every aspect of their life.

Significance of the Study

Women have become the vital factor in today's workforce of the country. The BPO sector prefers women employees in large numbers due the level of dedication when compared to male employees. Women employees working in BPO Sector in Salem district are the focal point of this research. The women employees in the of BPO segment in Salem district, experience a lot of stress with respect to inflexible shifts, prolonged working hours, work-life balance, career growth opportunities, and poor workplace relations.

Research Objectives

1. To ascertain stress level among women employees of BPO sector in Salem district.
2. To identify methods to overcome and reduce work-related stress.

Magnitude of Stress

To arrive at the stress level among women employees of BPO sector in Salem district, relevant data was collected from 256 women employees and analysed (Table 1).

Table 1: Stress level of women employees of BPO sector in Salem District

Classification	Recurrence	Percent
Low stress level	13	5.0
Medium stress level	64	25.0
High Stress level	179	70.0
Total	256	100

70 percent of BPO women employees (Table 1) experienced high stress level in their job and 25 percent averred that they experience medium stress level while 5 percent of women employees were facing meagre stress at their workplace. This scenario indicated the prevalence of immense physical / mental pressure.

Causes of Stress at Workplace

The following are believed to be important reasons that trigger stress [3-8]:

1. Job enlargement: Adding job activities horizontally without any additional benefits.
2. Prolonged working hours and inflexible shifts.
3. Lack of care of their children and elderly dependents.
4. No rest, no breaks.
5. Insecure feeling.
6. Lack of superior-subordinate relationship.

Table 2: Causes of Stress

Causes	Recurrence	Percent
Work Pressure	128	50.0
Time Management	64	25.0
Work life Balance	26	10.0
Workplace atmosphere	23	10.0
Professional Investment	15	5.0
Total	256	100

Work pressure and Time management were major factors (Table 2) causing stress among women employees in BPO sector. It is understood that working women were facing lot of work pressure and this affected them mentally while performing their jobs.

Implications of Stress

The implications of stress can be felt in myriad ways [9-17]. On a broader note, stress has implications on physical health, on productivity and also on mental health. Physical health can easily be targeted such that employees may land up with colds and flu; inability to control their tension; decrease in energy levels; abnormal breathing; pains in the body especially the chest; nervousness; lack of adequate sleep; pain in the head; digestive disorders; and weight gain. Productivity can be upset as is evidenced in increment in the rate of errors; continuous exit of the workforce; alarming levels of absenteeism; dent in the quality of tasks; and shortfall in the achievement of goals. Mental status too can go haywire as is evidence by worrying; putting off work for a later time; loss of self-esteem; reluctance to mingle with others; distractions; erroneous judgements; depressed moments; turning to alcohol, tobacco and substance abuse; frustrations and agitated behaviour; and a feeling of pessimism.

Technological advancements and lot of innovations has become an unavoidable area; the jobs and assignments have been increased in a huge manner. This reflects in employee job enlargement without any additional benefits in BPO sector.

Table 3: Impact of Stress on Behaviour

Workload level	Recurrence	Percent
Strongly admit	192	75.0
Partially admit	64	25.0
Reject	0	0
Total	256	100

Workload of employees (Table 3) has been increasing and seventy five percent of women respondents averred that stress impacts their behaviour.

Overcoming Stress

Thereare myriad methods that are preferred to overcome stress level of women employees [18-23].

Table 4: Methods to Overcome Stress

Causes	Recurrence	Percent
Entertainment & Relaxation	77	30.0
Counselling and support	26	10.0
Spending time with family	51	20.0
Yoga and meditation	25	10.0
Concierge services	25	10.0
Proper Planning	52	20.0
Total	256	100

Stress relievers preferred (Table 4) wereentertainment, relaxation, proper planning, and spending time with family. Counselling and yoga were equally believed to be stress relievers.

Table 5 shows the analysis between the relationship of causes of stress and methods to overcome using Spearman's Rho.

Table 5: Spearman's RHO Test on Causes of Stress and Remedies

		Work Pressure	Time Management	Work life balance	Workplace atmosphere	Professional Investment
Entertainment &	Correlation	-0.018	0.055	-.252*	-0.08	-0.166

Relaxation Yoga and meditation	Coefficient					
	Sig. (2tailed)	.0263	0.486	0.399	0.419	0.046
Counselling and support Concierge services	Correlation Coefficient	-.242-	-0.019	-0.101	-1.111	-0.158
	Sig. (2tailed)	0.12	0.73	0.307	0.317	0.093
Spending time with family, Proper Planning	Correlation Coefficient	0.05	-206*	-.151	-.161	-0.133
	Sig. (2tailed)	0.498	0.025	0.161	0.171	0.14
Entertainment & Relaxation Yoga and meditation	Correlation Coefficient	0.144	0.137	0.014	0.014	0.023
	Sig. (2tailed)	0.121	0.162	0.667	0.727	0.674
Counselling and support Concierge services	Correlation Coefficient	0.015	-0.011	0.006	0.006	0.017
	Sig. (2tailed)	0.559	0.726	0.685	0.685	0.702
Spending time with family, Proper Planning	Correlation Coefficient	0.001	-0.018	0.015	0.005	0.021
	Sig. (2tailed)	0.891	0.607	0.626	0.646	0.691

The results show statistically that there were no high significance or moderate correlations between causes of stress of women employees and remedies.

Suggestions

1. Support from management in the form of establishing crèche for childcare.
2. Management can introduce concierge services to keep a good work life balance.
3. Healthcare insurance policies for family can be provided.
4. A 24-hour medical Centre can be made available with female personnel.
5. Free and hygienic food can be provided for women employees.

Conclusion

The word stress has become common in any field. People are running as fast as the time and day. Being without rest and running behind jobs and business, each one of us becomes a victim of stress. Stress is common for both male and female employees in the recent employment scenario and the pandemic has added more woes. Prolonged working hours without holidays make everyone disconnected with their parents, friends, relatives, and children. This creates an insecure feeling that causes stress. Working women employees must be determined to tackle these kinds of stress stemming from the workplace. Vigilance, evaluation, planning and anticipation makesone to avoid stress. Women employees of BPO sector can achieve more in their career with the support of employer, family, superiors and team members thereby alleviating stress.

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CARTEL LENIENCY SCHEME: A STEP TOWARDS ABOLISHING CARTELISATION FROM INDIAN MARKET

N. Bibhu[1] and N.S. Mallik[2]
[1,2]School of Law, Galgotias University, Greater Noida, India
[1]nishikantcnlu@gmail.com

ABSTRACT

Cartels are major threats to Indian Competitive market, Cartels are dealt under Indian Competition Act 2002, which is basically a group formed on the basis of an agreement to restrict competition in the market which can be taken as a serious threat to the economy. To save the economic independence of the enterprises, the formation of cartels should be restricted and the prevalent cartels should be abolished. As the cartels are very hard to track or detect, there are a number of Programs running in various countries to detect these cartels by giving leniency to such members of cartels who reveals about the existence of such cartel of which he is a member and also helps the Regulatory by providing every possible details regarding it. Now this leniency is concerned with the leniency in the penalty to such members on condition of revealing the details of its cartel and giving evidence against it. In India we have such leniency provision in sec 46 of the Indian Competition Act 2002. Leniency as the name itself suggests, denotes a total or partial exemption from the penalties which would otherwise be imposed to the member of a cartel who reveals its cartel membership to an enforcement agency.

Keywords: *Cartel, Competition, Economic, Enterprise, Law, Leniency, Market*

Introduction

An association based on an agreement with a purpose to hamper the market competition is called a Cartel. There are a lot of other matters on which the cartel members agree i.e. prices, market shares, allocation of territories, total industry output, allocation of customers, bid-rigging, establishment of common sales agencies and the division of profits or a combination of these. The major problems with cartels as they are not easily detectable and hence are just like a disease which can't be easily diagnosed hence the remedy from this is time consuming. So these cartel forming agreements are highly anti competitive and are the biggest threat of the competition market. The cartel formation also results into the restriction of output by increasing the prices and acting as a monopolistic body.

- The four essentials of a cartel are:
- An Association
- Based on an agreement
- Amongst different competitors (which includes the distributors, suppliers, producers etc.)
- With an aim to restrict competition in the market

The report tells that there are four categories of activities which have been categorized as hardcore activities : -

- Market allocation
- Bid rigging
- Price fixing
- Output restrictions

"Hard core cartels are the most egregious violations of competition law". The aim of leniency program is to detect these hard core cartels. If the informant cooperates with the Competition Commission of India (CCI), in return the leniency program grants a reduced penalty to the informant. This program helps the authorities to book a hard core cartel for violation of sec 3 of the Competition Act 2002 (Hereinafter termed as "Act") by avoiding the complex court proceedings and costs. However this program involves a lot of levels or we can say stages in context of India.

The act of Cartelization is that type of agreement which results into an adverse effect which is appreciable for market forces Skills involving investigation under Competition Act is a way different from skill needed to detect the cartels. For detection of cartels specialised skills are in demand.

The purpose of this research article is to highlight the significance of a strong leniency provision which we are having under the Act. The Competition Commission of India (CCI) is authorised to grant leniency in penalty under section 46 of the Act in case when a member of a cartel reveals its existence before the Director General submits its investigation report regarding this to the CCI. Section 19 of the Act, says that the CCI is empowered to inquire into the cartel on basis of information received by any third party or a member of a cartel or suo motto or on reference by the state or central government. To ensure that the information provided to the CCI is not false, the Competition Act prescribes for a hefty fee for furnishing the information with an aim to be entertained by CCI.

The leniency programme of different competition authorities are more or less based on the same policy with having similar purposes depending upon the varied market structure of different countries. With the advent of leniency program firstly in USA, it expanded across the globe with almost the similar structure with certain geographical or commercial reservations.

The importance of this program is in keeping a track on the cartels prevalent in the markets. Competition Commission of India is authorised to impose reduced fine if the member of a cartel discloses about its involvement in anti competitive agreements as a cartel member. This disclosure must be made before the DG submits its investigation to CCI. Section 19 of the Act, empowers the CCI to inquire into the contravention of the provisions of this Act specially in sec 3(1) or Sec 4(1) on either on its own motion or on various grounds mentioned in Section 19 of the Act. This is a discretionary power with the CCI.

The Competition Commission of India (Lesser Penalty) Regulations, 2009 regulation 2, provides for the definition of an "applicant", who can file the lesser penalty application before CCI. Applicant as said is nothing but an "enterprise" which has been defined under sec 2 (h) of the Act. The Government has expanded the scope of an applicant and also included "Individuals" in addition to the enterprises, as an applicant, through the Competition Commission of India (Lesser Penalty) Regulations, 2009 (Amendment 2017)

Leniency Program in Indian Competition Law

The leniency under leniency scheme is provided to the disclosing member of a cartel. Under sec 46 the protection is given to the seller, service provider, distributor, producer etc. Who is a member of the cartel, if made a full and true disclosure in respect of the alleged violations of competition policy, the cartel of which the disclosing producers, sellers, distributors, traders or service providers are members, must have an allegation to violate the anti competitive provisions of the Act. This means the cartel is a subject of an anti competitive agreement.

Regulation 3 of Lesser Penalty Regulations provides for the conditions for applicants who are in search of the leniency under the leniency scheme under the Act. If the commission is not directing something contrary, the applicant seeking the leniency protection will no longer be a member to the cartel. It is also provisioned that the disclosure done by the applicant seeking lesser penalty must be vital information regarding the breach of sec 3(3) of the Act. It also provides for the furnishing of all documents, information and evidence, by the applicants, which is required by the commission. It also provides for the intention of the applicants disclosing information to be genuine and to give the full information continuously and expeditiously in the course of investigation as well as other proceedings before the commission. The commission under this regulation also bars the applicants in regards to the concealment, manipulation destruction or removal of the relevant documents. The relevancy is judged on the ground that how much these documents contribute in the establishment of the cartel. The failure of the applicants to comply with such conditions gives a freehand to the commission to use the evidence and

information given by the applicant as per the provisions mentioned in the Act. However these restrictions on the applicants are not exhaustive and they can be provided with further restrictions under sub regulation 3.

The regulations give the vast power to the commission in regards to the decision of monetary penalty which the commission shall exercise giving consideration to the quality of information given by the applicant, the stage at which the applicant turned up for disclosure, the evidence which the commission is already having. In "*Indian Railways for supply of Brushless DC Fans and other electrical items"* though Pyramid was the 1st applicant, the CCI did not give complete reduction in penalty due to the stage at which Pyramid had approached the CCI, i.e., after the investigation had commenced. This doesn't mean that the CCI is not inclined towards granting complete immunity from the penalty, but it depends upon the vitality of the information given and the stage when it was provided. In *re: Cartelization in respect of zinc carbon dry cell batteries market in India* This was the first time when CCI granted total exemption to the first applicant of leniency including its office bearers, as the investigation was because of the Panasonic's disclosure to the CCI even in "*Re: Anticompetitive conduct in the Dry-Cell Batteries Market in India"* after assessing the leniency application filed by the 1st applicant The CCI, granted a 100% reduction in penalty.

Regulation 3 is a condition precedent to Regulation 4 of the Lesser Penalty Regulations which provides for the granting of lesser penalty than the original penalty as per sec 27 (b) it also talks about the manner in which the commission decides the lesser penalty to be imposed to the applicants. The lesser penalty is not a right of the applicant hence an applicant under Regulation 4 after fulfilling the criteria under Regulation 3 may be granted the total reduction i.e up to or equal to one hundred percent, if he comes first for making a disclosure which is vital and through which the commission can form a prima facie opinion in regards to the existence of the cartel which is alleged to be in violation of section 3 of the Act. Secondly a hundred percent benefit of reduction in penalty may be given in a case when the applicant at first provides the commission a vital disclosure and submit evidence in favour of the violation of Section 3 of the Act with regards to an case where investigation is still going on and has not been completed. This is also a condition that the CCI has no sufficient proof to prove such violation when the leniency application is being filed. The total benefit of the leniency which means the benefit up to hundred percent will be provided if such benefit has not been provided to any other applicant at first in such matter. But this doesn't mean that the commission has no provision for any further applicant disclosing vital information. The commission prepares a priority list of the applicants whom the commission thinks to be fit for the lesser penalty benefits and provides the reduction in penalty accordingly. If for any further applicant subsequent to the first applicant, the commission thinks that the information furnished through evidence by him is of added value to whatever evidence the commission or the director general was having already and vital to identify the presence of a cartel which is in violation of section 3, may provide the benefit of lesser penalty. In Competition Commission of India (Lesser Penalty) Regulations, 2009 ('Lesser Penalty Regulations') the Lesser Penalty Regulation provides and fixes the total number of applicants who file the leniency application to seek lesser penalty and that was up to three applicants depending on what additional value the subsequent applicants add in the information given by the first applicant. Now the Competition Commission of India (Lesser Penalty) Regulations, 2009 ('Lesser Penalty Regulations') ('Amendment') 2017 broke the limit of number of applicants seeking immunity through this regulation and authorized CCI to accept the leniency application filed my more than three applicants who will be eligible for a maximum leniency of 30% depending on the additional value of their information.

The Amendment of 2017 kept the door open for more than three applicants to get the

benefit of leniency. This means even more than three applicants now can get immunity under this amended regulation of 2017 with a condition that the third and any further applicant will be eligible or a leniency up to thirty percent. This will prompt all members of a cartel to come forward for filing a leniency application. In *Nagrik Chetna Manch v. Fortified Security Solutions and others, the Competition Commission has granted leniency to more than three applicants.*

Logic Behind Leniency Programme

This leniency program is nothing but an incentive and encouragement to those members of a cartel who opt to share information with the commission regarding the anti competitive agreements entered into. In support of the provisions of the leniency scheme in the Act under section 46 which authorises CCI to award lesser penalty, the CCI brought the significant change in the Lesser penalty regulation of 2009 to The Lesser Penalty Amendment Regulations, 2017. The Regulations requires the enterprises who are applying for leniency to have an umbrella of sec 46 of the Act, to also furnish the details of all the individuals who are members are parts of such cartel, this enable the enterprises to seek immunity for their involved employees and former employees also. In case of *Re: Cartelisation in the supply of Electric Power Steering Systems (EPS Systems)* JTEKT/ JSAI was the second to approach the Commission as a Lesser Penalty applicant and had provided significant value addition in the matter, 50 percent reduction in penalty was granted to JTEKT/ JSAI and its individuals also.

The Competition Commission of India (Lesser Penalty) Regulations, 2009 (No. 4 of 2009) (the Lesser Penalty Regulations), was notified on 13th August 2009 as per the provisions mentioned in section 46 of the Competition Act 2002 (the Act), the manner and the magnitude to which the commission can reduce the penalties for the cartel members is prescribed in case they make the disclosures. These regulations introduced by the Competition Commission of India to have a manner and extent to which it can grant leniency in the penalties to the applicants who make the disclosure about the existence of the cartel they belong to as per the provisions provided by this regulations. The gravity of the cartelization is evident by the fact that under sec 27 of the Competition Act 2002, if after the inquiry the CCI finds that any agreement refereed in Sec 3 is in violation of section 3.

Penalty Provisions For Cartels Under The Competition Act 2002

The formation of cartel is the heinous offence under the Act and this formation makes the CCI to start inquiry order to impose penalty. Section 27 of the Act, empowers the CCI to award a penalty of up to three times the profit of each year earned by the sellers distributors producers service providers etc. By being involved in a the cartel, which entered into those anti competitive agreements prohibited under section 3 or a penalty up to ten percent of its each year's turnover(Till the agreement continues) whichever is higher.

In addition, the Commission also enjoys passing of any or all of the following orders:

- To direct the enterprises involved to modify the agreement entered.
- To direct the parties of such agreement forming a cartel to discontinue with such agreement and restricts them from entering into such agreement in future.
- To direct the enterprises to respect the orders of the commission which it may pass and abide by the rules if any.
- To pass any other directions or orders which the CCI deems fit.

Leniency Program and its Effects

For fighting with the cartels the world has developed the specific tools which involve the market studies, tracking the individuals involved, the groups negotiating with the competition authorities. The leniency program is a tool which allures the persons involved by promising leniency to them in case of penalties.

This program is basically a way to detect the cartels by providing them immunities from fines and penalties in return of their disclosure about the existence of the cartel of which they are a part.

According to International Competition Network, *"Leniency is a generic term to describe a system of partial or total exoneration from the penalties that would otherwise be applicable to a cartel member, who reports its cartel membership to a competition enforcement agency"*. Under section 27 of the competition Act, the CCI has a power to impose a penalty of up to three times the profit of each year earned by the sellers distributors producers service providers etc. By being involved in a the cartel which entered into such anti competitive agreement prohibited under section 3 or a penalty up to ten percent of its each year's turnover(Till the agreement continues) whichever is higher.

The success of leniency program is evident by the fact that the applications filed under the leniency program are in such a huge number which became a reason for revealing a lot of cartels.

Section 46 of the Indian competition Act says that if any member as named in the section of the cartel has violated section 3 of the Act but made the true disclosure of the act of violation by the cartel of which he is a member, the commission has a discretionary power to impose upon such member a lesser penalty as it may deem fit, but this provision of lesser penalty under sec 46 is applicable only to those cases where the report of investigation directed under section 26 has not been received before making of such disclosure.

Framework of Leniency Program

The source of the leniency scheme of the Competition Commission of India is sec 46 of The Competition Act 2002 which provides benefits to enterprises and individuals in return of their reporting about the existence of the cartel of which they are members. The Competition Commission of India (Lesser penalty) Regulations, 2009, Regulation 4 provides that CCI can give the benefit of leniency in the penalty up to 100% if the informant enable the CCI to form a prima facie opinion regarding the exercise of the cartel, by making a vital disclosure at first, by submitting the evidence of the existence of cartel. In the same way the informant who stands second in the priority list can be given the reduction in the monetary penalty up to 50% and similarly the informant who is in the third position in the priority list can get a reduction up to 30% in the penalty. But in order to obtain this position (marker) applicant/informant must be ceased to be the participant in the cartel further unless the commission directs for a certain purpose. Now the new amendment in lesser penalty regulations allowed CCI to consider the applications of even more than 3 applicants for the immunity depending on the relevancy of their information and the addition which they do in the already given evidence and information . "*Cooperate genuinely, fully, continuously and expeditiously all through the investigation and other proceedings before the commission; and not conceal, destroy manipulate or remove the relevant documents in any manner that may contribute to the establishment of a cartel"* The informant in order to take the benefit of the leniency provision is obliged to give all relevant evidences regarding the violation of sec 3 of the Competition Act 2002 with true and complete disclosure. In *Nagrik Chetna Manch v. Fortified Security Solutions and others*, the CCI extended the benefit of lenient treatment to four of the six cartelists, even though all six had applied for leniency

Filing of a Leniency Application

As per the report (February 2004) of US Department of Justice (DOJ) it was reflected that the rate of filing leniency application was one application per year in 1993 which was raised to one application per month. .

The reformation of EU leniency program also became a reason of the increased number of the filing of leniency application in EU. With the advent of leniency provision in EU in 1996 till following six years almost eighty leniency applications were filed.

The time limit to file the leniency application under Indian provisions has been extended under the *Amended Lesser Penalty Regulation 2017*. Now the leniency applicant as per the emended provisions have a 15 days time to file application, from the date it receives the notice from the Competition Commission of India to mark their status (Priority).

It is advisable that companies should inform the prevalence of a cartel immediately after its detection. It must be noted before filing the leniency application that the person applying for it must have the vital information regarding the existence of a cartel which can facilitate CCI to form a prima facie opinion regarding the existence and hence the leniency can be claimed then.

When there is an obligation on the applicant to have the vital evidence regarding the cartelization it includes two concerns:

- How to assess the sufficiency of the evidence provided by the leniency applicant to the satisfaction of the CCI basing which it can form a prima facie opinion.
- What is the option available for the applicant or the member/members of a cartel when it fails on the ground of sufficiency of the evidence and it cannot satisfy the CCI with its evidence submission regarding the existence of a cartel.

In the *Tyre Cartel Case* and the *Deutsche Bank case* the CCI based on its principle of "beyond reasonable doubt standard" stressed on the unequivocal establishment of the existence of the agreement. The principle says that the CCI initiates its enforcement exercise, adopting the standard which is "beyond reasonable doubt". While in the *Shoe cartel case*and the *Soda Ash Cartel Case* the CCI opined that the standard of proof is on the "balance of probabilities" for establishing the existence of cartel.

We don't have any clear instruction or guidelines with regards to the level of evidence which is needed to CCI for forming a prima facie opinion. So in this regard we rely on some international practices to come to a conclusion as to what should be the level of an evidence to bring it in the satisfaction of the CCI to form an opinion. The same happened in *Re: Cartelization by broadcasting service providers* where the 2nd applicant added value to the investigation, made vital disclosures, but as it did not help CCI to form an opinion it was awarded 30% reduction in penalty.

Generally when the cartel doesn't leave any direct evidence of its existence and is sustainable, without having a fear of being detected, it is a demand that the CCI gives stress on circumstantial evidence.

Agreement: nature of evidence

It is the intrinsic nature of the cartel that they generally don't leave any evidence for their presence this evidence can be construed in a direct sense and this leads CCI to have this opinion that the direct evidence is not necessary to prove the existence of a cartel or the presence of an agreement. Hence CCI give importance of the circumstantial evidence to find out and decide the existence of a cartel. This circumstantial evidence can be both the conduct based evidence or the circumstantial evidence in *Alleged cartelization in flashlight market in India* even after the conformity about the commercial sensitive information exchange between the alleged members, the existence of a cartel could not be proved because of the lack of cogent evidence.

CCI takes care of these evidences while carrying the inquires for the existence of a cartel. While in case ofthe conduct based evidence the CCI relies on similar or identical bidding prices, meeting between competitors, records and history of the cartelization and sharing of information, trade association membership is also one of the most important conduct based evidence relied by the CCI.

Concern on Confidentiality of Leniency Application

A leniency application is treated as a secret or we must say confidential between the party making the disclosure and the CCI till the pendency of the proceeding before CCI but

the final orders of the CCI are the public orders and in its order it grants the leniency to the applicant who are in compliance with the Competition Commission Of India (Lesser Penalty) Regulations, 2009 and helped CCI by disclosing the violation and giving evidence. Regulation 6 of Competition Commission Of India (Lesser Penalty) Regulations, 2009 if the applicant has consented towards the disclosure in within or does a public disclosure in such a case the confidentiality is not protected by the CCI.

Confidentiality

Showing a departure from the nature of the confidentiality clause mentioned in Regulation 6 of the Competition Commission Of India (Lesser Penalty) Regulations, 2009 , Regulation 35 of the competition Commission of India general regulations 2009 says that the CCI under regulation 35 has the discretionary power to grant confidential status to the informant who disclosed the cartel information and the information given by him during the course of investigation. While regulation 6 of Competition Commission Of India (Lesser Penalty) Regulations, 2009 makes it obligatory for the CCI to grant the confidentiality treatment to the identity of the leniency applicant and the information provided by him.

The reason behind maintaining the confidentiality of the identity of the informant and the vital information disclosure is to make the disclosure risk free and frequent affairs as to detect the more and more cartel.

Secondly the confidentiality is maintained to protect the leniency applicant and encourage them to have more and more disclosures without involving any risk of being public. The confidentiality clause has the objective towards the protection of the interest of the information giver or the leniency applicant as well as speedy and frequent detection of cartels. This confidentiality clause also puts the leniency cartelist in a better position than the non-leniency cartelists.

However, as per the provisions of lesser penalty regulation (Amendment) 2017, If the Director General thinks that the disclosure of the documents or evidence or information is indispensible for investigation then he is allowed to disclose these to the parties to proceedings. The consent of the leniency applicant is not a condition precedent to this. But this disclosure will be done with the permission of CCI and with the written recorded reason.

The question now arises that why do we have lack of leniency pleas? The research suggests that the leniency can be granted if the information given to the CCI is vital and the discretion is with the commission to decide it. It creates an uncertainty towards the grant of leniency .secondly the members of the cartel think that the risk of detection of the cartel is very low so why to opt for the leniency pleas. Separately, there has been a lot of media reporting about the approaching of an alleged cartel to CCI which raised concerns about the confidentiality of the members of the cartel disclosing vital information and put a question mark on the leniency effectiveness of the CCI.

In the words of the European Competition Commissioner (speech: "The First Hundred Days", NeelieKroes, International Forum on European Competition Law, Brussels, April 07, 2005, SPEECH/05/205): "Cartels attack free markets at their very hearts. They don't just mess up the grass on a level playing field – they blow great holes out of the surface. And it is consumers who are asked over and over again to pay the price of replacing the turf."

Conclusion

The harm of the consumer which is must be proved in the court of law to have a locus for initiating proceedings under the competition law . This is the main objective of the competition law to protect the consumers form the anti competitive activities going on in the market.

The leniency program in the competition act is well mentioned in the competition Laws of India but its well implementation is still in doubt. The applications in India under the leniency program are very less as compared

to other countries. However the introduction of the amended regulations is proving itself phenomenal in creating a sense of larger security to the enterprises and individuals coming to disclose the information.

The number of applications filed under leniency program in Europe are greater in number than India. For destabilizing the cartels the people must be encouraged to report such cartelization and its existence to the competition authorities and this is a duty of the CCI and the authorities to make the disclosure procedure and post disclosure effects more congenial to the informant, to make the leniency program more effective and secured for the informant. Persons coming for remedy under this provision are very few and we can say it in a nascent stage.

I think there is a need to amend sec 46 of the Competition Act 2002 to the level that, the discretionary power of the CCI should be tightened and the satisfaction level of the CCI on the information received should be certain. The level on which the commission satisfies with the information should be made closer to, and encouraging for, the informant, otherwise it leads to the discouragement of the informant in disclosing the information. The immunity under this provision must be absolute and should not be compromised. There should be more protection for the person disclosing the information in this regards.

Under the European law, the community courts are increasingly required to examine the value of evidence in the context of leniency in order to assess whether an applicant should have been granted a greater reduction.

Cartel is not a very generic term and concept hence there is also a necessity to make aware of different business houses regarding the concept of cartels and make all possible ambience discouraging the cartelization.

The leniency scheme in India is not too new to be well implemented but still it is not being late to have reformative measures. It can have a way to frequent cartel detection if the confidentiality clause is well noticed and the person making disclosure thinks himself protected disclosing the information this issue must be in the note of CCI and secondly CCI should be more active on its detection mechanism so as to expedite its search and seizure.

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SOLUTION OF USING Q- DIFFERENCE EQUATION

[1]Brightlin. D and [2]Dominic Babu. G
[1,2]P.G and Research Department of Mathematics, Annai Vellankanni College, Tholayavattam, Kanyakumari District, Tamil Nadu
Affiliated to Manonmaniam Sundaranar University (Reg.No:19213012092007)
[1]brightlin629156@gmail.com and [2]dominicbabu202@gmail.com

ABSTRACT

The main objective of this paper we derive formula for t-series to polynomials and polynomial factorials by finding the numerical and closed form solutions of the q-difference equation. Also we obtain the q difference operator and generalized the difference equation. Suitable examples and provided to illustrate the main results.

Keywords: *Generalized difference operator, closed form solution, Numerical solution, q-difference equations.*
AMS Classification: *46B08, 39A10, 39A70.*

1. Introduction

In this chapter, we define q-difference operator Δ_q and present some significant results on the inverse of the q-difference operator of the t^{th} order using generalized polynomial factorial. Also we derive the numerical and closed form solutions of the q-difference equation

$\Delta_q^t v(e^k) = u(e^k), e^k \in (0,\infty)$ and $q \neq 1$ (1)

Suitable numerical examples are provided to illustrate main results. In this chapter, we denote

$$\Delta_q^{-1}u(e^k) - \Delta_q^{-1}u\left(\frac{e^k}{q^m}\right) = \Delta_q^{-1}u(e^k)\left|\begin{matrix} e^k \\ \frac{e^k}{q^m}\end{matrix}\right.$$

$$\Delta_q^{-1}\left(\dots\dots\Delta_q^{-1}\left(\Delta_q^{-1}u(e^k)\left|\begin{matrix} e^k \\ \frac{e^k}{q^m}\end{matrix}\right.\right)\left|\begin{matrix} e^k \\ \frac{e^k}{q^m}\end{matrix}\right.\dots\dots\right)\left|\begin{matrix} e^k \\ \frac{e^k}{q^m}\end{matrix}\right. = \Delta_q^{-t}u(e^k)\left\|\begin{matrix} e^k \\ \frac{e^k}{q^m}\end{matrix}\right.$$

2. Q-Difference Operator

In this section, we present some basic definitions and preliminary results which will be used for the subsequent discussion. Let $1 \neq q \in (0,\infty)$ and the variable $e^k \in (o,\infty)$.

Definition 2.1:

Let $v(e^k)$ be a real valued function on $[0,\infty)$ and $1 \neq q$ be a fixed real number. Then the q-difference operator, denoted byΔ_q, on $u(e^k)$ is defined as

$$\Delta_q v(e^k) = v(qe^k) - v(e^k), \quad q \neq 1. \quad (2)$$

And the inverse Δ_q^{-1} of the q-difference operator is defined as

$$\text{if } \Delta_q v(e^k) = u(e^k), \text{ then } v(e^k) = \Delta_q^{-1}u(e^k). \quad (3)$$

The inverse of second order q-difference operator is defined by $\Delta_q^{-2} = \Delta_q^{-1}(\Delta_q^{-1})$. In general, the inverse of t^{th} order q-difference operator is defined by $\Delta_q^{-t} = \Delta_q^{-1}\left(\Delta_q^{(t-1)}\right)$.

Lemma: 2.2

If a_1 and a_2 are non-zero real numbers, $u(e^k)$ and $v(e^k)$ are real valued function defined on $[0,\infty)$ then we have

$$\Delta_q\left(a_1u(e^k) + a_2v(e^k)\right) = a_1\Delta_q u(e^k) + a_2\Delta_q v(e^k)$$

Proof:

$$\Delta_q\left(a_1u(e^k) + a_2v(e^k)\right) = \Delta_q a_1u(e^k) + \Delta_q a_2v(e^k)$$

$$= a_1u(qe^k) - a_1u(e^k) + a_2v(qe^k) - a_2v(e^k)$$

$$= a_1[u(qe^k) - u(e^k)] + a_2[v(qe^k) - v(e^k)]$$
$$= a_1\Delta_q u(e^k) + a_2\Delta_q v(e^k)$$

$$\therefore \Delta_q\left(a_1u(e^k) + a_2v(e^k)\right) = a_1\Delta_q u(e^k) + a_2\Delta_q v(e^k)$$

3. Q-Summations Formula

In this section we obtain finite summation formula for generalized q-difference equation (2.1) and formula for infinite series is also extended from finite summation formula.

Theorem: 3.1

For $1 \neq q \in (0, \infty)$, we have

$$\Delta_q^{-1}u(e^k)\left|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right. = \sum_{r=1}^{m} u\left(\frac{e^k}{q^r}\right) \quad (4)$$

and Hance $\Delta_q^{-t}u(e^k)\left\|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right.$

$$= \sum_{(r)_{1\to t}}^{m} u\left(\frac{e^k}{\prod_{j=1}^{t} q^{r_j}}\right)$$

Proof:

By Definition (2.1) we have

$$\Delta_q v(e^k) = v(qe^k) - v(e^k)$$

By (2.3), taking $\Delta_q v(e^k) = u(e^k)$ *and* $v(e^k) = \Delta_q^{-1}u(e^k)$

We arrive $v(qe^k) = u(e^k) + v(e^k)$

Replace e^k *by* $\frac{e^k}{q}$, *we get*

$$v(e^k) = u\left(\frac{e^k}{q}\right) + v\left(\frac{e^k}{q}\right) (5)$$

Again replacing e^k *by* $\frac{e^k}{q}$ in (5), we get

$$v\left(\frac{e^k}{q}\right) = u\left(\frac{e^k}{q^2}\right) + v\left(\frac{e^k}{q^2}\right) (6)$$

Substituting (.6) in (5), we get

$$v(e^k) = u\left(\frac{e^k}{q}\right) + u\left(\frac{e^k}{q^2}\right) + v\left(\frac{e^k}{q^2}\right) (7)$$

Putting $\Delta_q^{-1}u\left(\frac{e^k}{q^m}\right) = v\left(\frac{e^k}{q^m}\right)$, *replacing* e^k *by* $\frac{e^k}{q}, \frac{e^k}{q^2}, \ldots, \frac{e^k}{q^{m-1}}$ *in* (6)

Repeatedly and substituting all resultant expressions in (7), we get (4)

Again operating Δ_q^{-1} on (4), we get

$$\Delta_q^{-1}\left(\Delta_q^{-1}u(e^k)\left|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right.\right)\left|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right. = \Delta_q^{-1}\left[\sum_{r=1}^{m} u\left(\frac{e^k}{q^r}\right)\right]\left|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right.$$

$$\Delta_q^{-2}u(e^k)\left\|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right. = \sum_{r_2=1}^{m}\sum_{r_1=1}^{m} u\left(\frac{e^k}{q^{r_1+r_2}}\right)$$

Continuing this process (t-2) times we get

$$\Delta_q^{-t}u(e^k)\left\|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right. = \sum_{(r)_{1\to t}}^{m} u\left(\frac{e^k}{\prod_{j=1}^{t} q^{r_j}}\right)$$

Theorem: 3.2

Let $t \in N(1), u(e^k) = (e^k)^n$ *and* $e^k \in [0, \infty)$. Then the Numerical Solution of (1)

$$\Delta_q^{-t}(e^k)^n\left\|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right. = \sum_{(r)_{1\to t}}^{m}\left(\frac{e^k}{\prod_{j=1}^{t} q^{r_j}}\right)^n \quad (8)$$

Proof:

The proof follows by replacing $u(k)$*by* k^n *in Theorem* (3.1).

Theorem: 3.3

Let n$\in N(1)$ *and* $u(e^k) = e^{k^n}$, then equation (1) has a closed form solution

$$\Delta_q^{-t}(e^k)^n\left\|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right. = \frac{1}{(q^n-1)^t}\left(1 - \frac{1}{q^{mn}}\right)^t (e^k)^n\left|\begin{matrix}e^k\\ \frac{e^k}{q^m}\end{matrix}\right. \quad (9)$$

Proof:

By Definition 2.1, we get

$$\Delta_q(e^k)^n = (qe^k)^n - (e^k)^n$$
$$= (q^n - 1)(e^k)^n$$

Using (2.3) and applying the limits, we arrive

$$\Delta_q^{-1}(e^k)^n \left\| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right. = \frac{1}{(q^n-1)}\left(1-\frac{1}{q^{mn}}\right)(e^k)^n$$

Again operating Δ_q^{-1} on both sides, we obtain

$$\Delta_q^{-1}\left[\Delta_q^{-1}(e^k)^n \left\| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right.\right] = \Delta_q^{-1}\left\{\frac{1}{(q^n-1)}\left(1-\frac{1}{q^{mn}}\right)(e^k)^n\right\}$$

$$\Delta_q^{-2}(e^k)^n \left\| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right. = \frac{1}{(q^n-1)^2}\left(1-\frac{1}{q^{mn}}\right)^2(e^k)^n$$

Continuing this process (t-2) times, we get

$$\Delta_q^{-t}(e^k)^n \left\| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right. = \frac{1}{(q^n-1)^t}\left(1-\frac{1}{q^{mn}}\right)^t(e^k)^n \left| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right.$$

Theorem: 3.4

Let $u(e^k) = e^{k^n}$ $e^k \in [0,\infty)$ *and* $1 \neq q$. Then a closed form of the q-difference equation (2.1) is given by

$$\sum_{(r)_{1\to t}}^{m} u\left(\frac{e^k}{\prod_{j=1}^{t} q^{r_j}}\right)^n = \frac{1}{(q^n-1)^t}\left(1-\frac{1}{q^{mn}}\right)^t(e^k)^n \left| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right. \quad (10)$$

Proof:

Equating the equation (8) and (9).

$$\Delta_q^{-t}(e^k)^n \left\| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right. - \sum_{(r)_{1\to t}}^{m}\left(\frac{e^k}{\prod_{j=1}^{t} q^{r_j}}\right)^n = \Delta_q^{-t}(e^k)^n \left\| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right. - \frac{1}{(q^n-1)^t}\left(1-\frac{1}{q^{mn}}\right)^t(e^k)^n \left| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right.$$

$$\therefore \sum_{(r)_{1\to t}}^{m} u\left(\frac{e^k}{\prod_{j=1}^{t} q^{r_j}}\right)^n = \frac{1}{(q^n-1)^t}\left(1-\frac{1}{q^{mn}}\right)^t(e^k)^n \left| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right.$$

Example: 3.5

Taking t=2, k=3, q=2, m=2 and n=2

Solution:

Substitute these values in (10)

$$\sum_{(r)_{1\to t}}^{m} u\left(\frac{e^k}{\prod_{j=1}^{t} q^{r_j}}\right)^n = \sum_{(r)_{1\to 2}}^{2} u\left(\frac{e^3}{\prod_{j=1}^{t} 2^{r_j}}\right)^2$$

$$\sum_{r_1=1}^{2}\sum_{r_2=1}^{2}\left(\frac{e^3}{2^{r_1+r_2}}\right) = \sum_{r_1=1}^{2}\left\{\left(\frac{e^3}{2^{r_1+1}}\right)^2 + \frac{e^3}{2^{r_1+2}}\right\}$$

$$= \left(\frac{e^3}{2^{1+1}}\right)^2 + \left(\frac{e^3}{2^{1+2}}\right)^2 + \left(\frac{e^3}{2^{2+1}}\right)^2 + \left(\frac{e^3}{2^{2+2}}\right)^2$$

$$= 39.397$$

$$\frac{1}{(q^n-1)^t}\left(1-\frac{1}{q^{mn}}\right)^{t-1}(e^k)^n \left| \begin{matrix} e^k \\ \frac{e^k}{q^m} \end{matrix} \right. = \frac{1}{(2^2-1)^2}\left(1-\frac{1}{2^{2(2)}}\right)^2(e^3)^2 \left| \begin{matrix} 20.0855 \\ 5.0213 \end{matrix} \right.$$

$$= \frac{1}{(4-1)^2}\left(1-\frac{1}{2^4}\right)^2(e^3)^2$$

$$= 39.397$$

Theorem: 3.6

Let $u(e^k) = \frac{1}{e^{k^n}}$, $e^k \in (0,\infty)$ and $n, t \in N(1)$. Then a numerical solution of the q difference equation (1) is

$$\Delta_q^{-t} \frac{1}{e^{k^n}} \begin{vmatrix} e^k \\ \frac{e^k}{q^m} \end{vmatrix} = \sum_{(r)_{1\to t}}^{m} \left(\frac{\prod_{j=1}^{t} q^{r_j}}{e^k} \right)^n \quad (11)$$

Closed form solution on is

$$\Delta_q^{-t} \frac{1}{e^{k^n}} \begin{vmatrix} e^k \\ \frac{e^k}{q^m} \end{vmatrix} = \frac{q^{nt}}{(1-q^n)^t} (1 - q^n)^{t-1} \frac{1}{e^{k^n}} \begin{vmatrix} e^k \\ \frac{e^k}{q^m} \end{vmatrix} \quad (12)$$

And hence,

$$\sum_{(r)_{1\to t}}^{m} \left(\frac{\prod_{j=1}^{t} q^{r_j}}{e^k} \right)^n = \frac{q^{nt}}{(1-q^n)^t} (1 - q^n)^{t-1} \left(\frac{1}{e^{k^n}} \right) \begin{vmatrix} e^k \\ \frac{e^k}{q^m} \end{vmatrix} \quad (13)$$

Proof: The proof eqn(11) follows by replacing $u(e^k)\ by\ \frac{1}{e^{k^n}}$ in theorem (3.1)

By definition 2.1 we find that,

$$\Delta_q \left(\frac{1}{e^{k^n}} \right) = \frac{1}{(e^k)^n} - \frac{1}{e^{k^n}} = \left(\frac{1-q^n}{q^n} \right) \frac{1}{e^{k^n}}$$

Using 2.3 we find that,

$$\Delta_q^{-t} \frac{1}{e^{k^n}} \begin{vmatrix} e^k \\ \frac{e^k}{q^m} \end{vmatrix} = q^n \left(\frac{1-q^{mn}}{1-q^n} \right) \frac{1}{e^{k^n}}$$

Again operating Δ_q^{-t} on both sides we get.

$$\Delta_q^{-t} \frac{1}{e^{k^n}} \begin{vmatrix} e^k \\ \frac{e^k}{q^m} \end{vmatrix} = q^{2n} \left(\frac{1-q^{mn}}{1-q^n} \right) \frac{1}{e^{k^n}} \quad (14)$$

Hence the proof of (12) follows by operating $\Delta_q^{-t}(t-2)$ times on (14)

$$\sum_{(r)_{1\to t}}^{m} \left(\frac{\prod_{j=1}^{t} q^{r_j}}{e^k} \right)^n = \frac{q^{nt}}{(1-q^n)^t} (1 - q^n)^{t-1} \left(\frac{1}{e^{k^n}} \right) \begin{vmatrix} e^k \\ \frac{e^k}{q^m} \end{vmatrix}$$

Hence the proof.

Conclusion

In this paper solution of using q –difference equations Δq are introduced and formulas for sum of t-series of terms of multi series summation are derived. Also we derived some theorems and example.

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MENTAL HEALTH OF NURSES IN PUBLIC AND PRIVATE SECTOR

H. Sylaja and Remya Chitran
Department of Psychology, Sree Sankaracharya University of Sanskrit Kalady Ernakulam, Kerala

ABSTRACT

The present study was to examine mental health of nurses in public and private sectors. The sample for the present study consisted of 210 number of professional nurses working in government or private hospitals from Thrissur and Ernakulum district in the state of Kerala. The subjects were randomly selected from five hospitals. Standardized mental health scale and socio demographic questionnaire used to collect data. Result was discussed using percentages and t -test. Result indicates that the nurses working in public sector are comparatively higher mental health to private sector. It can be noted that the nature and risk of working in causality, intensive care unit and night shifts are the causes of work pressure, especially in private sector.

Keywords: *Nurses, mental health.*

Introduction

The word nursing is derived from the Latin word "nutrire", meaning to "nourish". Nursing is the protection, promotion, and optimization of health and abilities, prevention of illness and injury, alleviation of suffering through the diagnosis and treatment of human response, and advocacy in the care of individuals, families, communities, and population (ANA, 2010). Contemporary nursing practice requires a combination of intellectual achievement, ethical stands, scientific knowledge, technological skills and personal compassion. Gradually, over the centuries these elements have evolved and blended together. During this evolutionary process, nursing practice has been influenced by external factors such as economics, religion, politics, scientific advances, wars and changing life style. Nursing has been called the oldest of the arts and the youngest of the professions. The history of nursing has been that of frustration, ignorance, and misunderstanding. The history of nursing is described as an episode in the history of woman.

Mental health is an important factor in personal or work life. Mental health is defined as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community. The positive dimension of mental health is stressed in WHO's definition of health as contained in its constitution: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. WHO (2011).

Health is undoubtedly, an indispensible quality in a human being. The growth of science, technology, and materialistic predominance, and hazards and complexities of social life have caused a marked determination in mental health of the people in modern societies. The concept of mental health has been vaguely defined by psychologist and psychiatrists. It is very difficult to determine the cut point of mental health and mental illness. Before the second half of the twentieth century, mental health was considered as the absence of mental disease. Conrad (1952) attempted to differentiate the positive from non health and negative health. To her, "positive health's consists in way of living that is beyond the frontiers of more social existence implied by negative health. This category (positive health) applies when there is evidence that the individual fully utilizes a capacity or is working in that direction".

Need and significance of the study

Nursing is one of the most promising professions open to women. Due to rapid industrialization and globalization, Indian culture also is changing, the need to care for a sick or disabled person in every family. Long term or chronic illness often presents many problems. Hence, nursing care is very essential in our situation. Nursing is profession within the health care of sector focused on the care of

individuals, families, and communities so they may attain, maintain, or recover optimal health and quality of life. Today's nurses locally and globally are facing certain complex challenging environment on account of living in a culturally diverse and dynamic world work relationships between management and staff , and between and among peers of different nationalities can be positive or negative influence in the work place. If there is a hostile and threatening behavior between management and staff and unfriendly and isolating work relationship between and among peers, then these can affect a negative influence in the work environment. This negative must be cleared away positively to maintain harmonious and pleasant work atmosphere to support a stable and solid workforce.

Objectives

To find out whether there are significant differences in nurses working under government or private sector in various dimensions of mental health.

Hypothesis

There will be significant differences between nurses working under government and private sector in various dimensions of mental health.

METHODS

Sample

The sample for this study consisted of 210 number of professional nurses working in government and private hospitals from Ernakulam and Thrissur districts, in the state of Kerala.

Tools

Mental health scale

Mental health scale was constructed by P.Gireesan & Dr. H. Sam Sanand Raj (1988). The items are given both in English and Malayalam language. The test is primarily meant for adults. In the present study mental health means the scores obtained in six areas of mental health, namely attitude towards self, self-actualization, integration, autonomy, perception of reality and environmental mastery.

General Data Questionnaire.

The personal and demographic details of the subjects have been collected using general data questionnaire.

Procedure

The tools were administered individually to the subjects selected for the study. The response sheets were scored as per the instructions given in the manual. A consolidated data sheet were prepared and the same have used for analysis with the help of computer facilities.

RESULT AND DISCUSSION.

The details of the results obtained for the present study are shown in Tables.

Table 1. Means, SDs and 't' value obtained by nurses working in government and private sector in different dimensions of mental health.

Variables	Mean Private(N=192)	government(N=18)	SD		't'
Attitude towards self	40.32	41.72	4.723	5.027	1.196
Self-actualization	43.78	44.22	5.875	6.865	.304
Integration	43.56	43.83	5.552	7.793	.194
Autonomy	41.35	44.50	4.915	6.819	2.508 *
Perception of reality	43.90	43.44	5.726	6.827	.318
Environmental mastery	42.78	43.33	6.358	6.535	.355
Mental health total	255.60	261.06	24.140	33.012	.886

*Significant at 0.05 level

Table 1 shows the means, standard deviation and the 't' value in the six dimensions of mental health namely attitude towards self, self actualization, integration, autonomy, perception of reality, environmental mastery and overall mental health of government and private sector nurses'.

The mean and standard deviation of attitude towards self of private sector nurses' are 40.32 and 4.723 respectively and that of government nurses' are 41.72 and 5.027 respectively. The obtained' value is 1.196 which is statistically not significant.

Pillai. R, (2009) found that nurses in the private sector were also significantly more satisfied with all factors of their work than their colleagues in the public sector there were no relation between year of experience and mental health.

The mean and standard deviation of self-actualization of private sector nurses' are 43.78 and 5.875 respectively and that of government sector nurses' are 44.22 and 6.865 respectively. The obtained 't' value is .304 which is statistically not significant

The mean and standard deviation of integration of private sector nurses' are 43.56 and 5.552 respectively and that of government nurses' are 43.83 and 7.793 respectively. The obtained 't' value is .194 which is statistically not significant

The mean and standard deviation of autonomy of private sector nurses' are 41.35 and 4.915 respectively and that of male nurses' are 44.50 and 6.819 respectively. The obtained 't' value is 2.508 which is statistically significant at 0.05 level. Which means private nurses' and government nurses are significant differences obtain the mental health dimension of autonomy. The government sector nurses have comparatively high score than that of private sector nurses'.

The mean and standard deviation of perception of reality private sector nurses' are 43.90 and 5.726 respectively and that of government sector nurses' are 43.44 and 5.726 respectively. The obtained 't' value is .318 which is statistically not significant

The mean and standard deviation of environmental mastery private sector nurses' are 42.78 and 6.358 respectively and that of government sector nurses' are 43.33 and 6.535 respectively. The obtained 't' value is .355 which is statistically not significant.

The mean and standard deviation in overall mental health of private sector nurses' are 255.60 and 24.140 respectively and government sector nurses' are 261.06 and 33.012 respectively. The obtained 't' value is .886 which is statistically not significant.

From the table, it can be seen that there is no significant difference in the mean scores obtained by the private and government sector nurses' in most of the mental health dimensions, but one dimension of autonomy (which means right of self government) score higher than that of government sector nurses'. Although there is no significant difference in the mean score of overall mental health, we can see that government sector nurses' score little higher than the private sector nurses'.

Yvonne Brunetto, Y., Farr-Wharton., & Shacklock, K. (2011)conduct a study result shows that supervisor-nurse relationships affect nurses' perceptions of teamwork, role ambiguity and wellbeing, although the association is different for public sector compared with private sector nurses. However, of the two groups, private sector nurses were the most satisfied with their supervisor-nurse relationship and teamwork, and had higher perceived levels of both role clarity (instead of role ambiguity) and consequent wellbeing. Were the most satisfied with their supervisor-nurse relationship and teamwork, and had higher perceived levels of both role clarity (instead of role ambiguity) and consequent wellbeing.

Conclusion

In the variables attitude towards self, self-actualization, integration, perception of reality and environmental mastery of nurses in public sector have no significant differ from private sector. But in the sub scale of autonomy result shows that public sector differs significantly from private sector. Many government and private hospital organization are carrying out many vocational training programme for improving the mental health of nurses. Training courses such as life skill development and community welfare programs would enable them to adjust with their surroundings, and be self sufficient and mentally healthy. When people are psychologically empowered there will changes in their attitude, cognition and behavior, which most assuredly will lead to a positive change in value orientation, improved self-esteem, self efficacy, self-consciousness as well as better psychological well-being which in turn, will help for the development of nurses and a peaceful society.

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CHARACTERIZATION AND ANALYSIS OF BACKGROUND NOISE

Shivani Mishra
C.E.O., Aspexx Health Solutions Private Limited, Greater Noida

BP Mishra
JSS Academy of Technical Education, Noida

ABSTRACT

In this paper, authors investigate estimation and characterization of speech parameters which can be used for background noise classification and mainly presents a criterion to group a large range of noise into a reduced set of classes of noise with similar speech characteristics along with a set of robust acoustic parameters. Background noise fall into two main categories, which are environmental noise and mechanical noise [7]. One hundred noises were downloaded on internet from website www.partnersinrhyme.com with the help of a microphone connected to personal computer & stored in memory as a noise database. User defined program was written in MATLAB for Mel Frequency Cepstral coefficient (MFCC) while built-in programs for Linear predictive coding (LPC), Real cepstral parameter (RCEP) and power spectrum have been explored in MATLAB to estimate speech parameters which may be utilized for speech analysis through any one of the soft computing techniques viz. neural networks, fuzzy logic, genetic algorithms or a combination of these. Twenty five samples each of four commonly encountered noises (s2car1-s2car25, s3office1-s3office25, s4market1-s4marke25 & s5train1s5train25) i.e. 100 noises in total have been considered in our study for estimation of three coefficients viz. Mel Frequency Cepstral coefficient, Linear predictive coding and real cepstral parameter. Our experimental results show that Mel Frequency Cepstral Frequencies are robust features in noise parameter estimation. 27 filter banks were used and filter bank output along with power spectrum was obtained in MATLAB. By trial & error method, it was found that the best result was obtained at maximum difference of 0.182 when average of second highest & third highest MFCC coefficients was taken.

Index Terms: *Mel Frequency Cepstral Coefficient (MFCC), Linear Predictive Coding (LPC), Real Cepstral Parameter (RCEP).*

Introduction

In last 20 years, several techniques and algorithms have been proposed by many researchers to classify environmental noise using parameters such as line spectral frequency (LSF), log area ratio (LAR) coefficients, zero crossing rate (ZCR) and power spectral density (PSD). But none of the previously developed techniques have proven to be highly effective because of their own inherent limitations associated with each technique. Man-machine interaction has increased the demand for advanced speech processing algorithms capable of providing good performance levels [16]. Recently, different research groups have carried out studies on new methods and algorithms for environmental noise classification [23] but in this paper, authors have tried to explore parameter estimation for speech analysis. MFCC estimation is an important parameter, put forward by Davis and Mermelstein, describes energy distribution of speech signal in a frequency field [1]. A number of studies best support MFCCs and it produces good results in most of the situations [2]. Integration of phase information with MFCC may be quite useful in speech synthesis [3]. Emotions may also be incorporated since in real world situation, human beings seldom communicate with neutral speech [9]. In our daily life, we encounter different types and levels of environmental acoustical noises like traffic noise, car noise, office noise etc. In various speech-processing systems such as speech coding, speech recognition and speaker verification, the unwanted noise signals are picked up along with the speech signals which often cause degradation in the performance of communication systems. By modifying the processing according to the type of background noise, the performance can be enhanced. This requires noise classification based on estimation and characterization of speech parameters. Environmental noise classifier can be used in various fields as, speech recognition and coding being the main ones. The acoustic features can be adapted to the type of environmental noise by choosing the most

appropriate set to ensure separability between phonetic classes. As low cost DSP's are increasingly becoming popular, therefore, the next generation of speech coders and intelligent volume controllers is likely to include classification module in order to improve robustness to environmental noise.

Noise Classification Methodoly

Two of the most promising techniques found for audio classification are Artificial Neural Networks (ANN) and Hidden Markov Models (HMM) [14]. The methodology that can be adopted for environmental noise classification through parameter estimation is based on exploring any one or a few of the environmental noise parameters viz .Linear Predictive Coding, Mel-cepstral based parameters, Real Cepstrum based parameters, line spectral frequencies coefficients, log area ratio coefficients, zero crossing rate and power spectral density. From these noise parameters, we have explored and analyzed two main parameters Linear predictive coding, Mel frequency cepstral coefficients and one allied parameter i.e. real cepstrum parameter in this paper. Noise database created can be explored on basis of noise classes as follows:

- Automobiles noise class (ANC): Cars, trucks, buses, trains, ambulance, police cars etc
- Babble noise class (BNC): Cafeteria, sports, stadium, office etc
- Factory noise class (FNC): Tools such as drilling machines, power hammer etc.
- Street noise class (SNC):
- Shopping mall, market, busy street, bus station, gas station etc.
- Miscellaneous noise class (MNC): Aircraft noise, thunder storm etc

Out of these noise classes, only three noise classes have been considered viz. car & train noise from automobile noise class (ANC), office noise from babble noise class (BNC) and market noise from street noise class (SNC).

Analysis Of Speech Parameters

Speech parameters have been analyzed by acoustic-phonetic approach after spectral analysis. The first step in speech processing is feature measurement which provides an appropriate spectral representation of the characteristics of the time-varying speech signal by filter bank method implemented in MATLAB. Signal representation of downloaded car noise is as follows:

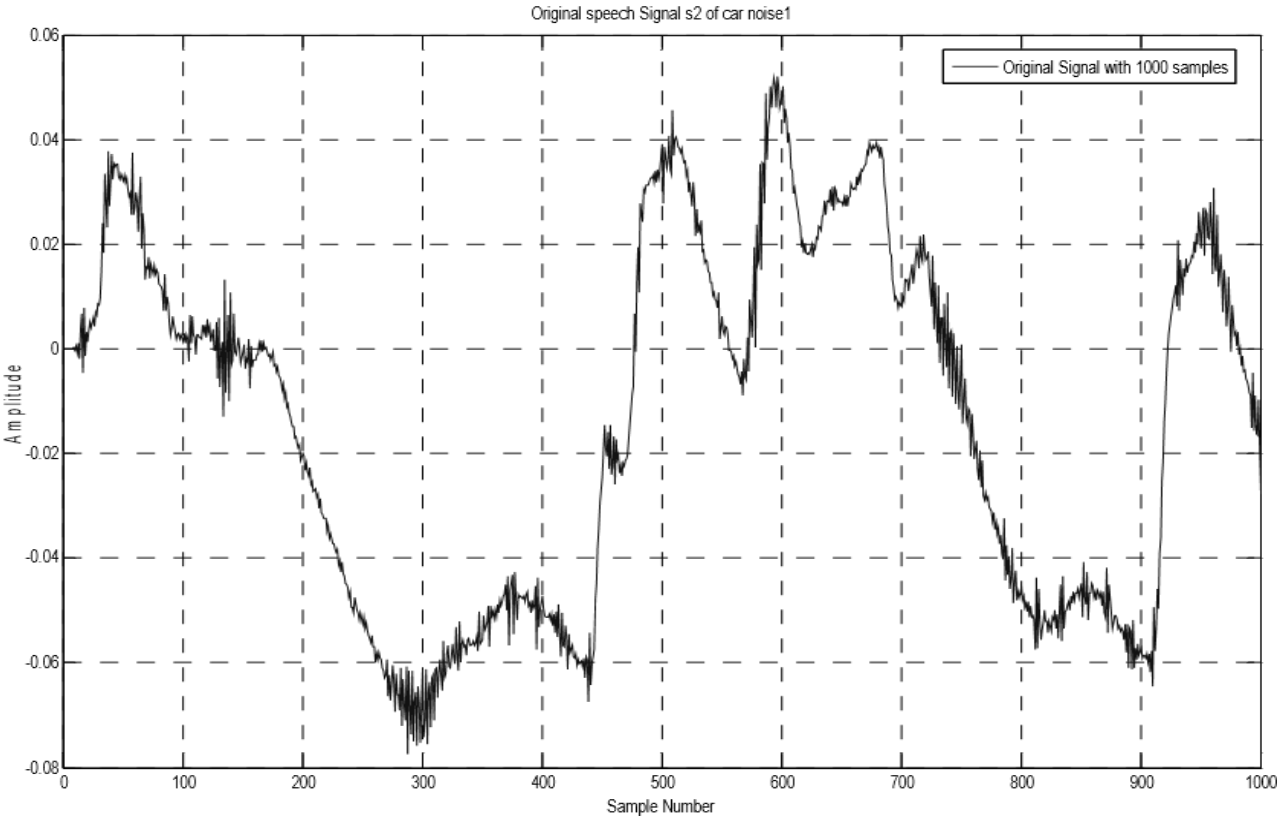

Figure 1: Car noise signal representation in MATLAB.

Similarly, signal representation of other noises has been recorded. The most common type of filter bank used for speech analysis is the uniform filter bank for
which the center frequency, fi, of the ith band pass filter is defined as
Fi = Fs i, 1 < i < Q, N
where Fs is the sampling rate of the speech signal, and N is the number of uniformly spaced filters required to span the frequency range of the speech. The actual number
of filters used in the filter bank, Q, of our work satisfies the relation
Q < N / 2 < 54/2 < 27
with equality meaning that there is no frequency overlap between adjacent filter channels, and with inequality meaning that adjacent filter channels overlap. (If bi < Fs / N, then certain portions of the speech spectrum would be missing from the analysis and the resulting speech spectrum would not be considered very meaningful).The digital speech signal, s(n), was passed through a bank of 27 band pass filters whose coverage spans the frequency range of interest in the signal (e.g., 100-3000 Hz for telephone-quality signals, 100-8000 Hz for broadband signals) & output in MATLAB is as follows-

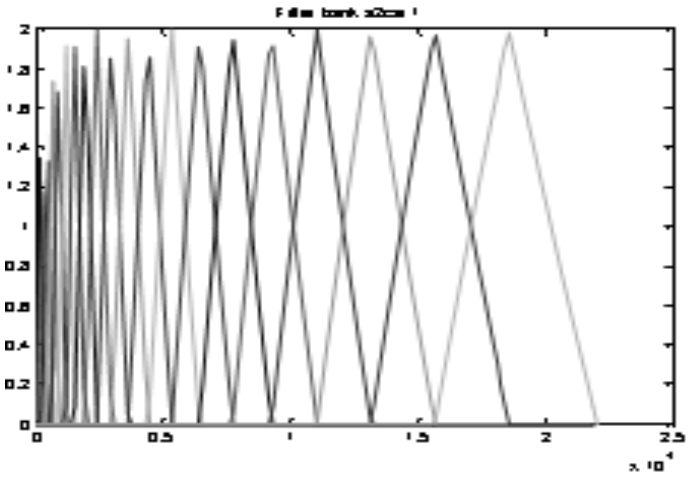

Figure 2: Filter-bank output of car noise in MATLAB.

Similarly, filter bank outputs were obtained for other noises.

Power spectrum output of all noises were obtained in MATLAB and that of car noise obtained is as follows-

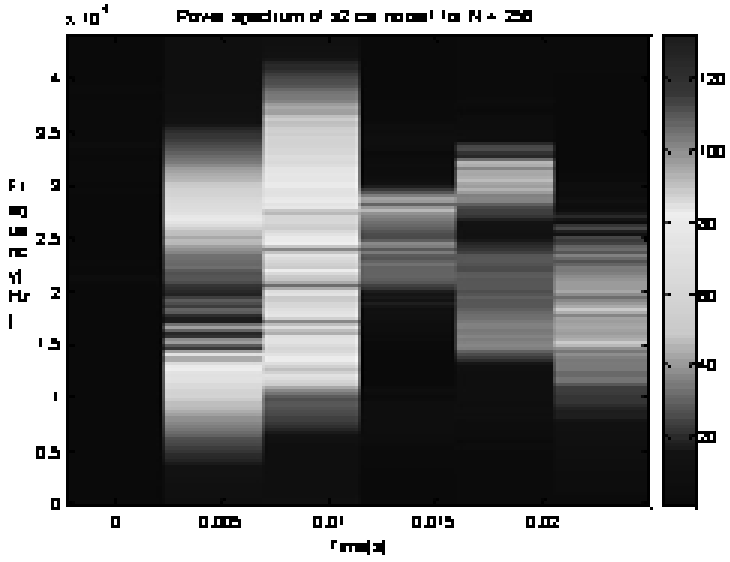

Figure 3: Power spectrum output of car noise in MATLAB.

Spectral Models Used for Environmental Noise Classification

The effectiveness of models and its authenticity depends on to what degree the model is adequate and how precisely corresponds to it [13]. A neuro-fuzzy computing may be used to provide system identification and interpretability of models [17]. Following models have been for environmental noise classification

Lpc Model

The choice of signal features is usually based on previous knowledge of the nature of the signals to be analyzed [24]. Speech synthesis based on LPC model in vocal tract of human throat may be assumed as follows in figure 4

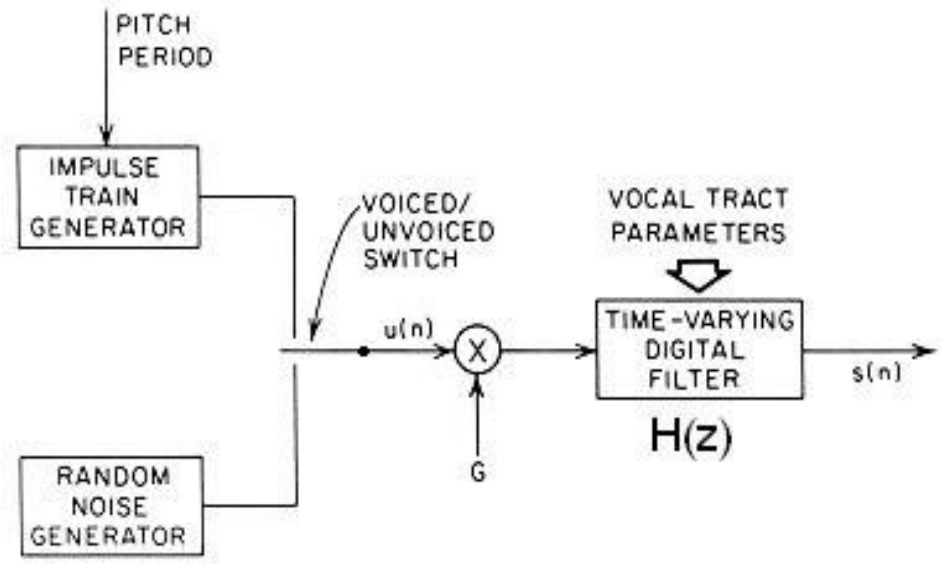

Figure 4: Speech synthesis based on LPC model in human throat.

The object of linear prediction is to form a model of a Linear Time Invariant (LTI) digital system through observation of input and output sequences. The basic idea behind linear prediction is that a speech sample can be approximated as a linear combination of past speech samples. By minimizing the sum of the squared differences (over a finite interval) between the actual speech samples and the linearly predicted ones, a unique set of predictor coefficients can be determined.

If u(n) is a normalized excitation source and being scaled by 'G' , the gain of the excitation source, then LPC model is the most common form of spectral analysis models on blocks of speech (speech frames) and is constrained to be of the following form, where H (z) is a pth order polynomial with z-transform and the coefficients a1, a2, …, ap are assumed to be constant over the speech analysis frame

$H(z) = ! + a1z\text{-}1 + a2\ z\ \text{-}2 + a3\ z\ \text{-}3 + \ldots + ap\ z\text{-}p$

Here the order 'p' is called the LPC order. Thus the output of the LPC spectral analysis block is a vector of coefficients (LPC parameters) that specify (parametrically) the spectrum that best matches the signal spectrum over the period of time in which the frame of speech sample was accumulated.

If 'N' is the number of samples per frame and 'M ' is the distance between the beginnings of two frame, then for a given speech sample at time 'n'; S(n), can be approximated as a linear combination of the past 'p' speech samples, such that

$s(n) \approx a1s(n\text{-}1) + a2s(n\text{-}2) + aps(n\text{-}p), (1)$

where the coefficients a1, a2, …, ap are assumed constant over the speech analysis frame. We convert eq. (1) to an equality by including an excitation, G u(n), giving:

$s(n) = \Sigma_{i=1}^{P} ais(n\text{-}i) + G\ u(n), \ (2)$

where u(n) is a normalized excitation and G is the gain of the excitation [4]. By expressing eq (2) in the z-domain we get the relation

$S(z) = \Sigma_{i=1} ai\ z\text{-}i\ S(z) + G\ U(z), (3)$

leading to the transfer function

$H(z) = S(z) = 1 = 1\_ \quad (4)$

$G\ U(z)\ p\ H(z)$

Because speech signals vary with time, this process is done on short chunks of the speech signal, which are called frames. Usually 30 to 50 frames per second give intelligible speech with good compression. When applying LPC to audio at high sampling rates, it is important to carry out some kind of auditory frequency warping, such as according to mel or Bank frequency scales.

Mfcc Model

MFCCs are widely used as acoustic features in speech analysis as they provide a compact representation of log-spectral envelope of speech signals [5]. Human perception of the frequency content of sounds, either for pure tones or for speech signals, does not follow a linear scale. This research has led to the idea of defining subjective pitch of pure tones. Thus for each tone with an actual frequency, f, measured in Hz, a subjective pitch is measured on a scale called the "mel" scale. As a reference point, the pitch of a 1 KHz tone, 40 dB above the perceptual hearing threshold, is defined as 1000 mels .Other subjective pitch values are obtained by adjusting the frequency of a tone such that it is half or twice the perceived pitch of a reference tone (with a known mel frequency).A filter bank, in which each filter has a triangular band pass frequency response, and the spacing as well as the bandwidth is determined by a constant mel frequency interval. (The spacing is approximately 150 mels and the width of the triangle is 300 mels). Mel scale cepstral analysis uses cepstral smoothing to smooth the modified power spectrum. This is done by direct transformation of the log power spectrum to the cepstral domain using an inverse Discrete Fourier Transform (DFT).

The modified spectrum of S(w) thus consists of the output power of these filters when S(w) is the input. Denoting these power coefficients by Sk, k = 1, 2, . . . , K, we can calculate what is called the mel-frequency cepstrum, Cn,

$$Cn = \sum_{k=1}^{K} (\log Sk) \cos [n (k - 1/2) \pi/K]$$

n = 1, 2. . . L,

where L is the desired length of the cepstrum. The first 12 coefficients (1st frame) can be discarded since they are the mean of the signal and hold little information. Hence 13th coefficient (1st frame) is usually considered. Conventional MFCCs based on Short-Time Fourier Transform (STFT) are not necessarily sufficient for speech synthesis [20].

The difference between the cepstrum and the mel-frequency cepstrum is that in the Mel frequency cepstrum, the frequency bands are positioned logarithmically (on the mel scale) which approximates the human auditory system's response more closely than the linearly-spaced frequency bands obtained directly from the FFT or DCT. DCT may be used as a hiding domain during steganalysis [6]. This can allow for better processing of data, for example, in audio compression. However, unlike the sonogram, MFCCs lack an outer ear model and, hence, cannot represent perceived loudness accurately.

Thus, in the sound processing, the mel-frequency cepstrum is a representation of the short-term power spectrum of a sound, based on a linear cosine transform of a log power spectrum on a nonlinear mel scale of frequency.

Steps in MFCC Extraction are as Follows:

Frame Blocking: In this step the continuous speech signal is blocked into frames of N samples, with adjacent frames being separated by M (M<N) [8]. Thus, audio noise signal s is blocked into frame of N samples shifting every M sample for each frame [10]. According to characteristics of the background noise it is possible to adapt each or some blocks dynamically, so as to optimize their performance by selecting the best configuration for that type of noise [15]. Human speech is a non stationary signal, but when segmented into parts ranging from 10-40 msec, these divisions are quasistationary. For this reason the human speech input is to be divided into frames before feature extraction takes place. The selected properties for the speech signals are a sampling frequency of 16 kHz, 8-bit monophonic PCM format in WAV audio. The chosen frame size is of 256 samples, resulting in each frame containing 16 msec portions of the audio signal. It seems that a value of 256 for N is an acceptable compromise. Furthermore the

number of frames is relatively small, which will reduce computing time.

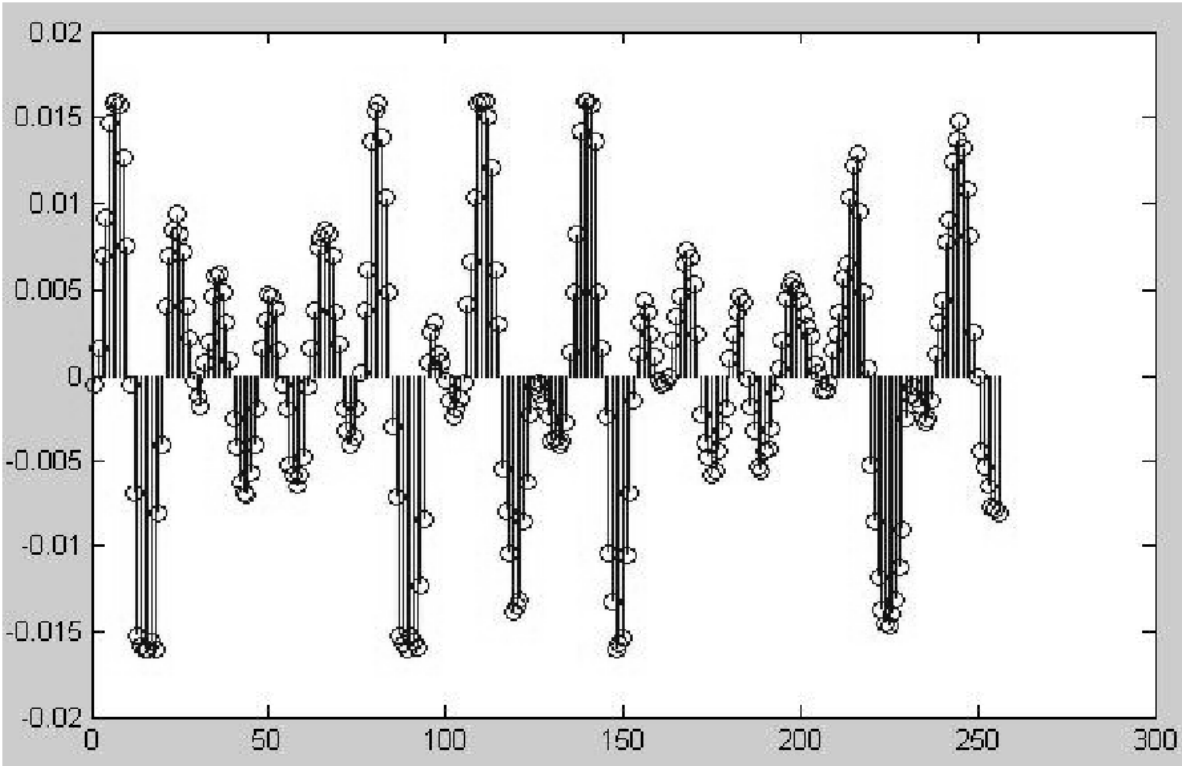

Figure 5: Frame of car noise in MATLAB.

Windowing: The use of the window function reduces the frequency resolution by 40%, so the frames must overlap to permit tracing and continuity of the signal. The motive for utilizing the windowing function is to smooth the edges of each frame to reduce discontinuities or abrupt changes at the endpoints. The windowing serves a second purpose and that is the reduction of the spectral distortion that arises from the windowing itself.

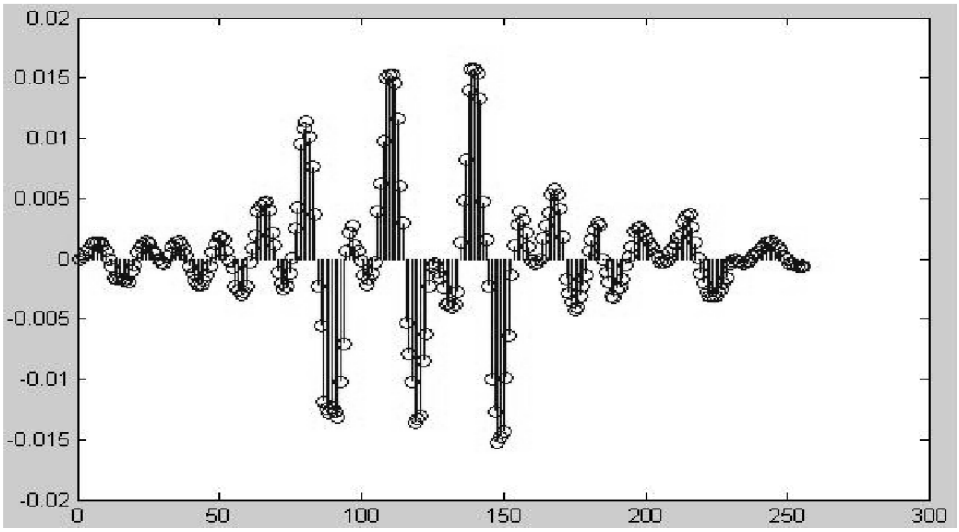

Figure 6: Car noise windowed data after Hamming in MATLAB.

Fast Fourier Transform: FFT is an effective tool for transforming signal into frequency domain [11]. The frame size is not a fixed quantity and therefore can vary depending on the resulting time portion of the audio signal. The reason that the authors selected number of samples as 256 is that it is a power of 2, which enables the use of the Fast-Fourier Transform. The FFT is a powerful tool since it calculates the DFT of an input in a computationally efficient manner, saving processing power and reducing computation time. The operation

results in the spectral coefficients of the windowed frames. It is desirable to derive an approximated version of Wang and Shamma's early auditory (EA) model in the frequency domain, where FFT algorithms are available [12].

Mel-scale Filter bank Frequency Transformation: Mel-cepstral coefficients are the features that will be extracted from speech during our work. The key difference between MFCCs and cepstral coefficients lies in the processing involved when extracting each of these characteristics of a speech signal. The process of obtaining Mel-cepstral coefficients involves the use of a Mel-scale filter bank. The spectral coefficients of each frame are then converted to Mel scale after applying a filter bank. The Mel-scale is a logarithmic scale resembling the way that the human ear perceives sound. The filter bank is composed of triangular filters that are equally spaced on a logarithmic scale. The Mel-scale warping is approximated and represent by the following Mel(f) = 2595 log10 (1 + f / 700),where f is frequency.

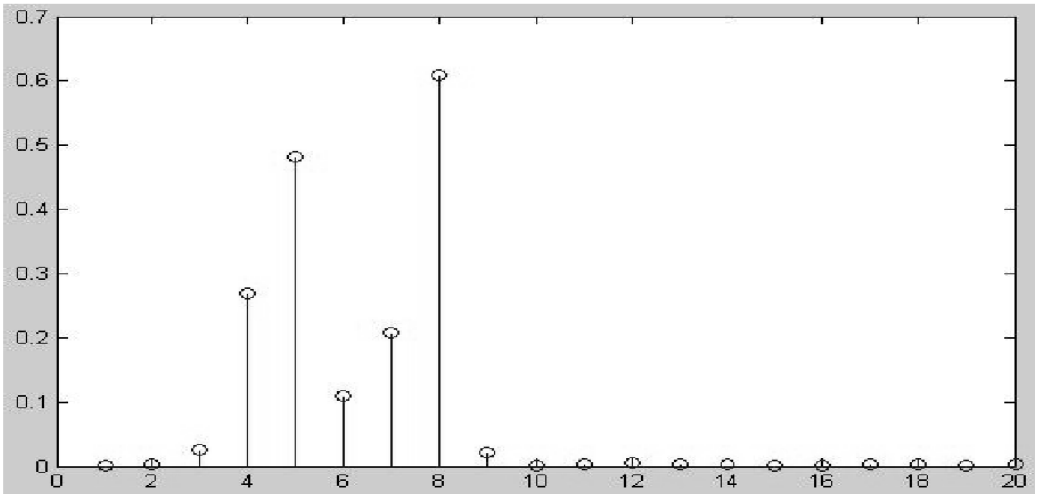

Figure 7: Mel Spectral Coefficients of car noise in MATLAB.

Discrete Cosine Transform: The Discrete Cosine Transform is applied to the log of the Mel-spectral coefficients to obtain the Mel-Frequency Cepstral Coefficients.

Only the first 12 coefficients of each frame are kept, since most of the relevant information is kept amongst those at the beginning. The first 12 coefficients (1st frame) can be discarded since they are the mean of the signal and hold little information. Hence 13th coefficient (1st frame) is usually considered and the use of the DCT minimizes the distortion in the frequency domain.

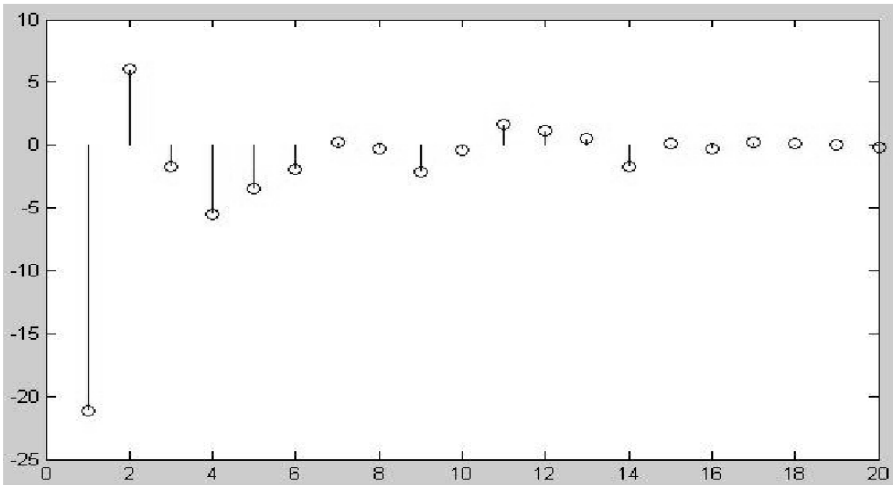

Figure 8: Mel-frequency cepstral coefficients.

Rcep Model

From the theoretical point of view, the Cepstrum is defined as the inverse Fourier transform of the real logarithm of the magnitude of Fourier transform. Therefore, by keeping only the first few cepstral coefficients and setting the remaining coefficients to zero, it is possible to smooth the harmonic structure of the spectrum. Cepstral coefficients are therefore very convenient coefficients to represent the speech spectral envelope.

Hence, the following function calculates the real Cepstrum of the signal x.

$$y = \frac{1}{2\pi}\int_{-\pi}^{\pi} \log|X(e^{i\omega t})|\, e^{i\omega t}\, d\omega,$$

This denotes the Fourier Transform of x and hence real Cepstrum as a real-valued function can be used for the separation of two signals convolved with each other. Thus, RCEP is a Cepstrum-based technique for determining a Harmonics-to-Noise Ratio (HNR) in Speech Signals and is a valid technique for determining the amount of spectral noise, because it is almost linearly sensitive to both noise and jitter for a large part of the noise or jitter continuum.

Thus real Cepstrum block gives the real Cepstrum output of the input frame and is also a popular way to define the prediction filter. Last, the line spectrum frequencies (a.k.a. line spectrum pairs) are also frequently used in speech coding. Line spectrum frequencies are another representation derived from linear predictive analysis which is very popular in speech coding

Results Obtained In Matlab (Upto Tenth Order For Five Samples Of Four Noises)

Mfcc

Car s1	Car s2	Car s3	Car s4	Car s5
0.7606	0.8497	-0.1915	0.5952	-0.6787
Office s1	Office s2	Office s3	Office s4	Office s5
1.1829	0.2051	0.6141	0.7134	0.2297
Market s1	Market s2	Market s3	Market s4	Market s5
0.8646	0.4135	0.8211	0.0903	0.1616
Train s1	Train s2	Train s3	Train s4	Train s5
0.0271	-0.5599	-0.1922	0.9966	0.9129

Lpc

Car s1	Car s2	Car s3	Car s4	Car s5
0.2164	0.1270	0.2298	0.0988	0.1835
Office s1	Office s2	Office s3	Office s4	Office s5
0.5474	0.5195	0.2179	0.1775	0.2018
Market s1	Market s2	Market s3	Market s4	Market s5
0.1504	0.1527	0.1558	0.1181	0.1645
Train s1	Train s2	Train s3	Train s4	Train s5
0.6579	0.6629	0.7030	0.6006	0.6627

Rcep

Car s1	Car s2	Car s3	Car s4	Car s5
0.0011	0.0009	0.0003	-0.0004	0.0000
Office s1	Office s2	Office s3	Office s4	Office s5
0.0007	0.0010	-0.0009	-0.0001	-0.0000

Market s1	Market s2	Market s3	Market s4	Market s5
0.0006	-0.0003	0.0001	-0.0007	-0.0002
Train s1	Train s2	Train s3	Train s4	Train s5
-0.0012	0.0005	0.0013	0.0008	-0.0017

Averages Of Coefficients

M F C C Coefficients	C1	C2	C3	C4	C5
Car Noise (S1-S5)	16.613	0.978	2.040	1.572	2.101
Office Noise (S1-S5)	19.651	1.074	1.787	1.397	1.331
Market Noise (S1-S5)	19.284	1.302	1.748	1.377	1.718
Train Noise (S1-S5)	18.976	1.154	1.687	1.437	1.594

LPC Coefficients	C1	C2	C3	C4	C5
Car Noise (S1-S5)	1.000	-0.497	-0.546	-0.281	0.543
Office Noise (S1-S5)	1.000	-0.590	-0.430	-0.172	0.099
Market Noise (S1-S5)	1.000	-0.298	-0.553	-0.619	0.209
Train Noise (S1-S5)	1.000	-1.432	0.005	0.769	-0.731

RCEP Coefficients	C1	C2	C3	C4	C5
Car Noise (S1-S5)	7.997	0.004	0.004	0.004	0.002
Office Noise (S1-S5)	8.522	0.000	0.005	-0.002	-0.006
Market Noise (S1-S5)	8.808	0.799	0. D. Barkana000	-0.002	-0.004
Train Noise (S1-S5)	8.433	0.001	0.003	0.003	0.001

Trial & Error (For Car Noise Only)

Sl No	Trial method (for MFCC)	Difference
1	Average of first ten coefficients	0.134
2	Average of maximum & minimum coefficients	0.088
3	Average of second highest & third highest coefficients	0.182
4	Average of highest & second highest coefficients	0.173

Conclusion

Our MATLAB results show that out of three noise parameters under consideration, Mel Frequency Cepstral Frequencies are robust features in noise parameter estimation and its characterization. By trial & error method, it was found that the best result of MFCC was obtained at maximum difference of 0.182 when average of second highest & third highest MFCC coefficients was taken since scaling becomes easier at maximum difference while undergoing defining membership in fuzzy logic operation for noise classification. Smart Volume Controllers may be designed after background noise classification based on these aspects.

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EFFICIENT INTRUSION DETECTION SYSTEM USING XGBOOST AND J48 DECISION TREE ALGORITHMS

V. Sathyendra Kumar
Department of MCA, Annamacharya Institute of Technology& Sciences (Autonomous), New Boyanapalli, Rajampet, Kadapa (Dt.), A.P
e-mail: vsk9985666531@gmail.com

A. Muthukumarvel
Faculty of Arts & Science, Bharath Institute of Higher Education & Research, Chennai, Tamil Nadu, India
e-mail: muthu14673@gmail.com

ABSTRACT

Intelligent Intrusion Detection plays a vital role in the field of network security as it helps to find various criminal attacks and various datasets in the crime field. Data Mining (DM) methods are the best choice for reporting the privacy of the crime tasks. It is the collection of a large set of data. Attacks on the network are growing daily. For predicting them, a model is created, that predicts the intrusion attacks in a system. The network which predicts those kinds of outbreaks and intrusion is known as IDS. As because of the reason that the crime attacks are increased, predicting the intrusion has become a critical task. For the IDS (Intrusion Detection System) several DM and ML methods are utilized. In this research work, XGBoost and J48 DT (Decision Tree) were offered to identify the efficiency of the IDS. Among the two ML models, XGBoost produces the best result in terms of accuracy rate.

Keywords: *Machine Learning, XGBoost, J48 Decision Tree, Accuracy, Preprocessing*

I Introduction

Data mining utilizes the statistical methods, the system of the algorithms, and ML (Machine Learning) techniques for finding the unseen relations and the designs within the features from many data sets that are utilized for detecting the unwanted attacks. For the prediction of criminal attacks, intrusion prediction is considered a well-known method.[1]

IDS are classified based on the prediction method such as signature and anomaly-based features. The classification of the IDS based on the Signature feature creates awareness when the data that is analyzed gets matched with the well-known signature design. The classification of the IDS based on the Anomaly feature produces awareness when the structure diverges from the usual characters. The IDS which are based on signature-based are mostly used. The IDS that are based on the Anomaly feature has a main benefit over the other basis, that they can predict the intimidations for that they don't exist a signature, with the targeted attacks. Hence the IDS that are based on the Signature feature can't predict the unidentified attacks.

Several DM methods are utilized for the detection of intrusion. In the year 1980, James P. Anderson categorized the intimidations and presents a method that can predict the anomalies in the behavior of the user. Then researchers utilized various methods that as SVMand PCA for providing an effective prediction of the intrusion.

II Literature Review

Mostly the researchers used the KDD Cup 99 data set that has board disappointment for not showing the present situation of the network. Shailendra Sahu et al., 2015 utilized a novel labeled dataset of a network known as Kyoto 2006+ data. In this type of data, many prompts are labeled as usual, or unusual attacks. Here DT technique is used for the classification of the packet of the network which can be utilized for IDS. For the examination and training, 134665 networks are utilized for instances. Here the authors work with Kyoto 2006+ set of data is obtained nearly to used, that is constructed on the three years of the real-time traffic data. J48 DT method is utilized for the intrusion prediction and the outcome is 97.23%. Utilizing the WEKA 3.6.10 tool, DT for predicting the intrusion is constructed in the Kyoto 2006+ data. As an outcome the

produced tree classified 130931 instances out of 134665 instances, which is 97.23%. The results show that the system has the ability for predicting unidentified attacks also.[1]

The most well-known J48 calculation is utilized to assess the information. This calculation is primarily used to assess various applications and to do the specific outcomes over the assessment interaction. The principal objective of fostering this changed J48 DT calculation is to lessen the journey way in contrast and the cutting-edge enthusiastic posting. D. Parameswari et al., 2020 have been utilized changed J48 decision tree set of rules for identifying attacks. This calculation delivers a comparable outcome as GA. In this chapter the execution piece of the changed J48 alternative tree set of rules and chase framework assessment will be tended to. The looking time appraisal of different organization limits (10 hubs, one hundred hubs, 500 hubs, 600 hubs, 800 hubs) is recorded utilizing the GA and the adjusted J48 set of rules. Execution of the instrument and its outcomes from a presentation is the main problem.[2]

The vast majority of the current writing thinks about the exactness and bogus positive rate for evaluating the presentation of arrangement calculations. The absence of other execution measures, for example, model form time, misclassification rate, and exactness ought to be viewed as the principal restriction for classifier execution assessment. Ranjit Panigrahi et al., 2021 present a primary commitment to dissecting the momentum writing status in the field of organization interruption recognition, featuring the number of classifiers utilized, dataset size, execution yields, inferences, and research holes.So, the art classifiers of different sets that are functions, Bayes, rule-based, and DT are analyzed and they are explored, in the view of the 16 main well-known measures of the performance. This work has an objective for recognizing a robust classifier, which is suitable for the deliberation as the basic learner while making a host-based or network-based system of the intrusion prediction. ISCXIDS2012, CICIDS2017, and NSLKDD data are utilized for examination and testing purposes.[4]

This is because of the improvement of the efficiency and RIDS (Robust Intrusion Detection System) is needs. Nabila Farnaaz et al., 2016 have constructed a system for the prediction of the intrusion prediction system utilizing the RF classification. For evaluating the presentation of the system, the experiments are carried out on the NSL-KDDdata set. This work contracts with the RF system for the prediction of four kinds of attack such as a probe, R2L, DOS, and U2R. Theselection of the attributes is put over the datasets for decreasing the dimensionality and to ignore the unwanted characters. The outcome obtained here proves that the accuracy level, the four types of DR and MCC are developed by the model that is proposed.[6]

The crime attacks are of two types they are known or unknown. The IDS have the capacity for safeguarding over the known kind of attacks as they have designed particularly for the specific purpose. Bhoopesh Singh Bhati, ET AL., 2020 proposed a method that executes the use of XGBoost with the ensemble that is based on IDS, which can generate good outcomes. XGBoost is on the basis tree boosting ML techniques. [7]

IoT is quickly spreading in different application situations through its notable components because of its features, going from horticulture and industry for transportation and different fields. With the expanding spread of IoT applications, IoT security is bit by bit becoming perhaps the main issue to monitor IoT gadgets against different network safety dangers. As a rule, IoT gadgets are the fundamental parts answerable for detecting, registering, and communicating; for this situation, how to proficiently guard the IoT gadget itself away from digital assaults, like malware, and virus turns into the indispensable point in IoT security. Xiali Wang et al., 2020 present a new system of IDS for IoT gadgets, which is intended to distinguish gadget or host-situated assaults in a lightweight way with regards to restricted calculation assets on IoT gadgets. In this paper, a stacking structure for coupling the [Extreme Gradient Boosting] XGBoost model and the LSTM (Long Short-Term Memory) structure together for the unusual state investigation on the IoT gadgets. [9]

ML techniques investigation of the data automates the building structure. It is a portion of the artificial consciousness dependent on the possibility which the frameworks can obtain from the information, analyze the designs, and provide driven data options. Tadepalli Anish Deepak et al., 2020 propose cloud-based IDS utilizing the tree-based classification of ensemble method known as XGBoost method. Water sparkling permits the user to join the fast, versatile ML function of H2O with the abilities of the spark. The IDS that have been proposed utilizing the XGBOOST method from H2O, produces good outcomes when it is compared with the other methods such as ANN, RF, GBM. XGBoost method gives an accuracy level of 99.8% level on the set of validation and approximately 99.1% on the set of tests from the cross-validation of k-fold.[10].

III Proposed System

Due to the development of networking methodology, intrusion prediction has become a developing field of research. IDS challenge for the identification and report the activities of the admin as usual. IDS is a nonlinear type and problem that are complicated and contracts with the network of traffic data. Several IDS techniques are introduced and generate various stages of the level of accuracy. Normally IDS is described as an event, that is induced from outside. It is playing a major role in the identification of different kinds of network attacks. Here ML(Machine Learning) classifiers like XGBoost and J48 DT(Decision Tree) are offered to identify the efficiency of the IDS. Figure 1 illustrates the general procedure used in IDS with ML classifiers.

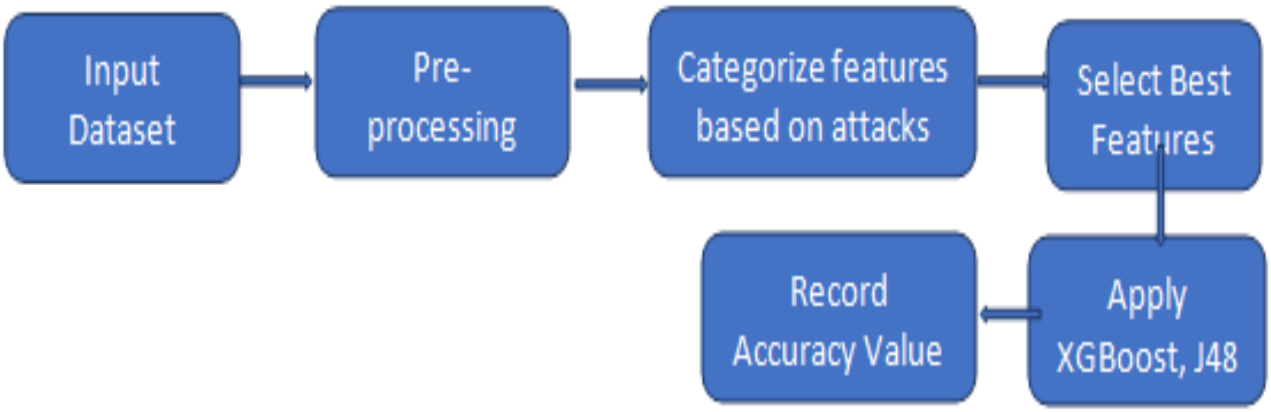

Fig 1: Common Procedure of IDS with Machine Learning Classifiers

Initially, the data set was collected from an online website and given to the input of the proposed model. Then the pre-processing techniques are applied to clean the original dataset. In the next level based on the network attacks the features are categorized. From the categorized features the major features are selected, apply the ML classifiers, and record the accuracy value.

XGBoost Algorithm

It is one of the DT-based ensemble ML models and it uses the Gradient Boosting technique to the given dataset and categorizes the data. Performance, memory efficiency, accuracy, and speed are the major benefits of the XGBoost classifier. XGBoost is the combination of CARTs. The basic type DT is known as CART and it can be implemented using the concept of entropy value. The element of the CART is the Gini value:

$$Obj: \min Gini_{indiex}(D,a) = \sum_{v=1}^{V} \frac{|D^v|}{|D|} Gini(D^v), - - - - - - (1)$$

$$Gini(D) \sum_{k=1}^{K} \sum_{k',k} p_k p_k^{'} = 1 - \sum_{k=1}^{K} p_k^2 - - - - - - - - - - (2)$$

From the above formula, a denotes the selected feature, V defines the scale value of a, v describes the attribute value, and K indicated the label's scale value. Gini coefficient value shows the dataset samples probability value. The XGBoost aims to fix residual value. It means the variance between the predicted information and the real data. Equation 3 describes the XGBoost model.

$$F(X,w) = \sum_{k=0}^{K} a_k\, h_k(X{:}\, w_k) = \sum_{k=0}^{K} f_k(X, w_k) ----(3)$$

Equation 3 X indicates the input dataset, $F(X,w)$ denotes the final model, $h_k$describes the separate tree, w means the tree parameter, and a_k denotes the tree weight value. By decreasing loss method $F(X,w)$ optimal model is generated. The loss method is described as follows:

$$F^* = \arg\min_{F} \sum_{k=0}^{K} L(Y_i\,, F(X_i; w_k)), ----- (4)$$

$$loss = \sum_{i} l(\hat{Y}_i, Y_i) + \sum_{k} \Omega(f_k) ----- (5)$$

$$\Omega(f_k) = \gamma N_{leaf} + \frac{1}{2}\boldsymbol{\lambda}\|\boldsymbol{w_k}\|^2 ---- --(\mathbf{6})$$

$$l(\hat{Y}_i, Y_i) = (Y \curlywedge_j - Y_i)^{\ 2} ------ --(7)$$

In equation 6 N_{leaf} describes the total quantity of leaf nodes in the DT. $Y_i$indicates the actual value and $\hat{y}_i$ describes the forecasted value, and $\boldsymbol{\lambda}, \gamma$ are the arguments.

J48 DT(J48 Decision Tree) Algorithm

According to Shailendra Sahu et al., 2015 DT is the categorization approach. This approach is executed using the divide & conquer technique. DT contains leaf nodes and the decision nodes. Leaf nodes describe the value of the class and the decision nodes indicate the attributes. Leaf node to the root node path is denoted by the rule. In DT categorization error influences the performance. It illustrates the percentage value of the miscategorized cases. Commonly the size of the training data set is large. Due to this reason DT generates a large number of layers and branches in DT. When the categorization number is huge, the accuracy is normally decreased. Various forms of DTs are available. J48 DT is used in this research work due to its better accuracy rate. Initially, J48 DT was used by Quinalan in the year of 1993.

The IG (Information Gain) of the given identifier is computed as:

$$gain = info(T) - \sum_{i=1}^{s} \frac{|T_i|}{|T|} info(T_i) ---- --(8)$$

From the equation T denotes the group of cases T_i is the subgroup of the T contains various features of A. info(T) is called as the entropy method illustrated as:

$$info(T) = -\sum_{j=1}^{Nclass} \frac{freq(C_j,\ T)}{|T|} X log_2\left(\frac{freq(C_j, T)}{|T|}\right) ----(9)$$

Usually, the created DT is large, it makes an unreadable form. In J48 it was resolved by regulating the level of confidence.

IV Result and Discussion

We have done a detailed study about the two algorithms XGBoost and J48 Decision Tree algorithm. Now let us see in details about the results obtained when we apply these two algorithms in finding out the intrusion detection when the testing with dataset is done. We have calculated the Accuracy as output parameter.

The confusion Matrix table shows the performance of the proposed algorithms. The following Table 1 demonstrates the confusion matrix.

Table 1 Confusion Matrix

	Forecasted Positive	Forecasted Negative
Actual Positive	True Positive	False Positive
Actual Negative	False Negative	True Negative

In ML classifiers accuracy defines the actual percentage value of properly categorized instances.

$$Accuracy = \frac{TP + FN}{TP + FP + TN + FN} - - - -(10)$$

The following Fig 2 represents the graphical representation of XGBoost and J48 Decision Tree algorithm in terms of accuracy. The following Table 2 represents the XGBoost and J48 Decision Tree algorithm in terms of accuracy.

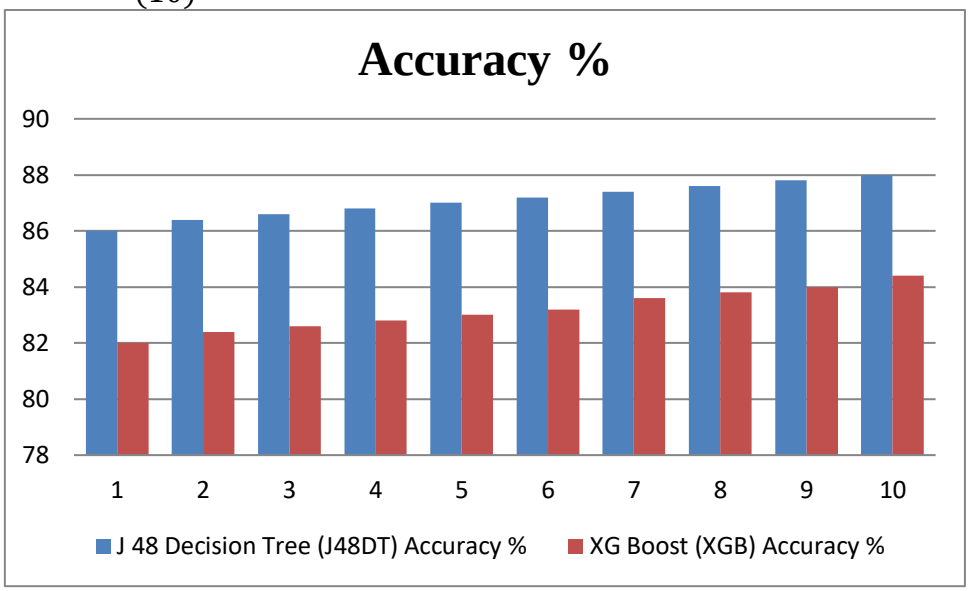

Fig2: Accuracy Comparison between XG Boost and J 48 Decision Tree Algorithms

Table 2 represents the XG Boost and J48 Decision Tree algorithm in terms of accuracy

SN.O	J 48 Decision Tree (J48DT) Accuracy %	XG Boost (XGB) Accuracy %
1	86.0	82.0
2	86.4	82.4
3	86.6	82.6
4	86.8	82.8
5	87.0	83.0
6	87.2	83.2
7	87.4	83.6
8	87.6	83.8
9	87.8	84.0
10	88.0	84.4

V Conclusion

Supervised learning and recognition of the pattern is a significant space of exploration in data recovery, information designing, picture preparing, clinical imaging, and interruption identification.The purpose of the web is increasing day by day, on the other hand, because of its development the crime attacks are also growing and all of them are not known for an IDS without clear updating. Various calculations have been intended to address such complex application spaces. RF classifier is considered as ensemble classification that achieves a good outcome when compared with the old classifications, for the efficient classification of the attacks.Due to the efficiency and faster execution, XGBoost is

applied in this IDS to retrieve better performance. Here J48 DT and XGBoost classifiers are offered for identifying the accuracy level of the IDS. Compare the outcome of two models XGBoost produces a better result.

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ENHANCED SECURITY PROCEDURE IN DIGITAL E-LEARNING: DYNAMIC ELLIPTIC CURVE KEY GENERATION & AES TRANSMISSION

Ambalika Ghosh
Department of Computer Science, The University of Burdwan, Burdwan

Joydeep Dey and Anirban Bhowmik
Department of Computer Science, M.U.C. Women's College, Burdwan

Sunil Karforma
Department of Computer Science, The University of Burdwan, Burdwan

ABSTRACT

In the current technology friendly age, the data security is the most vital issue on each and every application levels. Digital E-learning is a field where it imparts the teaching-learning process through digital platforms. A revolutionary change had occurred in this domain since the cameo of the novel corona virus. It keeps the education system intact though the online classes and lectures. This paper has proposed a dynamic key generation through Elliptic Curve Cryptography (ECC). Elliptic curve equations were deployed to propose the keys of dynamic size as per requirements. The same key would be generated at both the ends in order to avoid the key exchange through public medium. Furthermore, that proposed key would be used to encrypt and decrypt the E-learning files by the users. Overall, an enhanced security procedure has been proposed here. Various tests were conducted on the proposed technique. The proposed key generation time were 2.015 ms, 3.541 ms, and 3.775 ms for AES-128, AES-192, and AES-256 transmission respectively. The operational timing noted was to be satisfied on different data files.

***Keywords**: E-Learning, ECC, Dynamic key generation, AES Transmission, Operational time*

1. Introduction

Due to COVID-19 pandemic constraints, educational organizations like schools, colleges, and universities had adapted quickly towards digital learning. The novel corona virus has forced all the educational institutes globally to embrace web-based digital learning. Different E-learning frameworks and web-based applications have supported the entire education system remotely. Thus, students at different levels could connect themselves to the knowledge sharing education. E-learning alludes to organize, sort out and manages e-learning exercises inside a framework, like student enrolment, internal tests, tasks, semester tests, example plans, study materials, fundamental course materials, and so forth. Internet oriented learning techniques have propelled the teaching-learning system though remote mode. Especially it is more relevant in this current COVID-19 era [1-2]. There are several positive notes when online education can be treated better than traditional classroom teaching. They are: remote access, more available, less physical exhaust, convenient through audio-videos, etc. Since the capacity of the online education mainly rotates through the transmission of electronic data from sender to the receiver. So, these data needs to be protected from the outer unauthorized agents. To deal with that cryptography can be applied to encrypt such confidential online materials and online lectures.

Cryptography is one of the principle information security parts to communicate data from the source to the destination by the mathematical techniques. This paper involves the use cryptography on the field of digital learning system. Plan of the calculations has various prerequisites relying upon its application on the desired online education. Elliptic curve cryptography is a type of asymmetric cryptography where it uses smaller key size to have more security [3]. It basically works on the elliptic curve equation. The generalized equation of an ellipse can be stated in the following equation 1 on the real set of numbers.

$$Y^2 = X^3 + aX + b \quad \ldots\ldots(1); \quad where, 4a^3 + 27b^2 ! = 0$$

Due to its higher efficacy, it can be used in many application domains [4-5]. In this paper we have used ECC to generate the dynamic

key and that key would be used in AES transmission. AES is a very strong and symmetric algorithm to protect the data against the intruders [6]. Three variations of AES algorithm is widely present as AES-128 bits, AES 192 bits, and AES-2556 bits. The key size and the number of operational round present are 128, 192, 256 and 10, 12, 14 respectively [7]. Secured storage and transmission of the data can be handled by ASE transmission.

The notable contributions made in this proposed technique are as follows. Firstly, dynamic key generation has been proposed by the help of elliptic curve equation. Secondly, no need to share the common secret key between the recipients. They will generate the identical length key beforehand. Thirdly, the functional overheads had been reduced with respect to classical algorithms. Fourthly, finite field was implemented to have the session key. Fifthly, the selection of the dynamic length key and its orientations are variable. Intruders do not know the orientation styles.

Despite several advantages of online teaching-learning process, there exists a plenty of constraints that dampens the enhanced outcomes. Critical technological challenge is the most relevant one. The proper Internet connectivity is not available in most of the remote places [8]. It also includes the lack of technical support to the users. Students and teachers need proper technical guidance to conduct the smooth digital learning. But there seems some major lack in that respect too [9]. Another key challenge is the content security of the system. Most of the existing E-learning applications have security vulnerable [10-11]. In the COVID-19 period, online education had increased its transactions when compared to the pre-COVID era. Lack of technological infrastructure is another notable problem in such E-learning domain [12]. The computer literacy of the teachers under different categories were found to be poor. It leads to non-feasible outcomes of the system [13].

The layout of this manuscript has been as follows. The section number 1 contains the introduction. Related works were placed under the section number 2. In section number 3, the block diagram of the proposed technique has been given. The section number 4 has the proposed methodology. Section number 5 has the results derived under the proposed method. Conclusions were written at the section number 6. Future scope of improvement was given in section number 7. Ethical Statements and References were written at the last.

2. Related Works

This section represents the related works on digital E-learning, elliptic curve cryptography, and AES encryption / decryption. With the rise in Internet based technologies, E-learning has become an integral section in today's world. The security issues must be addressed in any online teaching learning system.

2.1 Related to Online E-learning System

Lisitsyna L.S. et al. [14] had described an online interactive MOOCs exercise with support of the technology. Their results were deeply studied by them and found that less time was needed to complete the assignments y the students. Liyanagunawardena T.R. et al. [15] had reviewed that online distant learning culture should be cultivated amongst various universities and higher education bodies. It will benefit all sections of the learners having low cost modules. Doolan M.A. et al. [16] had presented a collaborative platform for the university students learning system. Students were allowed to collaborate with other private organizations to complete their tasks. Thus, it would benefit the knowledge acquired by the students. Kularbphettong K. et al. [17] had designed an E-learning system to learn Physics through Android operating system. Students' satisfactions were also recorded in their system. Hwang, G.-J. et al. [18] had proposed an interactive concept map on the elementary school natural science students. Learning achievements were increased in such environment. Sevillano-Garcia, M.L. et al. [19] had surveyed 419 university students of European Higher Education Area (EHEA) on the impact of digital components on their study. Their study had produced the result that the digital gadgets had improved the learning activities and competencies in the field of higher education. Kularbphettong, K. et al. [20] had developed mathematics learning system through Android operating system. They were advised to learn mathematics in a more convenient way. Al-Azawei, A. et al. [21] had

survey different stake holders of the Iraq university to find out the obstacles of online teaching. They had also proffered many suggestions in this context. Bozkaya M. et al. [22] had studies the recent trends of online education between 2008 and 2011 in a specified journal. Nawaz A. et al. [23] had amplified the problems faced at the technical grounds of online E-learning support. Karimian Z. et al. [24] had explained the challenges of the medical science education during the COVID-19 era. They had surveyed 83 medical educationist from Shiraz University of Medical Sciences. They had found four important challenges in their study. Hilburg, R. et al. [25] had reviewed the impact of corona virus pandemic on the medication students. Medical trainees and residents were mostly adapted to the virtual mode of learning, where the clinical practices were restricted due to lockdown rules. Almarzooq Z. et al [26] had explained different ways of virtual learning in the field of medical science during the COVID-19 period.

2.2 Related to Elliptic Curve Cryptography & AES

AES is one of the classical symmetric algorithm. It can be used on various domains. Qazi R. et al. [27] had designed a security protocol for the WSNs using the Elliptic Curve Digital Signature. Their schemed had shown better efficacy in terms of session key management with acceptable key size. Ju S. [28] had proposed a light weight session key generation technique based on elliptic curve cryptography. The proposed technique was scalable and efficient with respect to computational complexity. Sethi P.C et al. [29] had developed an ECC m-gram selection oriented group security protocol with faster outcomes. Sravana D. et al. [30] had developed new encryption methods with finite ECC fields. Gulen U. et al. [31] had implemented ECC based on number theory to have secured wireless sensory networks. Bos J. et al. [32] had presented a secured mechanism on ECC on cloud computing. Users' privacy was extended by their work. Luma A. et al. [33] had proposed an encryption tool for audio messages on ECC. Hu Z et al. [34] had proposed a novel AES key management scheme. Operational speed can be increased without rising the complexity of the system. Thinn A.A. et al. [35] had proposed a modified AES encryption system with an extra second key. Another modification was done by them at the SubBytes step by adding transportation operation. Akhil G. S. et al. [36] had designed AES sharing and data storage mechanism. Bahig H.M. et al. [37] had developed a new AES variant known as DNAES. It was mainly comprised of deoxyribonucleic acid sequences. They had shown higher security aspects. Arab A. et al. [38] had evolved an encryption algorithm based on the modified AES and chaotic sequence. Diffusions were made on several images types. Partheeban P. et al. [39] had proposed a dynamic S-box for the purpose of high non-linearity and low autocorrelation. Ahmed B. A. et al. [40] had designed an image encryption using AES.

3. Block Diagram of proposed technique

The following figure 1 represents the block diagram of the proposed method.

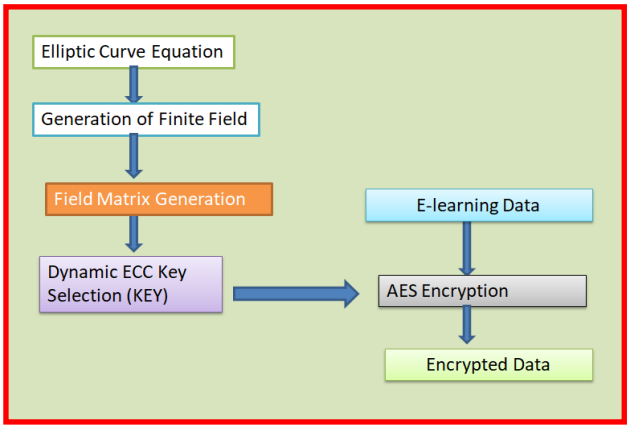

Figure 1: Block Diagram of Proposed Method

From the above mentioned figure 3, we can view the overall diagram of the proposed technique. At this technique, online education system can reinforce its security issues. At the sender's end, the elliptic curve equation is taken as input. A finite field (F) can be drawn using that equation. The field matrix can be derived from that finite field on binary levels. There on, a specific bits may be selected as the key, in turn acts as session key in AES encryption. The cipher text would be transmitted widely in the public networks. The inverse operation can be applied on the destination end.

4. Proposed Methodology

This section contains the proposed methodology. Broadly, it can be classified into two categories. Firstly, to generate dynamic key by using elliptic curve cryptography. And secondly, by using that key AES encryption would be applied on the E-learning data. In the recipient's end, same key would be generated though ECC, and AES decryption would be deployed. In the AES encryption phase, the original data would be encrypted through the proposed key, and the resulting cipher text will be made transmitted in the public domain. The receiver would first generate the same key by ECC and decrypt the cipher text into original format. There need not to share the common secret key between the recipients, rather than both will generate the identical key using the known elliptic curve equation.

4.1 Proposed Algorithm

This proposed algorithm has been separated into three sub- procedures. They are: Dynamic Key Generation by ECC, AES Encryption, and AES Decryption.

ALGORITHM* 1**: ***Dynamic Key Generation by ECC & *AES Transmission*
***Input*(*s*)**: *DataFile* (*D*1.*PDF*),
Length of Key (*LEN*)
***Output*(*s*)**: *AES Encrypted Data File*

1. $KEY[LEN] =$
Call Dynamic Key Geneartion (*LEN*)
// Key generation by ECC
2. *Call AES Encryption* ($KEY[LEN]$)
// AES encryption
3. Call *AES Decryption* ($KEY[LEN]$)
// AES decryption

All the above procedures have been described in the later paragraphs.

4.2 Dynamic Key Generation

This mechanism has been implemented on the elliptic curve equations. The pre-requisite things in this proposed technique is that the sender and the recipient will know the exact elliptic equation and a large prime number value. The generalized equation of the elliptic curve may be given in the following equation 2.

$$Y^2 = X^3 + aX + b \quad \ldots\ldots(2); \quad where, 4a^3 + 27b^2 ! = 0$$

We had designed a finite field (F) on specific operator *'#'*, and it can be viewed in the following equation 3.

$$F = a \# b \; Mod \; p \quad \ldots\ldots\ldots(3); \quad where \; p \; is \; a \; very \; large \; prime \; number \; and \; a, b < p$$

PROPOSED ALGORITHM* 1.1**: ***Dynamic Key Generation by ECC

***Input*(*s*)**: *ECC Co* $-$ *efficient of x term* (a), *ECC b term* (b), *Large Prime number* (p)

***Output*(*s*)**: $KEY[LEN]$

// Formation of Finite field Matrix
For $I = 0$ *to* $(p-1)$
  For $J = 0$ *to* $(p-1)$
    $FMat[I][J] = (a * b) \; Mod \; p$
  End for
End for
// Compression of Finite field Matrix
  Delete Row Number 1($FMat[p][p]$)

Delete Column Number 1($FMat[p][p]$)
// Binarization of Matrix
For $I = 0$ *to* $(p-1)$
  For $J = 0$ *to* $(p-1)$
    $FMat[I][J] =$ *ToBinary*($FMat[I][J]$)
  End for
End for
// Selection of Dynamic Key of LEN Size
If $((p+2) \; Mod \; 2 = 0)$ *then*
  $KEY[LEN] =$ *Row* $-$ *wise Select* $(FMat[p-1][p-1], LEN \; bits)$
Else
$KEY[LEN] =$ *Column* $-$ *wise Select* $(FMat[p-1][p-1], LEN \; bits)$

End if

- -

4.3 **AES Encryption**

ALGORITHM* 1.2: *AES Encryption

***Input*(*s*):** *Session Key* (*KEY*[*LEN*])

***Output*(*s*):** *Encrypted Data File*

ROUNDS
= Input ("Enter the number of AES rounds")

For I = 0 to ROUNDS

Perform S − box operation.

Perform Shift rows operation.

If (I! = ROUNDS)

Perform Mix columns operation.

End if

Perform Add round key operation.

End for

AES Encrypted data is ready to be transmitted.

4.4 **AES Decryption**

ALGORITHM* 1.3: *AES Decryption

***Input*(*s*):** *Encrypted File* (*E*1.*PDF*), *Session Key* (*KEY*[*LEN*])

***Output*(*s*):** *Original Data File*

ROUNDS
= Input ("Enter the number of AES rounds")

For I = 0 to ROUNDS

Perform Inverse shift rows operation.

Perform Inverse S − box operation.

If (I! = ROUNDS)

Perform Inverse Mix columns operation. End if

Perform Inverse Add round key operation.

End for

Original data is ready at the recipient.

5. Result Section

The proposed methodology was implemented in a computing environment of Intel Core i9 processor, Microsoft Windows 10 OS (64 bits), 08 GB RAM and 01 TB of HDD memory. This section deals with the results obtained during the execution of the proposed method. The main focus is to have security implementation on the digital E-learning system. In brief, the results were mentioned to prove our efficacy in terms of mathematical tests.

5.1 ECC Key Generation Time

In this sub-section, we have presented the key generation time required through proposed technique. Varieties of AES key bits were created with the dynamicity. The observed timing noted under this study, was mentioned in the following table 1.

Table 1: Proposed Key Generation Time

Sl. No.	ECC Key Size (bits)	Time Needed in Key Generation (ms)	Used AES type
1	128	2.015	AES 128 bits
2	192	3.541	AES 192 bits
3	256	3.775	AES 256 bits

From the above stated table 1, it may be observed that there is a correlation between the key size and time needed for the key generation. There exists a direct correlation (r) with value 0.920719. Thus, with increase in key size, the time needed would also increase. Thus, intruding would be more difficult in the case of the proposed technique.

5.2 Randomness Checking

To have robust session key through ECC, we have carried out some of the randomness tests to ensure their functional efficiency. We have carried out Poker test, Frequency test, and Run test on different size proposed key stream.

Table 2: Randomness Test Value

Sl. No.	ECC Key Size (in bits)	Value of Poker Test	Value of Frequency Test	Value of Run Test
1	128	0.214	0.314	0.186
2	192	0.163	0.247	0.255
3	256	0.268	0.305	0.192

According to the above presented table 2, we can conclude that each of the tests that were performed ad produced good outcomes. It proves our efficacy in terms of the randomness.

5.3 Operational Time

Using the online E-learning system, sender and receiver can communicate securely. The operational time is to be a critical parameter here. The system must operate on less encryption and decryption time. The encryption time and decryption time for the proposed system had been recorded in the following table 3.

Table 3: Proposed Operational Time

Serial Number	File Name	File Size (kb)	Encryption Time(sec)	Decryption Time(sec)	Cryptographic Time (sec)
1	FILE 1.PDF	11520	0.9408	0.2146	1.1554
2	FILE 2. DOCX	7854	0.8159	0.3585	1.1744
3	FILE 3. JPG	21478	0.6415	0.3109	0.9524
4	FILE 4. XLS	16974	1.2540	0.7810	2.0350

The cryptographic time obtained on different four files was acceptable. In the following figure 2, we have shown a graph on the original file size and encrypted file size. The same files mentioned in table 3 were considered for this purpose.

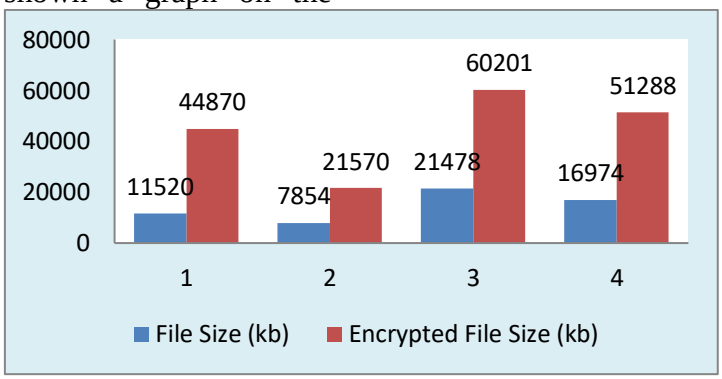

Figure 2: Encrypted File Size Display

From the above mentioned figure 2, we can say that the encrypted file is much greater than its original file size. Thus it creates much bigger troubles for intruding in the field of E-learning.

5.4 Key System Complexity

The tricky part is that the intruders will try to decode the ECC key. In this proposed technique, the key system complexity can be found by the following equation 4.

$$S.C\ (T) = \sqrt{Ord}\ operations \quad \ldots\ldots(4);$$ where,

S.C(T) is the key system complexity, Ord means the cyclic order of the elliptic curve with generator. To deal with key size 192 bits, and Ord a very very large number, the key system complexity can be derived as follows [41]. Also suppose each operation would need 0.0000002 second to operate.

$$S.C\ (T) = \sqrt{Ord}\ operations$$

$$= 7.92282 * 10^{28}\ operations$$

$$= 3.8 * 10^{11}\ days$$

By this time, the communication key validity will expire, when evaluated by the intruders.

5.5 Key Size Efficacy

Another notable parameter in any online education system is the length of the session

key. In this part, we have considered an arbitrary file, and intended to have identical encryption hardness using the proposed method, and other classical algorithms. In the following table 4, we have shown the comparison on the different key size needed.

Table 4: Proposed Key Size Efficacy

Serial Number	Proposed Here (Key Size in bits)	Classical Symmetric Algorithm (Key Size in bits)	Classical Asymmetric Algorithm (Key Size in bits)
1	128	80	1040
2	192	100	1440
3	256	128	2048

From the above noted table 4, we may conclude that the proposed technique deals with moderated key size.

5.6 Standard Comparison

In this sub-segment, standard comparisons had been made here. Firstly, the proposed method had been compared with classical algorithm. And secondly, it had been compared against some of the literature articles of the earlier section 2.

5.6.1 Comparison with Classical Method

Here, the proposed system had been compared with classical RSA algorithm [42]. The following table 5 has the comparison values in a brief format.

Table 5: Comparison between proposed method and classical algorithm

Serial No.	Comparable Features	Classical RSA algorithm	Proposed Here
1	Computing Power	High computing	High computing in low time
2	Overheads Incurred	High	Lower than RSA
3	Time in Key Generation	Slow	Fast
4	Key Size	Depends on Integer factorization	Dynamic length
5	Cryptographic Function	Average	Better

7.6.2 Comparison with other literature papers

In the following table 6, we have presented a comparative structure between the proposed technique and literature papers.

Table 6: Tabular Comparison with literature works

Attributes	Reference [15]	Reference [16]	Reference [18]	Reference [19]	Reference [27]	Reference [29]	Reference [30]	This paper
Digital E-learning	Yes	Yes	Yes	Yes	No	No	No	Yes
Use of ECC	No	No	No	No	No	Yes	Yes	Yes
Key Generation	No	No	No	No	Yes	Yes	Yes	Yes
E-learning Data Encryption	No	No	No	No	Yes	Yes	Yes	Yes
E-learning Data Decryption	No	No	No	No	Yes	Yes	Yes	Yes
Randomness Testing	No	No	No	No	No	No	No	Yes
Key Size Efficiency	No	No	No	No	Yes	No	No	Yes
Operational Time	No	Yes	No	No	Yes	Yes	Yes	Yes
Comparative Study	No	No	No	No	No	No	No	Yes

6. Conclusions

In the current innovation and amicable age, the information security is the most indispensable issue on every single fields of digital

computing [43-44]. Advanced E-learning is a field where it bestows the educating learning measure through computerized techniques. A progressive change had happened in this space since the appearance of the novel corona virus. It had acted as a catalyst to reinforce its popularity and significance. It keeps the education framework unblemished with online classes and talks. This paper has proposed a dynamic session key creation through Elliptic Curve Cryptography (ECC). The proposed session key needs not to be communicated to the recipients. A similar session key would be created at the opposite end. Moreover, that proposed key would be utilized to scramble and unscramble the E-learning documents by the clients. Generally speaking, an improved security method has been proposed here. The functional planning noted was to be fulfilled on various information documents. There has been a correlation between the key size and time needed for the key generation, and $r =$ 0.920719. Thus, intruding would be more non-viable in such proposed technique.

7. Future Scope of Improvement

The proposed cryptographic method can be modified into Artificial Neural Network models, so that it can automatically test the results in the field of online E-learning.

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Availability of Data and Materials

Not applicable.

Ethics Approval and Consent to Participate

Not applicable.

Consent for Publication

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

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A CNN TECHNIQUE FOR FACE RECOGNITION BASED ON IMAGE AESTHETICS

Venkateshwarlu P and Manjula B
Department of Computer Science, Kakatiya University, Warangal, Telangana, India

ABSTRACT

The effective deep learning approach is used to implement the aesthetics quality assessment over a new type of pretrained features in a data set that comprises of aesthetics data. As the previous approaches omit some of the statistical evidence over the original images that comprises of minute crops that performs down-scaling or warping of the originals while training the dataset. Initially the proposed methodology takes full resolution images as input with distinct input sizes for improvising the Spearman Ranked Correlation Coefficient (SRCC) with the Mean Opinion Scores (MOS) from the existing best reported of 39% and standard deviations is best reported to be 41%. The performance is achieved by extracting Multi Level Spatially Pooled (MLSP) features with convolutional blocks implemented on AVA dataset, TID2013 dataset and personal dataset with more than 1000 images are tested our proposed model using traditional superficial Convolutional Neural Network (CNN) architecture.

Keywords: *CNN, MLSP, MOS, SRCC, deep learning, Aesthetics*

Introduction

The Aesthetics quality assessment (AQA) [1] involves the process of forecasting subjective opinions for performing the ratings of aesthetics assessments or disseminations. Fixed size blocks are processed using GPU blocks of data like image batches with similar resolution that are trained and are extremely inefficient due to the minimal batch size [2].

The AVA database comprises of almost all extraordinary resolution images with an average width and height of 629×497 with a maximum of 800×800 pixels, this is most effective when we perform training over DNN models for resampling the database of images [3].

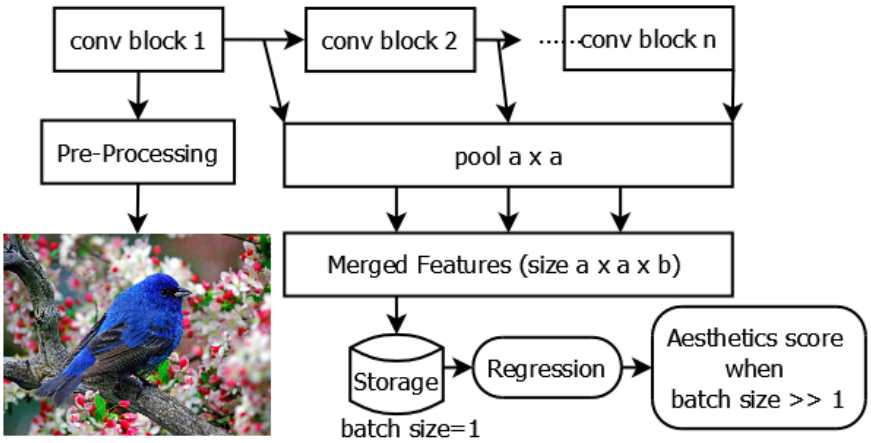


Figure 1 Pipeline training of framework over inception type network

In **figure 1** we extract distinct stored features that with distinct sizes and with higher resolutions over an inception network that consists of various features comprising of Multi level Spatially Pooled activation blocks (MLSP) that is merely required for evaluating distinct aesthetic features by provisioning larger images by bypassing most of the major disadvantages that leads to a lesser resolution image by efficiently training the input or original images in AVA data set or the user dataset [4].

In this paper we introduce a novel method for categorizing and predicting the aesthetic and the higher quality of an image or which is the best image in a specific dataset that is implemented using CNN architecture. The process consists of utilizing the higher correlation that is gained through distinct ratings provided by distinct users using which we classify the images using the mean scores at

are evaluated or about to obtain in near further denoted in the form of a histogram [5].

When we take into account the maximum resolution images used for performing training or testing over distinct resources that are utilized by most of the people who tends to reflect only low-resolution images for which we utilize GPUs more efficiently and successfully when compared to memory consumption.

Related Work

To process and predict higher resolution images using machine learning has deliberately represent and extract higher level of features by using CNN tends to denote the performance by replacing and using blind quality assessment [6]. When we deal with point-to-point feature learning system the task of assessing the pixel-level quality using CNN [7]. Shallow network is the proposed model with a single convolutional layer along with dual fully connected layers with the 32×32 input patches [8].

As per the [9] the deep CNN comprises of 12 layers for improvising the image quality predictions using the minimal input size (32×32) with the required score aggregation over whole image with the deep quality predictor based on AlexNet with multiple CNN features that are extracted from various image crops with regressing sizes of 227×227 for getting image scores for categorizing minimum and maximum aesthetics that are clearly based on mean human ratings [10].

Most of the Convolutional Neural Network (CNN) architectures for classifying the tiny images that are below 300×300 pixels with the similar resolution are considered [11]. And the two challenges that are faced by AQA in deep learning is that the database comprises of more than 25K unique images with 800×800 pixels on which we can perform the transformation but the disadvantage with this kind of images is it cannot preserve the information over any transformation [12].

The DNN and AQA methods tried to provide the solution for overcoming both the limitations by proposing the multi-column architectures that considers many small resolution rescaled images in the form of 224×224 as inputs over their aggregates to attain the aesthetics score [13].

The double column DNN architectures support integration process of global rescaled view with 224×224 pixels that are randomly cropped from a 256×256 downsized original images along with the local crop of 224×224 pixels that are extracted from original image [14]. And the work further extended by implementing the multiple columns with 256×256 pixels using the random patches from original image and employing the same in shallow networks based shared weights using CNN over each column attained [15].

This work is further extended by performing selection of 224×224 pixel patches that are sequentially attained based the aspect of image saliency and further by aggregating the entire modeling process over the relative layout [16]. Further a multi-column architecture is accommodated to integrate pooling sizes of five spatial images for testing the attainability of variable resolution images using VGG-16 architecture. This process improvises the architecture by bypassing user inputs using small patches to train the features directly over the original images without any limitations [17].

For classifying the images using fully connected regression techniques we rely over MobileNet [21], VGG16 [22], Inception-V2 [23] we can predict various ratings while distributing the ratings over images by rescaling 224×224 to 256×256 images. Better results have been attained using AVA approach that augments the process of fine-tuning the basic networks by proposing the regression head element as the image corps are directly proportional to each feature of images with 90% of the width and height of the aesthetic images when quality is considered [18].

The aesthetic images are ranked using the training process of AVA using the implementation of rank-based loss function in a dual column architecture that learns the variation of distinct aesthetic scores over distinct input images with 227×227 random crops attained from 256×256 rescaled original images using triple loss function [19].

The conventional way to verify the SRCC metric is by executing the ranking loss by optimizing the aesthetic quality using lower-

level factors like the process of image degradation by improvising the content-oriented image factors that reduce the image resolution at the time of pre-computation over multiple levels of content feature networks [20].

And some more researchers have done predominant work in this area but there is no specific process to identify the best image which we are about to do in this paper. As the proposed methodology will tend to identify the images based on the aesthetic scores that are attained by random users collected through using the full resolution images as input with distinct input sizes for improvising the Spearman Ranked Correlation Coefficient (SRCC) with the Mean Opinion Scores (MOS).

Proposed Methodology

Loss Function

Most of the references specify that Soft-max cross-entropy is extensively utilized for training the loss in a specific classification tasks to represent$\sum_{i=1}^{n} -p_{si} \log(\bar{p}_{si})$, where $\bar{p}_s$ denotes the probability of ith bucket for maximizing the projected probability with correct labels based on the ordered that comprises of aesthetic scores and with quality estimate. The cross entropy-based loss comprises of deficiencies based on the association between various classes using the bucket scores denoted by real numbers using regression framework that outperforms regression model orders intrinsic training datasets to handle the losses based on loss function calculated based on the miss classifications over various distances attained.

Graph Based Model

The term partial denotes the part or combination of frontal face image such as eye, nose and mouth. We implement the graph matching over face recognition under fractional visibility to diminish image information as it must be converted to gray scale RGB level where each of the color image comprises of three given channels represented in red, green and blue components in RGB color scheme. Initially we convert a RGB full face scale image to gray scale image by defining the gray scale level where the pixels in images are stored in 8-bit integer to denote the color from black to white. Then in preprocessing stage we equalize the histograms attained for gray level images in a statistical approach adopted for performing image processing. Histogram equalization is the process of implementing contrast adjustment using histogram.

The proposed method usually increases the contrast of the input image which is further converted to gray scale image by implementing edge detection methods using morphological techniques that are applied for reduction of noise and reconstruct the skin shape or regions. All the connected components are present in the edge image with a constant threshold value over several connected components for elimination distinct connected components with a diminished threshold to attain a clear region that intersects the edge mask. Further segmentation is applied over the original image using the Scale-Invariant Feature Transform (SIFT) [21] technique to detect the local feature key points and further marking of dots over full face in a partial face images as we shown in figure 2 and 3. Partitioned clustering techniques are used in detecting major components such as eye, nose, and ear regions that clusters the centroids to generate an adjacency matrix over vertices of an image for matching then training and querying face image using graph Matching to get the desirable recognition results. The more the number of key points detected in an image is the more clarity image to be considered, hence the count factor of key points is considerably important aspect which is also called as the aesthetic score.

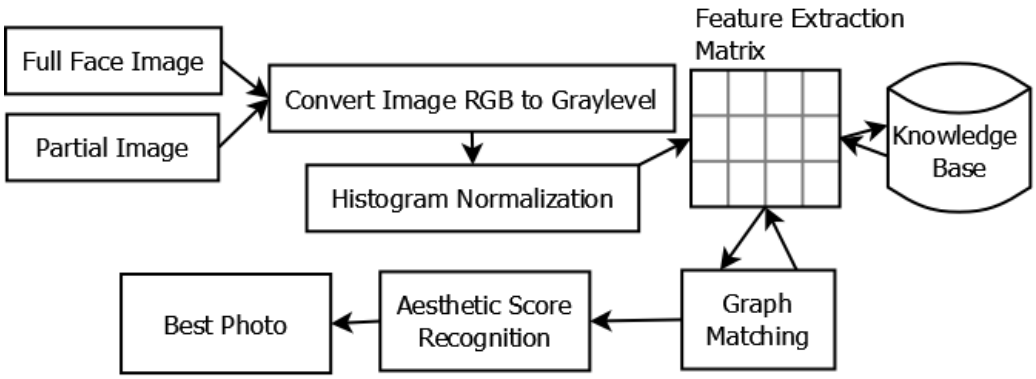
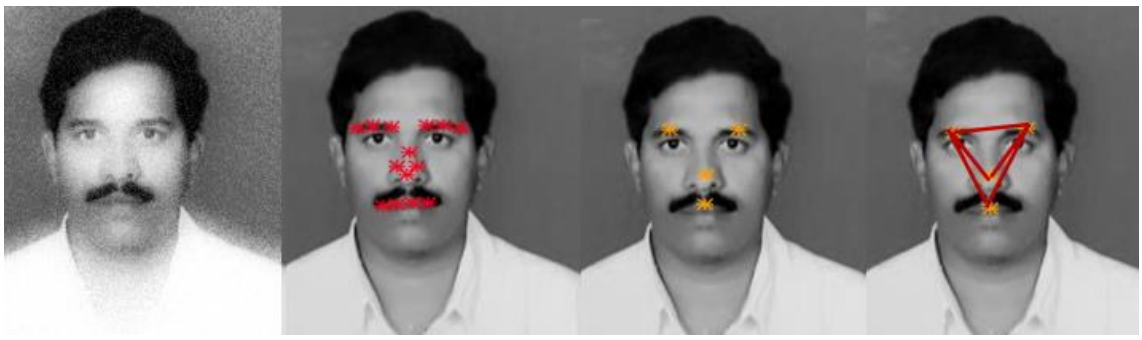


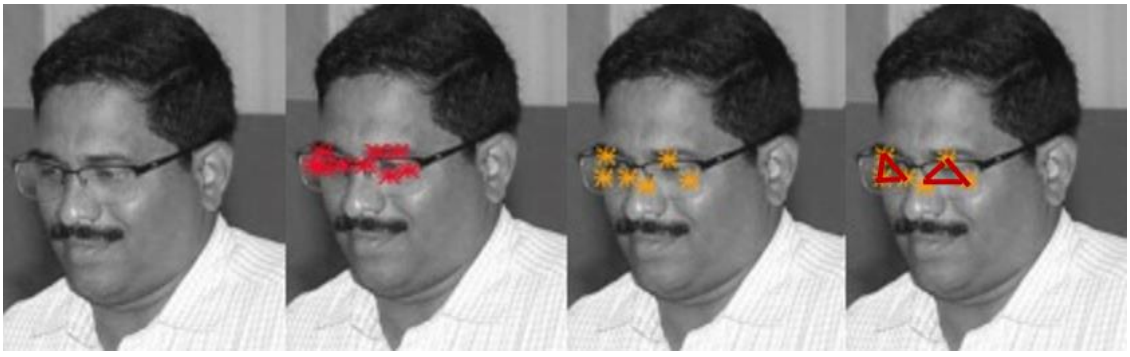
Figure 2 Block diagram of proposed model

The process of feature extraction is applied on SIFT where initially the feature detectors detect local feature key points to filter out outliers by implementing rotation of image corps, translation of image corps, scaling and even occlusions between querying image and training images based on testing image which is merely difficult to normalize them with respect to eye positions as per the face alignment. Hence, we propose local features and detect key points with SIFT feature detector as it is typical with 128×128 face image as the SIFT feature detector can generate hundreds of feature key points denoted by C based on the relative positions in an image frame.



(a) (b) (c) (d)

Figure 3 Images taken from training dataset with highest aesthetic score (a) Full Face Image (b) Shift Features points (c) clustered centroids (d) Complete graph for cluster centroids



(a) (b) (c) (d)

Figure 4 Images taken from training dataset with highest aesthetic score (a) Partial Face Image (b) Shift Features points (c) cluster centroids (d) Complete graph for clustered centroids

The count of key points identified in a facial image can vary based on the clarity of the image in terms of pixels and their colors that matches with the set of training points that are further scaled to attain the computationally intensive. All the unreeving key points that might consider as a hinder point by matching the process as it misleads the implementation

of the process of matching the local minimum value that is specifically genuine as it matches with the pairs that matches with the features that identifies the outliers formerly matches.

The graph method is used to detect individual aspects of an image based on the constant features using the statistical approach by denoting a graph G(V, E) where in V denotes vertices and E denotes edges in a graph with finite and nonfinite set. All the components in an image are represented by V and v nodes including faces and the Euclidian distance δ_e is measured using δ_{ij}, where e denotes number of edges such that e ε E and i, j denotes centroids where each edge and node must have similar levels as the graph must match exactly other wise such graph is considered as the inexact graph.

In a graph G, $G_R=(V_R, E_R)$ are used to represent the face object in an image for which we have taken more than 500 example graphs with the generated geometric mean value of the node with distinct sizes and calculated edge distance which is used to denote a face graph by considering position of component and size as the primary aspect. Similarly graph G_D is formulated from the generated graph by observing the components such as v ε $V_D$as the components with connected nodes in a face edge e ε E_D used for connecting the nodes.

G (V_i^c, E_i^c) are used to denote the deviation aspect attained from two measures obtained through node pairs comprising of components over a graph G_D to extract possible graphs G (V_i^c, E_i^c) for representing individual face with distinct sizes and position of a face object in a graph G_C. For comparing the process of sub graph with lower similarity combination are supposed to be removed by using the distance information-based components $v \varepsilon V_w$, are used to introduce the face completion process in a detected graph with minimum components in a graph or a sub graph G_i^s (V_i^s, E_i^s) are chosen from the consequential graph.

Most of the characteristics of a graph are clearly described using the aspects of geometry to discriminate the graphs based on the face images, as all the vertices are arranged spatially in a graph with partial face images with obligatory constraints based on length of edges between all the neighboring vertices for constructing the feature points using SIFT feature descriptor. By considering n feature points in a full-face image or a partial face image is minimum n! in this manner all the graphs are emerged for each image and evolution is done over each testing image by considering number of graphs is computationally costlier. Hence an acceptable graph is generated with possible set of vertices that are projected per iteration where in each iteration edges and vertices are added as required and further projected using Breadth first search approach using spatial neighborhood distance measure over each vertex for generating unique graph with feature points set.

Selecting best image from a set of images:

As we know that the conventional SSD algorithm is implemented using the multi-scale feature map for identification of target by extracting the multi-scale features by diminishing each of the subsequent layer size to improvising the discovering the speed and accuracy which must further improvised. And the MobileNet algorithm implements the deep convolution layer whose basic layer is the deep separable convolution network layer for reducing the calculations and further optimizing the delay aspect based on the size of model for detecting the target, the aspect of accuracy is lower than expected, hence we combine the two networks to attain the real-time and high-precision detection both.

The proposed algorithm1 improvises the speed of detection as the MobileNet algorithm is combined with SSD algorithm and though it is typical to attain the real-time detection results. We perform the merging of BN layer with the convolution layer in the MobileNet and SSD algorithm as:

Algorithm 1:

Input: Image Dataset

Output: Detected best image

Method:

Step 1: Start

Step 2: implement the equation 1 and attain CONVj for generating pixel matrix

Step 3: implement equation 2 to denote convolutional output layer

Step 4: reconstruct the parameters by implementing $\sum_{i=j}^{j+n} x_l \frac{\sigma*\omega_{l-j}}{\sqrt{variance}} + \frac{\sigma*b}{\sqrt{variance}} - \frac{\sigma*m}{\sqrt{variance}} + \varepsilon$

Step 5: generate novel weights by implementing $\frac{\sigma*\omega}{\sqrt{variance}}$

Step 6: reconstruct the weights based on the aesthetic scores by implementing $\frac{\sigma(b-m)}{\sqrt{variance}} + \varepsilon$

Step 7: select the best image based on the detection layer

Step 8: Stop

$$CONV_j = \sum_{i=j}^{j+n} x_l \omega_{l-j} + z(1)$$

Where X denotes pixel matrix attained for every image, z denotes offset value of image and $CONV_j$ denotes the output of convolutional network, ω denotes traditional weight of convolutional layer

$$Bn = \frac{\sigma(CONV_j - m)}{\sqrt{variance}} + \varepsilon(2)$$

Where Bn denotes the output layer of the convolutional layer and σ, εdenotes re-construction parameters. The operation process is shown in equation 1 and 2

$$Bn_j = \sum_{i=j}^{j+n} x_l \frac{\sigma*\omega_{l-j}}{\sqrt{variance}} + \frac{\sigma*b}{\sqrt{variance}} - \frac{\sigma*m}{\sqrt{variance}} + \varepsilon\ (3)$$

Where Bn_j denotes output of the convolutional layer, σ, εdenotes reconstruction parameter, ω denotes traditional weight of convolutional layer, b, m denotes offset values (score) of convolutional network, and equation 1 and 2 are combined to get equation 3

$$\omega_{new} = \frac{\sigma*\omega}{\sqrt{variance}}(4)$$

Where ω_{new} denotes novel weight of convolutional layer and ω denotes traditional weight of convolutional network

$$b_{new} = \frac{\sigma(b-m)}{\sqrt{variance}} + \varepsilon\ (5)$$

Where b_{new} is the offset convulational offset (score) output value attained and ε denotes reconstruction parameter, new calcualation methods illustrated in equation 4 and 5 are derived from equation 3

The structure of the proposed algorithm is illustrated in Figure 5 where the size of all input images taken from user data set are normalized to 300×300 and $CONV_1$ to $CONV_4$ are deep separable convolutional layers with 4 standard convolutional layers which can be further extended as required. BN layer and ReLU are merged on the added convolutional layer and the convolved layers of Conv1 comprises of 75x75x128, Conv2 comprises of 38x38x256, Conv3 comprises of 19x19x512, and Conv4 comprises of 10x10x1024 these layers which is the combination of CONV0 + BN + ReLU + Score. These layers are further extracted to the detection layer as the method can effectively solve the issue of gradient vanishing and incline detonation for reduction of calculation amount and to improvise the performance and provides the effective of the model.

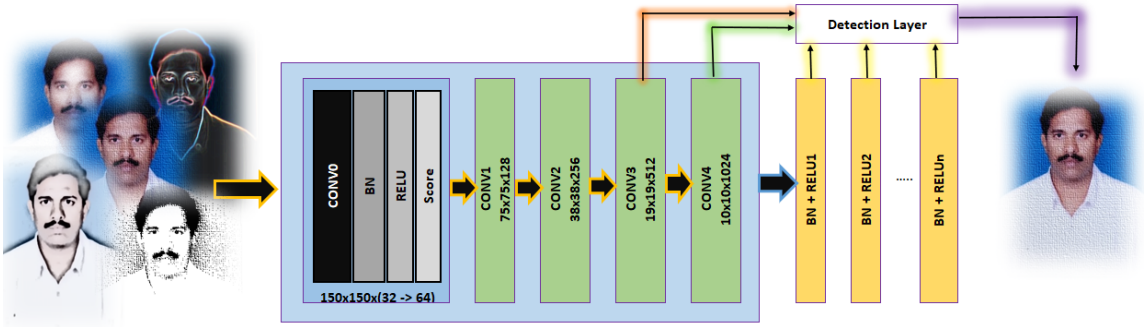


Figure 5 Proposed algorithm Structure

Shape extraction from face by morphological reconstruction

By adopting the process of morphological reconstruction process which is the powerful transformation process for extracting the shape of a face in an image and to structure the image elements that comprises of both the starting point of an image transformation and the mask image of it to detect the face by re-constructing the image detected by implementing the erosion and dilation operations using the elements 8x8 for defining the approximation process and the connectivity aspects of human face shape. And the proposed algorithm2 is:

Algorithm 2:

Input: Image with distinct image objects

Output: Detected faces in the image

Method:

Step 1: Start

Step 2: Read a RGB image

Step 3: Resize the input image as per the image resolution
Step 4: Convert RGB image to grayscale image
Step 5: Initialize value hue H and saturation S based on the image
Step 6: Initialize blue difference value C_b and red difference value Cr of image
Step 6.1: if (C_r[i][j] >= 140 && C_r[i][j] <= 165 && C_b[i][j] >= 140 &&

C_b[i][j] <= 195 && hue[i][j] >= 0.01 && hue[i][j] <= 0.1)
Step 6.2.1: identify Skin Region
else
Step 6.2.2: Reject pixel
Step 6.2: eliminate noise from the segmented binary image using erosion then dilation and hole filling morphological operations
Step 7: identify the shape of face then reconstruct morphological image
Step 8: draw red rectangular box on the region after detecting face based on eyes, nose andmouth.
Step 9: Display the detected image as output
Step 10: Stop

Training

We have implemented testing the proposed system using AVA dataset [1], Tampere Image Database 2013 (TID2013) [2] and personal datasets that comprises of more than 20,000 images from which around 19,900 images were clearly readable and further we were able to split the images by considering 95% as training set and left over 5% as the validation set. This bifurcation of testing and validation set gave us better results than rest of the bifurcation with minimum loss as per our previous analysis to predict the good quality image based on aesthetic score and to detect an object or face image in a photo with a greater number of objects or images.
We initially initialized the learning rate proposed in training set is with the ration of 10:4 that is the set of 20 epochs are divisible by 10 and it is observed that the aspect of loss is almost less than 5 epochs based on transition and the minimal aesthetic score attained by different users is between 10 to 6. We use the Adam optimizer [12] over every hyper parameter for initializing the learning rate with the default values and with the proposed batch size of 128 using finetuning models per batch of 32 images. And the results have been attained on a system with i5 processor and 32GB RAM using Keras with Tensorflow as the backend for implementing our proposed model.

Experimental Results

In the proposed methodology we implemented the proposed algorithm using anaconda software in the academic environment using 64 gb RAM on a Intel XEON server that uses 8 cores.
And the proposed methodology is implemented separately to train models for calculating aesthetics score and to perform the technical quality assessment on our three datasets by splitting each of the dataset into train and test sets with 20% of data is used for testing and 80% for dataset and assessed the results by modifying the percentages and these are the values with which we got the best results. We identified the best pictures based on aesthetic scores and identifying the face image in a crowded image.

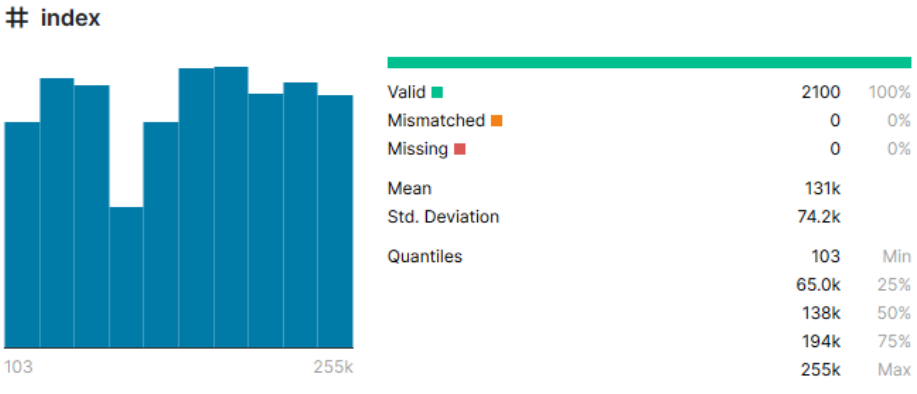


Figure 6 Test dataset over aesthetic score index values attained

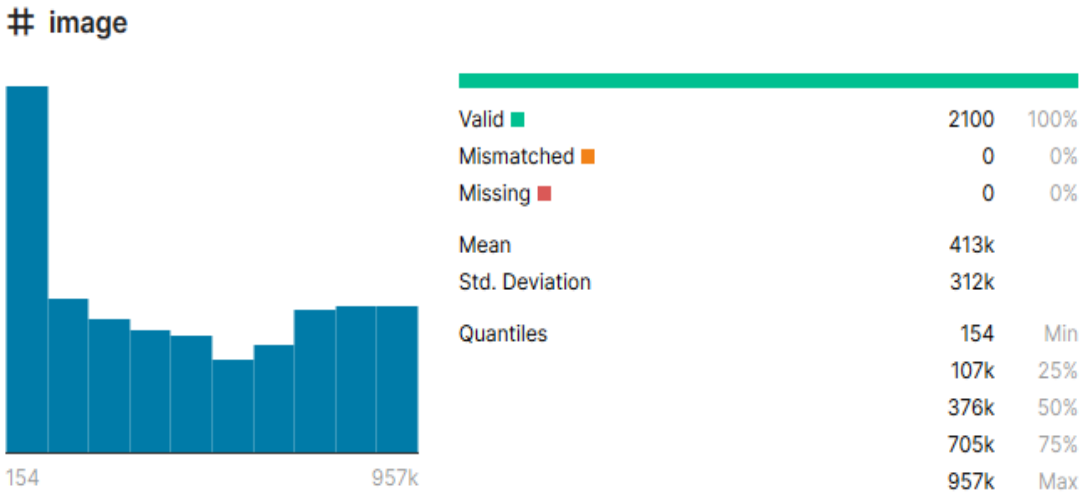


Figure 7 Test dataset over aesthetic score image values attained

Figure 6 and 7 represents the test dataset results attained by considering the aesthetic score image values attained for all the three datasets considered in the paper

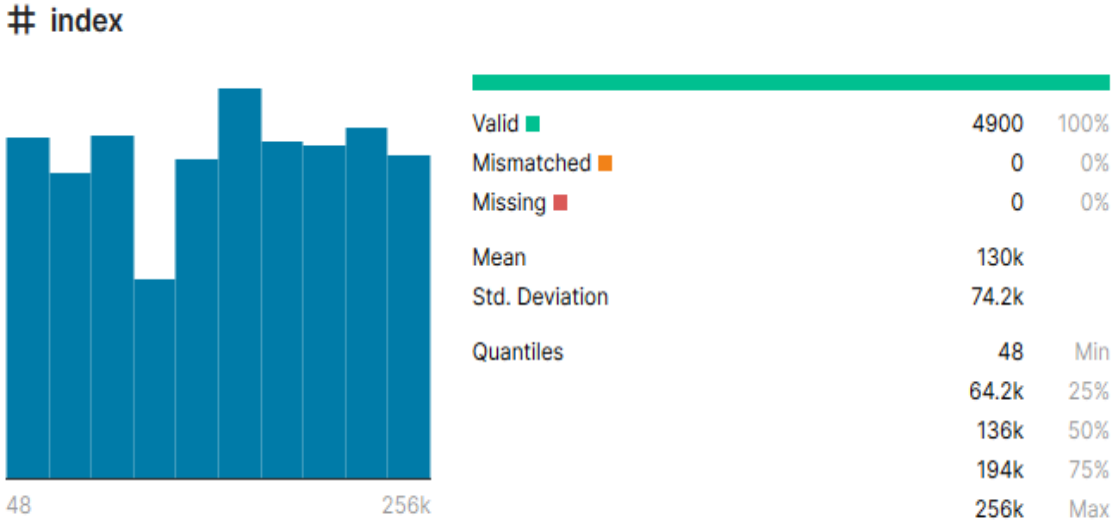


Figure 8 Training dataset over aesthetic score index values attained

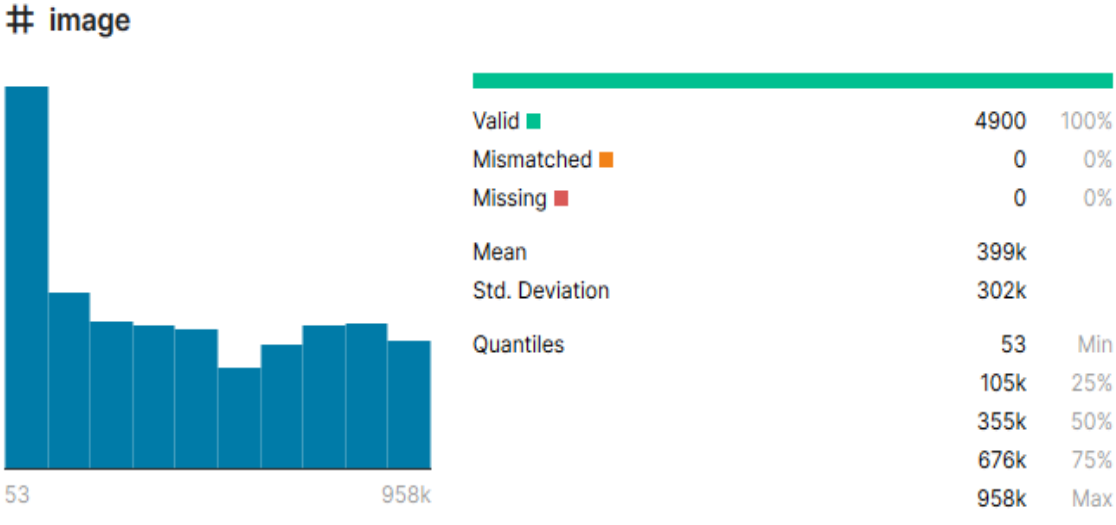


Figure 9 Training dataset over aesthetic score image values attained

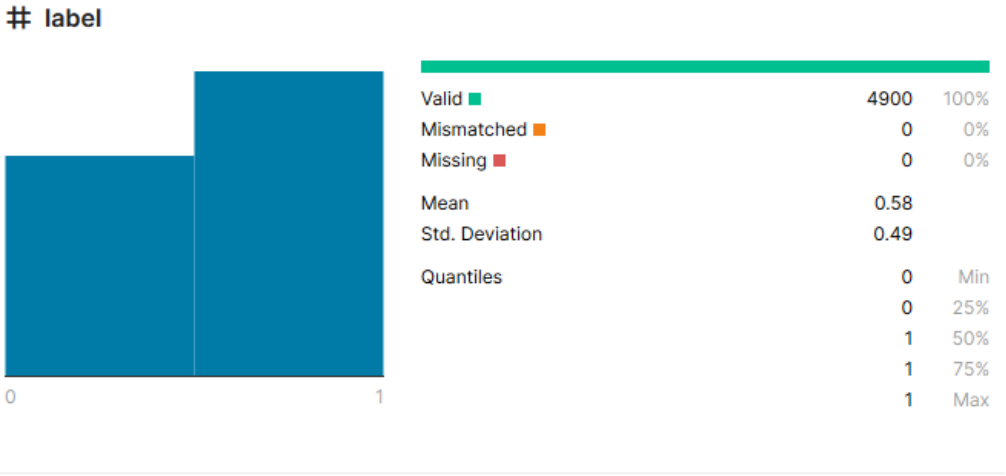


Figure 10 Training dataset over aesthetic score label values attained

Figure 8, 9 and 10 represents the training dataset results attained by considering the aesthetic score image values attained for all the three datasets considered in the paper

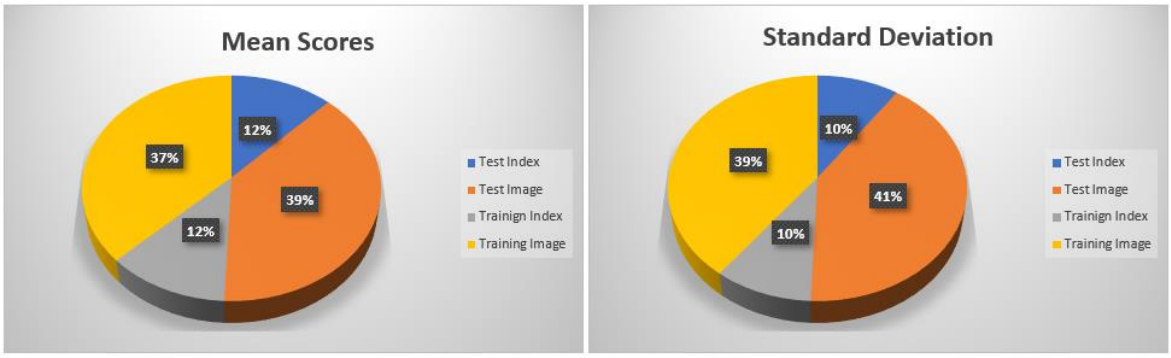


Figure 11 Pie chart denoting Mean scores and Standard deviation all images considered in three datasets

Figure 11 represents the pie chart generated by calculating the mean score and standard deviation scores generated for all the image dataset considered from three datasets and the images denote that the training image is having highest mean and standard deviation for all the datasets considered in this paper

6.47(±1.03) (b) 6.25 (±2.08) (c) 5.18 (±2.13) (d)3.14(±1.05)

Figure 12 Example images of AVA dataset [1] with quality score $\mu(\pm\sigma)$, where μ denotes mean value and σ denotes standard deviation attained based on aesthetic score. a,b,c,d denotes the image details as per T**able 1**

Table 1aesthetic score statistics attained for top 5 AVA dataset image

Image name	Rank	Users	commenters	participants	Votes	Comments
Big City Lights	1	7.4249	8.6111	7.0519	233	68
Above the Crowds	2	7.1538	8.4167	6.6711	234	46
Fireworks	3	6.9958	8.6667	6.6001	238	27

Small Town America	4	6.7301	8.1905	6.4545	237	30
Night Flare	5	6.6781	7.7895	6.3506	233	24

(a) 6.38(±1.24) (b) 6.14 (±2.32) (c) 5.35 (±2.04) (d) 3.25 (±1.36)

Figure 13 Example images of TID2013 dataset [2] with quality score $\mu(\pm\sigma)$, where μ denotes mean value and σ denotes standard deviation attained based on aesthetic score. a,b,c,d denotes the image details as per Table 2

Table 2 aesthetic score statistics attained for top 5 TID2013 dataset image

Image name	Rank	users	commenters	Participants	Votes	Comments
Patriotic Explosion	1	6.6223	8.5789	6.3289	233	25
Toothy Grin	2	6.607	7.7501	6.4807	229	16
Light palms	3	6.4686	8.2308	6.2405	239	23
Boom	4	6.4502	8.0909	6.1039	231	12
Time Warp	5	6.4716	7.8002	6.2838	229	15

(a) 6.14(±1.07) (b) 6.07 (±1.24) (c) 3.22 (±1.01) (d) 2.15 (±2.12)

Figure 14 Example images of personal dataset with quality score $\mu(\pm\sigma)$, where μ denotes mean value and σ denotes standard deviation attained based on aesthetic score. a,b,c,d denotes the image details as per Table 3

Table 3 aesthetic score statistics attained for top 5 personal dataset image

Image name	Rank	users	commenters	participants	Votes	Comments
Farewell party	1	500	114	225	58	23
Freshers party	2	500	65	226	47	25
May I Help you	3	500	50	230	38	22
Workshop	4	500	105	233	37	21
Sprots day	5	500	43	235	35	20

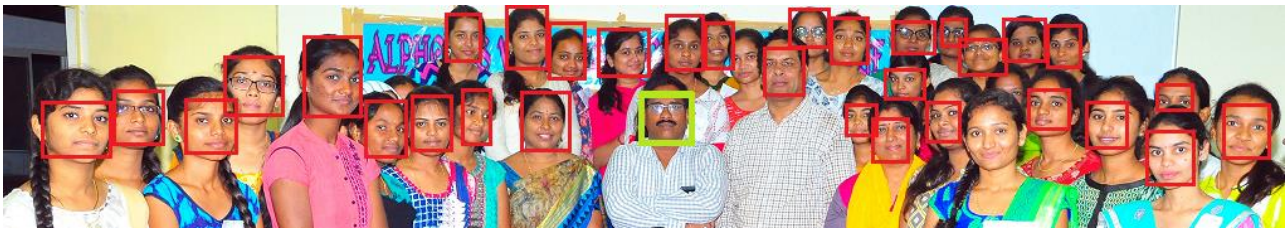


Figure 15 detecting face in image with distinct image objects or in a crowded image

Figure 12, 13 and 14 are results that are generated based on **Table 1, 2 and 3** respectively where we have taken the statistics generated from the dataset for the images based on the aesthetic score provided by users. **Figure 15** denotes the result of comparing the image with distinct image objects in a crowded image by considering a input image of one of the author over a image with the highest aesthetic score.

Datasets Used

Based on the aesthetic values of images a data set is available called as the Aesthetic Visual Analysis (AVA) dataset that comprises of around 255,000 images collected by amateur photographers [1]. Where every image in dataset is being scored by an average of 200 users in a photography contests that took place based on a unique challenge as a theme and the ratings were given in a range of 1 to 10 where 10 is the maximum aesthetic score given to an image.

Another image dataset that is used in this paper is Tampere Image Database 2013 (TID2013) [2] which comprises of 3000 images with 25% of them are the cleaned images called as Kodak images [25] with 5 levels and 24 types of distortions of each image with distinct artifacts. And TID2013 dataset is experimented over distinct volunteer observers for identifying the best image with distorted choices where each image is paired with 10 distinct images and further compared to get the points ranging from 0 to 9. These points are summarized and averaged to get the final quality scores.

And the final dataset that is used is the personal dataset whose images are captured using mobile phone that is over 1000 images and these images are rated in an academic environment by undergraduate students and the aesthetic scores are attained for each image with seven distinct topics.

Conclusion

In this paper we have proposed a effective deep learning approach to evaluate the aesthetics quality of an image based on the aesthetic scores given by comentators or verifiers selected randomly over the image datasets: AVA [1], TED 2013 and personal dataset by considering more than 1000 images in personal dataset along with pretrained features in a data set with aesthetics data. We proposed two algorithms that are based on graph method to find the best image based on the aesthetic scores given by users. And to detect a face image in a crowded image based on the statistical evidence over the original images that comprises of minute crops by performing the down scaling or warping method on original imaged dataset by improvising the Spearman Ranked Correlation Coefficient (SRCC) with the Mean Opinion Scores (MOS). The results attained denote that mean value is attained to 39% and standard deviations is best reported to be 41% which are satisfactory and acceptable. The proposed model is implemented using traditional superficial Convolutional Neural Network (CNN) architecture.

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IMPACT OF DEMONETISATION ON DIGITAL BANKING – A REVIEW

Divya Verma and Deepak Sahni
School of Management & Commerce Studies, Shri Guru Ram Rai University, Dehradun

ABSTRACT

Demonetization is a process when imposed on currency it will not be considered as legal tender of money. Demonetization was implemented by various countries, in India demonetization occurred thrice the latest was announced by our PM Narender Modi on 8th November 2016 around 8pm at night, that notes of Rs 500 and Rs 1000 will not be considered as legal tender of money, this news gave shock to all, whether one is a wage earner or a businessman. Government gave time to people to deposit the same currency at bank till December 31st later this time extended till 31st March, as old notes demonetized and new notes were not in circulation, people started facing problem due to lack of cash. Many digital wallets were introduced that time to resolve the problem, government had taken several measures to encourage and motivate people to use digital modes as it will also give a way to digital economy which is one of a dream of our PM. people started using digital modes for doing transaction like,NEFT, RTGS, Paytm, Debit cards and credit cards etc. this will givea way to cashless economy. study is based on secondary data, several studies are been conducted on this topic, so the objective of the research is to study gap in the available literature. this research is been conducted to study the impact of demonetization on digital banking through available literature.

Keywords: *Demonetization, Digital wallets, Cashless economy, Debit Cards, RTGS,NEFT.*

Introduction

Four year ago, on 8th November 2016, prime minister Narender Modi had announced the news of demonetization, the reason behind the announcement of such high denomination currency was black money, tax evasion, terror funding and cashless India. After the announcement Government give time to people to deposited the notes of Rs100 and Rs 500 into the bank till December. Irrespective of long queue at bank for deposits every day, many people still not able to deposited the cash into bank as a result, Government extended the time for deposits till march 31st 2017.Banks observed a sharp increase in deposits in the normal accounts or in Jan Dhan account as people deposited their black money in accounts and pushed to pay taxes on their income. In India as most of the transaction is on cash basis and at that time old notes were demonetized and new notes were not in circulation. Due to shortage of cash, People faced a lot of problems like long queue in ATMs in which they were not to withdrawn the amount in excess of the limit fixed by the government, difficulty in buying grocery, difficulty in payment of emergencyservices like hospital bills. In order to resolve the problem government had taken several measures to encourage and motivate the customers as old modes were there like debit and credit cards, Paytm, Mobikwik, NEFT and RTGS some new modes were also introduced like IMPS (Immediate Payment Service), UPI (Unified Payment Interface)BHIM (Bharat Interface for Money), AEPS (Aadhar Enabled Payment System) later on Banks also introduced app like YONO introduced by SBI, LIME digital wallet by Axis bank, PAYZAPP by HDFC and so on.

knowledge about digital transaction or e-wallets is very importation for its usage. At time of demonetization the one who were aware about digital wallets and e- transaction can easily use digital modes of payment but the people who were not aware about such digital wallets are not able to use the digital wallets.

Government encourages digital payments. In order to provide better service government introduced many new digital modes under NPCI (National Payment Corporation of India)

National Payment Corporation of India was set up in December 2008 under the guidance of RBI (Reserve Bank of India) and IBA (Indian Banking Association), Certificate of commencement was issued on April 2009.it has 10promoters' banks namely SBI, PNB, BOB, Canara Bank, Union Bank, BOI, ICICI Bank, Citi Bank, HSBC and HDFC Bank. On 24 September 2009 NPCI got approval from BPSS (Board for Regulation and Supervision of Payment and Settlement System) for

operating various retail payment system in the country and granted authorization for operation of NFS(National Financial Switch) ATM network wef. 15 October 2009, on 14 December 2009 it taken over operations of National Financial Switch. Rules and regulation of membership had been framed in order to enroll all banks as member, this move is required in order to include all on a standardized platform.

National Payment Corporation of India (NPCI) introduced various digital modes in order to improve digital payment system. Some of them are as follows:

Immediate Payment service (IMPS): IMPS is electronic system that enables instant interbank transfer in India through smartphones. People can use it anytime any day as the service is available throughout the year including public holidays. this facility available 24x7. The system is managed by NPCI (National payment corporation of India)

Unified Payment Interface (UPI): UPI system is developed by National Payment Corporation of India that enables immediate real time fund transfer. The system is regulated by Reserve Bank of India. UPI makes instant fund transfer between two bank accounts through mobile phones.

Bharat Interface for Money (BHIM): BHIM is an Indian payment app developed by National payment corporation of India (NPCI). BHIM is based on UPI, so it supports all Indian banks which uses Unified payment Interface. This app can be run in all mobile device it enables users to transfer money from one bank account to another instantly.

Aadhar Enabled Payment System (AEPS): Aadhar Enabled Payment System is developed by National payment corporation of India (NPCI).it allows user to do the financial transaction through Micro-ATM by just using Aadhaar number and verifying transaction with help of their finger prints.

Objectives of the study

Specific objectives

1. To study the gap in the available literature.

Methodology Used

Descriptive Research : Descriptive research design is used in the study .Paper describes the impact of demonetization on digital banking.

Data Collection

The research is based on the extensive study of Secondary data. Data is collected through internet, journal, magazines, books and research articles.

Literature review

S. Vijay Kumar* T Shiva Kumar ** 2016 conducted a research on Demonetization and Complete Financial Inclusion. They spoke about the economic importance of demonetization. According to them demonetization leads to financial inclusion as demonetization resulted in increase of deposits at bank in turn bank provide loans to individuals as well as to businessman at lower rate of interest. Businessman used that low interest loans money into economic activity, so economic activity boosted. Demonetization increases banking education to the semi banked and unbanked population which was not possible through other means. Post demonetization cashless transparent system gained momentum and leads to more financial inclusion which will continue till our country achieve full financial inclusion.

Manpreet Kaur 2017 researched on Demonetization- impact on cashless system. Researcher states that demonetization hits the liquidity side of the economy, demonetization is an attempt to moved towards cashless economy. It increased the role of electronic financial transaction as after demonetization usage of debit cards and credit cards, net banking and digital wallets increased, more and more people shifted towards cash to cashless economy. Cashless transaction become the need of present society as it has several benefits like it reduce the risk of damage, safe and less time consuming and maintain records of all transaction. he further stated that people of all sectors will completely adapt cashless system in future

Shweta Singhal 2017 conducted a research on Demonetization and E-Banking in India. In this case study she checked the awareness level of rural people about e-banking and its usage after demonetization. Primary research is been

conducted through survey on urban and rural population and data was analyzed by use of ANNOVA to test the differences between the rural and urban youth in terms of awareness level and usage of e- banking services and she found that there is significant difference between the two in terms of awareness and usage level of e- banking. Male youth of urban area is more aware about e- banking services and highly used e-banking services and there is noticeable awareness in rural youth about e - banking services and usage of e-banking is quite low. She felt that study will help banks can improve their e-banking facility.

Vijay Singh 2017 carried a research on Demonetization a march towards digital economy. He said that government had various reasons for the implementation of demonetization policy one such move was creating India a Digital economy. When government announced the demonetization, people of India was not in habit of using digital wallets but government encourage the digital payments by introducing new digital wallets like IMPS, UPI and BHIM and so on. Initially people only used debit cards for withdrawal but rise in such payment increase when e-commerce brands like Flipkart and Amazon started giving heavy discounts on payments through the wallets and debit cards. People started using such wallets for the doing transaction. Based on this fact he further said that people are coming into digital reality and soon people adapt the digital payment system completely in future.

Yaswanth Nuthalapati* Hampapuram Prithvi Krishna 2017** carried a research on Banks and Demonetization. They studied that impact of demonetization on banks and other factors that leads to increase in transaction cost. After Demonetization there was an increase in deposits with banks and demands for both short term and long-term loans in the corporate sectors is also reduced, that leads to reduction in the Banks's profit.so, banks have to increase its transaction cost. Increase in deposits with banks may be fruitful in long run.

Nancy Prajapati* Sanjeev Kumar Singh 2017** researched on Impact of Demonetization on online transaction. Researcher studied the facts behind the increase in online transaction because of demonetization and how cash-based economy converted into cashless economy in a country where nearly all transaction were done on cash basis and problems that affect the online transaction. They found that there was increase in online transaction with e-commerce during demonetization because of lack of liquidity as e- commerce companies give discounts on purchases via digital modes so there was an increase in usage of internet banking and other digital wallets. Banks also started launching their apps and promoting the same for online payment. People also started using the apps and other digital wallets for doing online transaction.

Tanya Sanatani 2017 conducted a research on Effect of Demonetization on Digital Payment Systems in India. Researcher studied the impact of demonetization on digital payment systems like net banking and other payment apps and its usage in pre and post demonetization period and she found that after demonetization there was an increase in usage of Digital payments as these modes are quick, easy and handy available 24x7. People don't have to visit the banks for doing transaction, any error and mistakes in online transaction are resolved easily. But people still not sure about the transaction as they have their doubts in relation to security of transaction.

Mr. Shabeerali Pullikkalakath 2017 researched on A Study on the Impact of Demonetization in India with special reference to electronic payments like RTGS, NEFT, mobile banking and point of sale. He said there was various reason behind the demonetization like tax evasion, black money, fake currency and cashless economy. He analyzed the Impact of Demonetization in India with special reference to electronic payments like RTGS, NEFT, mobile banking and point of sale and he found that the was increasing in the usage of the digital modes as people don't have any option left. So, they forced to adopt the digital modes for doing transaction.

Prof. Dr. Roshan S. Patel 2017 conducted a research on Demonetization- A way to cashless Payment System in India. He stated that Government and RBI puts a lot of efforts in reducing the use of cash in the economy and promoting digital modes of payments. Government encouraged the digital modes of payment and avoids cash that's how

government giving push to the people towards cashless economy. In this research he analyzed the increase in the usage of digital payments modes after demonetization and found that the government had taken action in the right direction and demonetization helps a lot in creating India a cashless economy.

Dr Girish Prabhu*Girish VMamatha R*** 2017** carried a research onDemonetization and its effects on Banking sector. researcher stated that demonetisation is a tool to solve various problems like black money, corruption, inflation and cash dependency. Demonetisation hits all sectors but banking sector affected most by the move.it had various positive and negative impact on sector, post demonetization short impact was disturbance in banking operation and the long-term impacts was increase in deposits without incurring any add on cost, lower cost of funds, low lending, increase in demand of government bonds. It has both positive and negative impacts. Positive impact was increase in bank deposits, digital interface and increase in bank's customers. Negative impact was 100% increase in CRR on incremental deposits and reduction in demand of banks loans, ATM charges waived, stress on bank employees and so on.According to them although demonetisation affects banks badly but it will definitely find growth and proved fruitful in future.

Gurjit Singh 2017 conducted a research on Demonetization and its effects on banking sector. Research is based on secondary data. He stated that demonetization affects the banking sector both positively and negatively. Negative impact was for short term only. He further stated that banking sector was the one which is largely affected but it helps the economy to find growth through institutions like banks.

Ms. Sapna Kumari* Ms. Nida Zaidi 2017** carried a research on Impact of demonetization on banking sector – with reference to Meerut region.Researchers stated that Demonetization affects life of every single person but life of bank employees affected very much, it creates a lot of pressure on them as their workload increases that leads to increase in working hours too, that creates more stress on them, it is one of the biggest challenge of crises of their career. The positive side of demonetization is that people started using e- banking services and digital wallets for doing transaction and no of bank accounts also increased as people open accounts to deposit money.

Piyush Kumar* Dr. Dhani Shanker Chaubey2017** carried a research on Demonetization and its impact on adoption of digital payments:opportunity, issues and Challenges. Researchers stated that demonetization changed the buying behaviour of people, prior to demonetization people were only cash for doing transaction as demonetization announced people were facing problem of shortage of cash so they were forced to use plastic money, net banking and other digital wallets for doing transaction. Demonetisation helped in converting cash economy to cashless economy. In this research author try to analyse the importance of digital modes after demonetization as perceived by Indian people. Study is based on primary research and after analysing data researcher finds that digital payment methods proved be very important for people after demonetisation as it give them a chance to learn to make a use of digital methods, he further stated that people are ready to use the digital methods but don't want to pay any transaction cost.

Mrs. Anita D'souza2018 researched on Impact of demonetization on consumer's financial transaction. Researcher stated that demonetization affects every class of society being it an upper class, middle class and lower class. Major problem was faced by the people of informal sector where digital methods was rare in use. Demonetization of high denomination of currency creates a serious short-term problem for people like labours, vegetable vendors, kirana stores, small traders and wholesalers. She further stated that demonetization and measured taken by the government reached in its destined way. People become more cautious about online transaction.

Padmavathi Agarwal and B Bhagavan Reddy 2018 researched on Demonetisation and its effect on banking sector. Demonetization hits all sector of the economy but banking sector had affected badly, it has some positive or negative impacts, negative side was increase in deposits and decrease in demand of loans by

corporate sector, in the absence of cash small and medium enterprises were not able to pay instalments of loans resulting in increase in NPA' s and waiver of ATM charges leads to loss of 20 per transaction and stress on bank employees are some. Positive side of the move was increase in deposits leads more liquidity with banks and increase in the usage of digital method for payments.

Dr Lilesh Gautam 2018 researched on Impact of Demonetization on Banking Services – Among all forms of mistakes, Prophecy is the most gratuitous. He stated that demonetisation make it difficult for the people to buy essential in the absence of cash. People who are familiar with e- transactions were able to manage the things. Government also encouraged people to use digital modes of payment, sometime government make it compulsory for the people to use digital modes of payment for doing transaction. The consumer's attitude and willingness and usefulness of the use of e-banking services was identified and measured, consumers shifted from cash to cashless transaction. He further stated that banking sector affected very much but it will help the economy to find growth of the country through financial institutions like banks.

Dr Subrahmanya Bhat 2018carried a research on Impact of Demonetization and e-monetization on Indian economy – A study. He stated that immediate effect of demonetization is increase in deposits of old currency with banks and its after effects is increase in e-monetization. Author try to analyse the short - term, medium-term and long-term effect of demonetization, special focus has been made on e-monetization. Demonetization leads to three- fold increase in e-monetization as people started using digital wallets and e-banking facility after demonetization, medium term effect is increase in tax base and long-term effect is remarkable increase in e-monetization and healthy growth in GDP.it is expected that government will continue their efforts in order to make Indian economy a digital economy in future.

Ms. Renu Sharma* Dr Meenakshi Tyagi ** 2018 conduced a research on Impact of Demonetization on functioning of Banks. Researchers analysed the impact of demonetization on liquidity of banks and thew a light on impact of demonetization on balance sheet and profitability of banks. They stated that there was a significant effect of demonetization on balance sheet of Scheduled Commercial Banks in terms of size. There was a sharp increase in deposits by customers leads to excess of liquidity with banks, RBI has taken various measures to absorb the excess liquidity that divided into four phases. Large amount of deposits has been employed by Scheduled Commercial Banks in reverse repo with RBI, cash management bills used under market capitalizing schemes, loans and advances also extended by banks and excess liquidity has been mobilised by banks inliquid assets. According to them this move affected the banking operations but it will helped the economy to find growth through banks.

Dr Bhabani Shanker Gupta 2018 conducted a researched-on Skills needs for future Indian Banker. He said the attrition rate of bank employees and their customer is a reflection of after demonetization scenario of Indian economy, small traders and people of rural areas suffered a lot because of lack of cash. He further stated that the cashless transaction in our country is low require big step, the major challenge for poor people is no knowledge about e-banking transaction, lack of financial awareness, poor internet connectivity and it aims at making behavioural shift in the society in order to make it a cashless society.According to author special skills are required in banks employees to serve the needs of the people, some measures were suggested by author to improve banking services like changes in HR team and recruitment process and regular training, transparent e- transaction, leadership for customer perceived value, and coordination among banks, RBI and Government.

Mrs. A. Caroline Priyanka Koorse Govindaraj*, Dr. S. Kavitha 2018** researched on A study on Digital Banking with regard to demonetization in India. according to researcher's technology made its way in every field and the banking sector is one of them. Digital modes of payments are very useful for every bank customer as it makes transaction easy and quick that available 24x7 including public holiday and easy access to banking service. Researcher made an attempt analyse

whether demonetisation leads to increase in digital transaction. Study is based on descriptive research design and research is based on quantitative secondary data. They conclude study by stating that digital transaction was increased during and after demonetization and demonetization leads to increase in digital transaction, but government and banks need to take measures to create awareness about digital banking and need to remove fear of risk and security from their minds. Although demonetization made a way for digital banking but India is yet to see the digital banking to reach its peak.

Research Gap

After reviewing the above literature, it is observed that everyone was talking about the creating awareness about digital banking and removing fear and risk from the minds of customers but how such awareness is created is nowhere discussed and what measures needto take to remove fear about risk and security is no where discussed. so future study can be conduct in this topic.

Conclusion

Demonetization created liquidity crunch in short run, in the absence of cash people change their buying behaviour and move towards cashless system for doing transaction. People started using e banking, debit cards, credit cards and digital wallets like Paytm, Google pay etc. Demonetization helped a lot in creating a digital economy, as there was increase in usage of digital methods during and after demonetization. Usage of digital wallets was increased sharply after demonetisation as people find it important and easy for doing transactions, as digital modes provide transparency, safety and available 24x7. Some researcher says there is need to create awareness and knowledge among people of rural areas about digital banking, some says people are ready adapt digital modes but don't want to pay any transaction cost.

Demonetisation was very helpful in creating cashless economy, as many people started using the digital modes for payment but still there is a lot more to do in order to make India a cashless economy.

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STUDENTS' PERCEPTIONS AND ATTITUDES TOWARD QUALITY EDUCATION OF PRIMARY LEVEL IN NAKASHIPARA COMMUNITY DEVELOPMENT BLOCK IN NADIA DISTRICT OF WEST BENGAL

Mukhlesur Rahaman Gain[1], Subrata Biswas[2] and Prasenjit Deb[3]
[1,2,3]Department of Lifelong Learning & Extension, University of Kalyani, West Bengal, India
[1]mukhlesurlle21@klyuniv.ac.in, [2]subratakucl@gmail.com, [3]drprasenjitdeb@gmail.com

ABSTRACT

Educated persons are always respected in society. In the past, those who were illiterate were often neglected and even criticized. Due to financial instability and social backwardness they could not attain education. The poor households hardly managed their daily meal. In order to gain higher education, one's base of primary education must be firm. Therefore it is necessary to universalize primary education and enhance its quality. In our state as well as our country, education did not spread to the furthest in the past. Only select families were entitled to education. But the quality of education of this age is quite impressive. Parents and the society play a minute role. Only the teachers used to teach their students responsibly. They possessed an admirable level of ethics. So they taught students even at a meager salary. Presently, teachers who teach well claim that if there is a teacher for each class, students can be taught more efficiently. Students have their breakfast by 9AM and lunch at around 2PM. So there is a time gap when the students feel hungry and cannot concentrate on their studies properly because 'studying is difficult when hungry'. Universalization of primary education is done in West Bengal but the quality of education is hardly appropriate. The objective of this research paper is to find out why it is so.

Introduction

'The purpose of primary education is the development of your weak characteristics; the purpose of university education, the development of your strong." -Nevin Fenneman

The word 'primary' originates from Latin word 'primus' which means 'first'. In that sense, primary education is the first education. Everything has a beginning. Education is no exception.

The very first step of education is primary education, which everyone has to pass through. Therefore, primary education is indispensable to every individual. After completion of this primary step there are many steps for further education such as upper-primary education, secondary education, higher secondary education, graduation level, post- graduation level and at last research study. The steps can be different for different countries but the basic structure for education is the same. No country can ever prosper unless all its citizens are imparted quality primary education. In order to attain the mentioned, the highest priority should be given to primary education ensuring definite, advanced and effective syllabus.

Since the verge of the last century the number of enrolment has been on an increase. And after the proper implementation of Mid-day Meal (MDM), students have been attending school regularly and studying with a new zeal. The dropout rate of students up to Class VIII has come down to near about zero. Parents remain busy earning bread for the family. But still mothers are, comparatively, more concerned with their child's education in various ways like, if they are going to school daily, if they are attending tuitions, if they are studying properly, etc.

Most children at Nakashipara of Nadia district belong to such a humble background that getting education is not the only focus for them. It is equally important for them to get a good meal at school. The child at home takes her lunch there and if she is at school she will have her meal there at school. The quality of Mid-day Meal (MDM) is not the same in every school. It is good only in a few schools.

Children at Nakashipara of Nadia district tend to go to government schools, mostly because they can study there freely, can play there and above all they can enjoy their freedom there. In West Bengal primary schools have formed cabinets manned with students of the respective schools. Someone plays the role of the prime minister, someone health minister, education minister or food minister there. Through this they have resembled themselves

with new identities and the schools are becoming a second home for them.

Not all the schools are evaluating their students via the same methods. Only few schools have implemented Continuous and Comprehensive Evaluation (CCE) method. Most of the schools have well infrastructure- accommodative school building, drinking water, toilet, etc. Schools also provide school dress, school bag, shoe, scholarship, books and exercise books and MDM. There are also some sincere teachers who teach affectionately and are delighted when students get something to learn from them. But the number of such teachers is meager. Teachers at Shishu Siksha Kendras (SSKs) are trying to teach their students effectively with the help of the parents.

A large number of students of primary schools and Shishu Siksha Kendras (SSKs) have expressed their delight in attending school and learning. Many children from labour-Class background asserted that they do not feel like carrying out the job of an agriculture laborer. To many of them, school is the place to lessen their burden of poverty and to others it is the place to augment their social status. In the words of the son of a day laborer, "My father is an illiterate; he cannot even write a letter….. but people will not call me an illiterate"[1].

According to Rabindranath Tagore, "Is the child guilty as she was born without memorizing algebra formulae and history facts? Don't the children born illiterate so that they could enjoy learning when they are born? If due to our inability and savagery, we were not be able to make education enjoyable to them then why do we, with trial and even wish, with brutal force try to shape the innocent children's school as a prison?"[2]

Regarding children, Sukhenlal Brahmachary observed, "Ask your mother to buy you a new shirt" and the child thought, "the way I think, I do, I see, they think, they do and they see in the same way."[3]

In Boi Porar Utsab(Festival for Reading Books), children participants expressed their feeling in the following manner. They wrote, "I loved this day very much, I had never thought that this day would come" in Bengali with spelling mistakes. We often criticize them on their mistakes. But never do we realize the satisfaction a child gets in writing these and do not let them celebrate for whatever they have written. We always assert our might over these meek creatures at every step.[4]

Amartya Sen raised a concern, "Why should students depend on private tuition for education when schools are set up in view of imparting education to their students?" Huge syllabus at primary level is a reason that can be attributed to it. Normally, at primary level home task is completely unnecessary. As long as the syllabus is not reformed, it is really hard to reduce the dependency of students on private tutors. It must be kept in mind that the main objective of primary education is to make the students deft at reading, at writing and at arithmetic (Three R).[5]

Debating "good" and "bad" examinations is by no means to argue in favor of dilution of academic challenges. And it is by no means to argue against the critical importance of academic standards and rigorous pedagogy in a discussion of quality schooling. Indeed, we need not be forced to choose between academically challenging classroom life and fair and meaningful assessment of student achievement. Standards and assessments are a form of contradictory resource: when fairly and creatively employed, they may enhance students' eagerness and ability to meet academic expectations, but when manipulated to limit, ration and sort students, they may compromise the goals of both quality and equity in education.[6]

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Statement of the Problems

The main issue of the present study is to find out why the quality of education of government school students is lower vis-à-vis private school students, although the quality of education of government school students is not very bad; in fact it is quite good.

The quality of Mid-day Meal provided is not good because government allotment for it is a meager Rs. 4.48 per student as was in February, 2020. At Nakashipara, the quantity of meal is most important for the students. In order to increase the quantity of food it is essential on part of the government to sufficiently increase the allotment.

It has been found out that wherever the quality of education is superior it is because of the involvement of the parents along with teachers. There are some educated and established parents who have been alumnus of government schools themselves. But most parents of government school students are either illiterate or even if literate then of inadequate nature and hence they are unable to assist their children in their study. Should the government take adequate steps in order to resolve this problem? Or, can this problem be left as it presently is?

Significance of the Study

The present study will enable us to understand the role of parents as well as private tutors for the quality education of their children at primary level. Teachers will have clearer perceptions about their students.

Objectives

- To study the achievement of quality education of primary school students;
- To study the role of private tutors in enhancing quality education in primary school students;
- To study the role of parents enhancing quality education in primary school students; and
- To study the quantity of Mid-day Meal in primary schools at Nakashipara.

Scope of the Study

The scope of present study is to identify students' perceptions and attitudes toward quality education of primary level in Nakashipara Community Development Block in Nadia district of West Bengal.

Methodology

The primary data was mainly collected from the target students of Nakashipara block of Nadia District in West Bengal. The survey was conducted during December, 2020 to January, 2021. With the help of the random sampling method, 100 beneficiary students were identified from whole block of Nakashipara. A structured schedule covering different questions / statements / opinions was placed in front of each respondent. Also interview of limited persons/officials was taken for the study. Statistical approaches through SPSS 2.0 version to discover the calculation output under correlation, regression, step down regression and Chi-Square were used.

Outcomes

Outcomes of the present analysis include the perception level of students on Quality Education at Primary Level (Y), Type of School (X_1), Religion (X_2), Social Identity (X_3), Financial Stability (X_4), Gender (X_5), Class(X_6), Who Accompanies You to School? (X_7), Who Accompanies You While Returning From School? (X_8), Solo (Alone) (X_9), Under Someone (X_{10}), At School (X_{11}), Most Preferred Cause(s) At School (X_{12}), Can You Read? (X_{13}), Can You Write? (X_{14}), Problem in Understanding Text in School (X_{15}), Why Do You Face Problem in Understanding Text in School? (X_{16}), Do You Refer Your Teacher If You Face Problem? (X_{17}), Do The Teachers Teach Carefully (affectionately)? (X_{18}), Do the Teachers Punish? (X_{19}), How much do You Spend on Your Tuition? (X_{20}), Do You Receive Mid-day Meal? (X_{21}), Do You Receive Sufficient Meal (Mid-day Meal)? (X_{22}), How is the Quality of the Meal (Mid-day Meal)? (X_{23}), Do You Wash Your Hands before Eating? (X_{24}), Does Your School Have Toilet? (X_{25}) and Does Anybody Recite You Stories? (X_{26}).

Analysis

Using correlation and multiple regression models, we assessed relationship between of the perception level of students on Quality

Education at Primary Level from different socio-economic and personal variables.

Table - I: Correlation analysis between dependent variable the perception level of students on Quality Education at Primary Level (Y) and 26 casual variables.

Variable	"r" Value
Type of School (X_1)	-.2558*
Financial Stability (X_4)	0.4492**
Who Accompanies You to School? (X_7)	-0.2177*
Who Accompanies You While Returning From School? (X_8)	-0.2285*
Do You Refer Your Teacher If You Face Problem? (X_{17})	0.2777**
Do The Teachers Teach Carefully (affectionately)? (X_{18})	-0.2294*
How much do You Spend on Your Tuition? (X_{20})	-0.2761**
Do You Receive Mid-day Meal? (X_{21})	0.4062**
Do You Receive Sufficient Meal (Mid-day Meal)? (X_{22})	-0.4067**
How is the quality of the meal (Mid-day Meal)?(X_{23})	-0.4038**
Do You Wash Your Hands before Eating? (X_{24})	-0.4046**
Does Anybody Recite You Stories? (X_{26})	0 .2920**

Critical value (2-Tail, 0.05) = +or- 0.197	*Significant at 5% level
Critical value (2-Tail, 0.01) = +or- 0.256	** Significant at 1% level

Table-I depicts the perception level of students on Quality Education at Primary Level (Y), Type of School (X_1), Religion (X_2), Social Identity (X_3), Financial Stability (X_4), Gender (X_5), Class (X_6), Who Accompanies You to School? (X_7), Who Accompanies You While Returning From School? (X_8), Solo (Alone) (X_9), Under Someone (X_{10}), At School (X_{11}), Most Preferred Cause(s) At School (X_{12}), Can You Read? (X_{13}), Can you Write? (X_{14}), Problem in Understanding Text in School (X_{15}), Why Do You Face Problem in Understanding Text in School? (X_{16}), Do You Refer Your Teacher If You Face Problem? (X_{17}), Do The Teachers Teach Carefully (affectionately)? (X_{18}), Do the Teachers Punish? (X_{19}), How much do You Spend on Your Tuition? (X_{20}), Do You Receive Mid-day Meal? (X_{21}), Do You Receive Sufficient Meal (Mid-day Meal)? (X_{22}), How is the Quality of the Meal (Mid-day Meal)? (X_{23}), Do You Wash Your Hands before Eating? (X_{24}), Does Your School Have Toilet? (X_{25}) and Does Anybody Recite You Stories? (X_{26}). From the table of correlation coefficient, it has been found that Type of School (X_1), Financial Stability (X_4), Who Accompanies You to School? (X_7), Who Accompanies You While Returning From School? (X_8), Do You Refer Your Teacher If You Face Problem? (X_{17}), Do The Teachers Teach Carefully (affectionately)? (X_{18}), How much do You Spend on Your Tuition? (X_{20}), Do You Receive Mid-day Meal? (X_{21}), Do You Receive Sufficient Meal (Mid-day Meal)? (X_{22}), How is the Quality of the Meal (Mid-day Meal)? (X_{23}), Do You Wash Your Hands before Eating? (X_{24}) and Does Anybody Recite You Stories? (X_{26}) have immense impact on the predictor variable (Y).

Table- II: Multiple Regression Analysis

Variable	"β" value	"t" value
Type of School (X_1)	0.003444	0.038
Religion (X_2)	0.088498	0.997

Social Identity (X_3)	- 0.002963	-0.034
Financial Stability (X_4)	0.362251	4.249**
Gender(X_5)	- 0.065042	-.797
Class(X_6)	0.020669	0.256
Who Accompanies You to School? (X_7)	- 0.219187	-1.223
Who accompanies you while returning from school? (X_8)	0.030899	0.171
Solo (Alone) (X_9)	0.149038	1.771
Under Someone (X_{10})	0.033887	0.352
At School (X_{11})	- 0.136709	-1.538
Most Preferred Cause(s) At School (X_{12})	0.104568	1.190
Can You Read? (X_{13})	0.016869	0.132
Can you Write? (X_{14})	0.234081	1.567
Problem in Understanding Text in School (X_{15})	1.236901	0.169
Why do you face problem in understanding text in school? (X_{16})	1.260205	0.172
Do you refer your teacher if you face problem? (X_{17})	0.109676	1.041
Do the teachers teach carefully (affectionately)?	- 0.210799	-2.129*
Do the Teachers Punish? (X_{19})	- 0.116779	-1.295
How much do you spend on your tuition? (X_{20})	- 0.177647	-2.030*
Do You Receive Mid-day Meal? (X_{21})	- 10.062907	-1.563
Do you receive sufficient Meal (Mid-day Meal)? (X_{22})	- 0.331676	-1.094
Do you wash your hands before eating? (X_{24})	10.110762	1.575
Does Your School Have Toilet? (X_{25})	-0.182772	-2.146*
Does Anybody Recite You Stories? (X_{26})	0.176924	1.863

Critical value (2-Tail, 0.05) = +or- 1.989 *Significant at 5% level

Critical value (2-Tail, 0.01) = +or- 2.636 ** Significant at 1% level

Multiple R = 0.77651

R Square = 0.60296

Adjusted R Square = 0.46883

Standard Error = 1.74110

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	25	340.67440	13.62698
Residual	74	224.32560	3.03143

F = 4.49523 Signif F = 0.0000

Table II presents the multiple regression analysis with β values and corresponding t values. It is discernible that the variables like Type of School (X_1), Religion (X_2), Social Identity (X_3), Financial Stability (X_4), Gender (X_5), Class (X_6), Who Accompanies You to School? (X_7), Who Accompanies You While Returning From School? (X_8), Solo (Alone) (X_9), Under Someone (X_{10}), At School (X_{11}), Most Preferred Cause(s) At School (X_{12}), Can You Read? (X_{13}), Can you Write? (X_{14}), Problem in Understanding Text in School (X_{15}), Why Do You Face Problem in Understanding Text in School? (X_{16}), Do You Refer Your Teacher If You Face Problem? (X_{17}), Do The Teachers Teach Carefully (affectionately)? (X_{18}), Do the Teachers Punish? (X_{19}), How much do You Spend on Your Tuition? (X_{20}), Do You Receive Mid-day Meal? (X_{21}), Do You Receive Sufficient Meal (Mid-day Meal)? (X_{22}), How is the Quality of the Meal (Mid-day Meal)? (X_{23}), Do You Wash Your Hands before Eating? (X_{24}), Does Your School Have Toilet? (X_{25}) and Does Anybody Recite You Stories? (X_{26}) have significant regression effect of the perception level of students on quality education at primary level.

Different factors have been identified which affect the perception level of students on quality education at primary level. It should also be mentioned that all twenty six variables put together to account for 60.29 per cent of the total effect ($R^2 = 0.60296$).

Table III: Step-down Regression Model

Step 1= Financial Stability (X_4)	
Multiple R	= 0.44916
R Square	= 0.20174
Adjusted R Square	= 0.19360
Standard Error	= 2.14527
Step2= Do You Receive Sufficient Meal (Mid-day Meal)? (X_{22})	
Multiple R	= 0.56804
R Square	= 0.32267
Adjusted R Square	= 0.30870
Standard Error	= 1.98627
Step3= Do You Refer Your Teacher If You Face Problem? (X_{17})	
Multiple R	= 0.63022
R Square	= 0.39718
Adjusted R Square	= 0.37834
Standard Error	= 1.88358

Table III presents the step down regression model. It has been found that after step III, only 3 variables namely, Financial Stability (X_4), Do You Receive Sufficient Meal (Mid-day Meal)? (X_{22}) and Do You Refer Your Teacher If You Face Problem? (X_{17}) can together explain 39.71 per cent and the remaining 23 variables explain 20.58 per cent of the total estimated effect.

Table-IV: Mean and standard deviation between dependent variables (Y) and 26 casual variables

Variable	Mean	Std Dev
Type of School (X_1)	1.20	0.51
Religion (X_2)	1.49	0.50
Social Identity (X_3)	1.51	0.82
Lesser Financial Stability (X_4)	3.04	2.10
Gender(X_5)	1.50	0.50
Class(X_6)	1.50	0.50
Who Accompanies You to School? (X_7)	4.21	1.01
Who accompanies you while returning from school? (X_8)	4.23	0.92
Solo (Alone) (X_9)	66.20	32.47
Under Someone (X_{10})	34.10	42.52
At School (X_{11})	267.80	64.94
Most Preferred Cause(s) At School (X_{12})	1.97	0.36
Can You Read? (X_{13})	2.47	0.69
Can you Write? (X_{14})	2.65	0.54
Problem in understanding text in school (X_{15})	2.22	0.42
Why do you face problem in understanding text in school? (X_{16})	77.93	39.88
Do you refer your teacher if you face problem? (X_{17})	1.10	0.50
Do the teachers teach carefully (affectionately)? (X_{18})	1.97	0.17
Do the Teachers Punish? (X_{19})	3.44	0.89
How much do you spend on your tuition? (X_{20})	225.57	178.78
Do You Receive Mid-day Meal? (X_{21})	1.84	0.37
Do you receive sufficient Meal (Mid-day Meal)? (X_{22})	17.51	35.74

How is the quality of the Meal (Mid-day Meal)? (X_{23})	16.78	34.72
Do you wash your hands before eating? (X_{24})	18.18	35.45
Does Your School Have Toilet? (X_{25})	2.92	0.34
Does Anybody Recite You Stories? (X_{26})	1.40	0.49

Table IV shows that the results as above give the mean score and standard deviation score. According to the mean score and standard deviation, the medium high is in between 1.10 to 267.80. The mean score highest and lowest standard deviation are 64.94 and 0.50 respectively.

Findings

1. There are some good teachers at Nakashipara, Nadia who enjoy teaching and teach very well. Among them few are associated with Siksha Alochona, a joint venture of Pratichi Institute and select primary teachers of West Bengal.
2. Government schools here in this area cover children of socially and economically well off families. This in turn creates a pressure on the teachers to teach well. On the other hand, it has been alleged that where there are poor children largely prevalent at school, teachers do not attend classes regularly and punctually. It is reported that in Miraypur Adivasi primary school among other schools some teachers are found to have been asleep while in school. As most of those schools are socially and economically backward, teachers tend to pay less heed to them. There is an economical Class difference between the teachers and the students.
3. Since the verge of the last century the enrollment of students has increased remarkably. Almost all of them are first generation students. The MDM scheme, launched in 2003, further enhanced and carried on the enrollment of students and maintained their retention in school.
4. Students at Madrashah Siksha Kendra are found to have been learning minuscule. They only get MDM and scholarship from the MSK. Only children of the poorest of the Muslim families read there. They have a common apathy to go to primary school. They are so poor that they are afraid to go to school where they have huge gaps with teachers as well as with other students both economic and social. But at MSK they are quite comfortable.
5. Two types of tuitions are largely prevalent in Nakshipara, Those who teach well demand high fees and therefore are not accessible to the poor. As a result the poor families send their children to average tutors who claim low fees (Rs. 150-350) but cannot teach properly. The problem is as the parents are illiterate; they cannot substantiate the quality of tutoring.
6. Children are prone to playing games. They usually play all the day and being tired, fall asleep early in the evening. They have also developed a deep attraction for the mobile phones. They often play mobile games.
7. Government schools lag behind private schools in performance at Nakashipara. When a survey was undertaken for Class III and Class IV regarding three subjects viz Bengali, English and Mathematics, the following were found ---

a. Only 50% government school students can read Bengali text. While in private schools the proportion is high at 90%. Only 29% Government school students understand the text while 80% Private school students cannot even read Bengali text. As many as 14.5% government school students cannot even read Bengali text of their Classes.
b. Regarding English only 26.66% students can read the text while 70% of the private school students can do the same. Among them 13.33% Government School students understand the text. At private school that is 60%. A large number of students, about 60%, at Government School cannot even read English text of their respective Classes. The percentage is quite low at 20% for Private school students.
c. Performance at mathematics is no better. Government school students who can do basic sums are only 37.77%. It is about 60% for private school students. While only 20% Government schools students can manage to subtract, it is above 50% regarding their private school peers.

Conclusion

Primary Education has been universalized in West Bengal. As Nakashipara is a minority populated block, most students get scholarships. They are quite elated at it. But as the non minority students are not entitled to scholarships, they have dissatisfaction in them. Parents of the students other than minorities often claim that their children should also be included in scholarship schemes. This is because they have negligible economic difference with minority parents. Lack of teachers for every class is a reason attributed to the low quality of education of students. As in many schools, not even a single teacher is allotted to each class. As a result, the teachers cannot teach properly even if they want. The quality of education at private school is comparatively much high. It is because private schools have at least a single teacher for every Class. And the PTR there is quite high at 10:1. Two types of tuitions are prevalent of Nakshipara, Those who teach well demand high fees. And for that they are not accessible to the poor. Therefore, the poor families send their children to average tutors who claim low fees (Rs. 150-350) but cannot teach properly. The problem is as the parents are illiterate; they cannot substantiate the quality of tutoring. It is better if education is not developed only on the basis of private tuition.

Students at Madrashah Siksha Kendra are found to have been learning minuscule. They only get MDM and scholarship from the MSK. Only children of the poorest of the Muslim families read there. They have a common apathy to go to primary school. They are so poor that they are afraid to go to primary school. This happens as a result of having huge gaps with teachers as well as with other students both economically and socially. But at MSK they are quite comfortable. In order to solve the problem and raise the quality of education at MSKs, regular inspection from concerned authority is essential. Students of humble background are much attracted by MDM to attend school. For Class III and Class IV the rice allotted is quite less at 100 gram per students. It is neither satisfactory nor sufficient for most of the students. These village children usually get meals thrice a day---- breakfast at 9 AM, MDM at around 2PM and Dinner at around 8PM. By evening they get tea often without even a biscuit. So when they it rice they wish to have more. They normally have dinner which is the remaining of their lunch, in low quantity.

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MICRO CREDIT AND ITS IMPACT ON SELF HELP GROUPS IN RAMNAD DISTRICT

A. Jasmine
Thassim Beevi Abdul Kader College for Women, Kilakarai, Tamilnadu
E-Mail: carolinesaro@gmail.com

ABSTRACT

Self Help Groups are informal groups of people who come together to address their common problems .A group of 12 to 20 poor women in the age group of 18 to 60 years who are residing in the same area are organised as a 'Self Help Group' (SHG). The objectives of SHG are to conduct regular meetings, promote savings and internal lending among its members and inculcate the practice of collective and democratic decision making. To ensure the economic and social empowerment of women the SHGs are trained to effectively follow the Pancha Sutras namely regular meetings, regular savings, regular internal lending, regular repayment and regular maintenance of book of accounts.
Microcredit is the extension of very small loans (microloans) to impoverished borrowers who typically lack collateral, steady employment, or a verifiable credit history. It is designed to support entrepreneurship and alleviate poverty. Many recipients are illiterate, and therefore unable to complete paperwork required to get conventional loans. As of 2009 an estimated 74 million people held microloans that totalled US$38 billion. Grameen Bank reports that repayment success rates are between 95 and 98 percent. Micro Credit is a powerful tool to fight against poverty.

Keywords: *Self Help Groups, Micro Credit, Women, Poverty, Poor*

Introduction

The Nobel Committee cited ' Micro Finance can help people to break out of poverty, which in turn is seen as an important prerequisite to establish long lasting peace' The success of Micro Credit Scheme also depends on the awareness of the scheme among the rural poor particularly women. Even the central government has recognized the advantages of group lending and has adopted the approach in its battle against poverty.

Microcredit is the extension of very small loans (microloans) to impoverished borrowers who typically lack collateral, steady employment, or a verifiable credit history. It is designed to support entrepreneurship and alleviate poverty. Many recipients are illiterate, and therefore unable to complete paperwork required to get conventional loans. As of 2009 an estimated 74 million people held microloans that totalled US$38 billion. Grameen Bank reports that repayment success rates are between 95 and 98 percent.

Microcredit is part of microfinance, which provides a wider range of financial services, especially savings accounts, to the poor. Modern microcredit is generally considered to have originated with the Grameen Bank founded in Bangladesh in 1983. Many traditional banks subsequently introduced microcredit despite initial misgivings. The United Nations declared 2005 the International Year of Microcredit. As of 2012, microcredit is widely used in developing countries and is presented as having "enormous potential as a tool for poverty alleviation." Microcredit is a tool that can be helpful to possibly reduce feminization of poverty in developing countries.

In India, the National Bank for Agriculture and Rural Development (NABARD) finances more than 500 banks which lend funds to Self Help Groups (SHGs). SHG comprises twenty or fewer members, of whom the majority are women from the poorest castes and tribes. Members save small amounts of money, as little as a few rupees a month in a group fund. Members may borrow from the group fund for a variety of purposes ranging from household emergencies to school fees. As SHGs prove capable of managing their funds well, they may borrow from a local bank to invest in small business or farm activities. Banks typically lend up to four rupees for every rupee in the group fund. Nearly 1.4 million SHGs comprising approximately 20 million women now borrow from banks, which make the Indian SHG-Bank Linkage model the largest microfinance program in the world.

In this chapter, an attempt has been made to assess the awareness and knowledge about the scheme by the sample women SHG members,

level of borrowings, rate of interest and repayment performance of SHG members in Ramnad District

II. Statement of the Problem

Povertyhas always been with us and for at least forty years its alleviation has been the professed objective of many strategies to improve the lot of Indians. But the way in which it has been perceived however, has been subject to considerable change. Relatively little attention was paid to the development of the poor themselves rather, they were portrayed as the beneficiaries of development in larger systems which were to provide the dynamic force for the elimination of poverty. Development was principally something that happened to the poor on a "trickle-down" basis.

The simple assumption that the poor would benefit from general economic growth, without paying any special attention to them, changed somewhat in the late 1950s, when it was perceived that the poor might not automatically benefit from macro-economic growth was to be assured. From this point there emerged a specific line of anti poverty thinking to improve the income of poor people. The Self help Group is a viable alternative to achieve the objectives of rural development and to get community participation in all rural development programmes. It is an organized set up to disburse micro credit to rural women for the purpose of encouraging them to enter into entrepreneurial activities. Credit needs of the rural women are fulfilled totally through the SHGs. The women led SHGs have demonstrated the success of mobilizing and managing thrift, appraising own credit needs, managing credit and linkages with banks and enforcing financial self discipline.

III. Objectives of the Study

The specific objectives of the study are:

[1] To study the role of Micro Credit to promote Self Help Groups.
[2] To discuss the socio – economic background of women beneficiaries in pre and post SHG periods.
[3] Toanalyze the level of borrowings and factors influencing the level of borrowings.
[4] To identify the factors influencing the repayment of loan by women beneficiaries.
[5] To assess the impact of SHG on Income, Saving, Assets and intensity of poverty.
[6] To examine the socio – economic impact of SHG on women beneficiaries.

IV. Area of the Study

Ramanathapuram District in its present form came into existence from 15 March 1985 trifurcating the composite Ramanathapuram District. It is surrounded by Pudukottai District to the North, Sivaganga and Virudunagar districts on the North West and West Tirunelveli, Tuticorin districts and Gulf of Mannar on the southern Palk Strait on the East. The district has been divided into 7 taluks and 11 community development blocks. There are 429 panchayats with 400 revenue villages consisting of 1970 small villages and hamlets. There are 9 town panchayats and two municipalities. The collectorate is located at its head quarters at Ramanathapuram.

V. Framework of Analysis

Keeping in view of the objectives of the study, 500 sample women beneficiaries were stratified into two categories namely Agriculture and Allied activities and Non – Agricultural activities. Out of 500 sample women beneficiaries, 382(76.40 per cent) of them came under Agriculture and Allied activities and remaining 118(23.60 per cent) of them fell under the Non – Agricultural activities

VI. Review of Literature

O.P. Opplilliin his article "SHGs put women on their feet"pointed out that the life of SHGs members has changed today, after joining in the SHGs launched by the State Bank of India in association with SarvaSeva farms [ASSEFA] an non-governmental organization in Kancheepuram District. He has authentically proved the economic enlistment attained by the true SHGs women members.

Manoranjan Sharma in his article entitled "Micro – Finance : creating value for the poor" stressed that micro finance and poverty alleviation programmes are inextricably linked because of the potentiality of micro finance programmes to link the formal banking

structures with the rural poor by mobilization of savings and promotion of entrepreneurial endeavours.

Das Gupta A in his article entitled "SHGs and Micro Credit: Rural banking for women" concluded that micro credit has ushered a era of hope to the poor and women. Although the performance of co-operative, commercial and rural bank is not much encouraging, but the RBI and NABARD have provided new guidelines for Micro Credit. Apart from this other organizations are planning to provide massive support to make available Micro Finance to poor women in a bid to strengthen the country's economic base.

Bain K in his article titled "building on burning bridges" the accountability of transnational NGO network in policy alliances with the World Bank, in this paper he has pointed out the importance of NGOs in the promotion of SHGs. The Government has given basic impetus for women's empowerment as the starting point to tackle rural poverty and socio economic issues. Through self management technique women are brought together to shape their future destiny by forming SHGs.

Mrs.Shylendra examined "The role of regional Rural banks in achieving institutional reforms in rural credit in terms of loan diversification in South India". In her study she has analyzed that there was a larger coverage of the poorer households under poverty alleviation schemes which were household-based and paved way for the current innovative SHG based lending, to supplement the formal credit agencies in reaching the rural poor more effectively.

Mr.K.K.Tripathy in his study "Poverty alleviation makes micro – finance sustainable" analyzed that the micro credit is a reach for the million poor in India through the Self – employment Scheme, namely, SwarnajayantiGram SwarozgarYojana [SGSY]. The NABARD envisages reaching banking services to one-third of the very poor in India, through one million SHGs by 2007-08. It has been estimated that India has the world's largest Micro Finance programme in terms of outreach, with 7.8 million households accessing credit through 17,085 branches of the formal banking system under the Micro Credit finance programme.

Padek in his article "saving, solidarity and Self help" concluded that self help groups are part of an integrity community development approach. SHG activities are complimented and strengthened by other support, such as agricultural extension, skill and literacy training, provision of clean water and health care. This support maximizes the benefits that saving and credit provides.

Table 1: Details of SHGs in Tamilnadu

No. of. SHGs	6.96 (in lakhs)
No. of. SHG Members	103.32
No. of. Rural SHGs	4.67
No. of. Members	69.28
No. of. Urban SHGs	2.29
No. of. Members	34.04
Total Savings of SHGs	8,921 (crores)
No. of SHGs given Seed Money	5.98
Cumulative Credit Availed by SHGs (2011-2020)	65,930 (crores)

Source: Tamilnadu Corporation for Development of Women Ltd.

VII. Periodicity of Group Meetings attended by the Sample Respondents

All the Self–Help Groups (SHG) conduct meeting at regular intervals at homes of the individual or in community buildings. Meetings are sometimes held at short notice in case of need. The meetings are held in a constructive and friendly atmosphere. Active and enthusiastic participation in discussion of members are encouraged.

Table -2: Periodicity of Attending the Group Meeting

Periodicity	Number of Beneficiaries	Percentage to Total
Once in a month	168	33.60
Once in fortnight	83	16.60
Once in a week	249	49.80
Total	500	100.00

Source: Primary Data.

From Table 2 it was clear that majority of the respondents have attended the meeting once in a week and 33.60 per cent of the respondents have attended the meeting once in a month and the remaining 16.60 per cent of the respondents have attended the meeting once in fortnight

VIII. Sources of Awareness of the Micro Credit Scheme

Table-3: Sources of Awareness of the Micro Credit Scheme

Awareness Through	Number of Beneficiaries	Percentage to Total
Advertisement	23	4.60
Bank	105	21.00
Friends and Relatives	35	7.00
Self Help Group	236	47.20
Non - Governmental Organization /Voluntary Agencies	101	20.20
Total	500	100.00

Source: Primary Data.

Table 3 indicates that out of 500 sample respondents majority of 236(47.20 per cent) of them got the information through SHGs. It provides the useful medium of promoting the disbursement of loan for productive purpose. SHGs characterized by ethical and economic homogeneity are able to spread the news among other women quickly than other medium. NGO also play a positive role in popularizing the scheme that is 101(20.20 per cent) of the sample respondents came to know about the Micro Credit scheme through NGOs. Details about the scheme are also disseminated through banks. This is clear from the study that 105(21.50 per cent) of the sample respondents got information through the banks. Advertisement has not reached many. Only 23(4.60 per cent) of them got the information through advertisement. Friends and relatives also play a significant role in making the sample respondents informed about the possibilities of getting loan. Among the sample respondents 35(7.00 per cent) came to know about the scheme through friends and relatives.

IX. Reasons for Getting Micro Credit

Micro Credit is extensively utilized to promote income generating enterprises among the poor and weaker section, in particular with women. The reasons for obtaining Micro Credit and the rank assigned by the sample respondents along with Garrett Ranking are given in Table 4

Table 4: Garrett's Ranking Results

Factors	Total Score	Average	Rank
Additional Employment	19246	55.90	I
To have more income and Assets	18363	55.23	II
Hereditary and Experience	18121	54.46	III
Marketing Facility	17960	50.29	IV
Training Received from SHGs / NGOs	17029	49.49	V

Source: Primary Data

According to the Garrett Ranking, creation of additional employment is the prime reason cited by the sample respondents to obtain Micro Credit. To create more income and additional assets is the second reason given by the sample respondents. The availability of marketing facility is the third reason for getting Micro Credit. The NGOs not only provide

financial support to start micro enterprises but also suitable place for marketing the products for entrepreneurs. Today many women groups have started manufacturing products like palm leaf articles, agarbathy (incense sticks) candles, simple chemicals, soaps and soap powder, herbal medicines, lace items, readymade garments, woolen knitting, pickles, pappads, fruit juices and eatables to name a few. Many more women try their luck in traditional shandies (weekly markets).

X. Regularity of Repayment

The micro-credit experience worldwide has shown that poor borrowers, especially women, make productive use of credit for Self-Employed micro enterprises / small firms and are prompt in repayment, with average repayment rates above 95 per cent, much better than recoveries under small lending. The opinion about difficulty in repayment of loan is given in Table 5

Table 5: Repayment of Loan by the Beneficiaries

Nature of Repayment	Number of Beneficiaries	Percentage of Total
Irregular Repayment	29	5.80
Regular Repayment	471	94.20
Total	500	100.00

Source: Primary Data.

During the survey, it was observed that out of 500 sample respondents only 29(5.50 per cent) of the sample respondents were irregular in repayment of loan, while 471(94.20 per cent) of the sample respondents found to be regular in repayment.

XI. Motivation behind Repayment of Loan

Banks and financial institutions suffer much due to the nonpayment of loan amount by the borrowers. But, generally SHGs availing Micro Credit, have shown excellent record of loan repayment. Micro Credit has enabled the sample respondents to earn income and the poor women take timely repayment a prestige issue and repay the loan regularly. The pressure from the peer group has discouraged default by individuals.

Table 6: Motivation behind Repayment of Loan

Factors	Number of Beneficiaries					Total
	I	II	III	IV	V	
Group pressure	136	141	101	73	49	500
Adequate Income Earning	163	124	89	98	26	500
To Avail further Loan	99	193	102	63	43	500
Self Ethics	156	166	60	54	64	500
Fear of Legal Action	143	176	71	68	42	500

Source: Primary Data.

Table 7: Garrett's Ranking Results

Factors	Total score	Average	Rank
Adequate income earning	21517	63.29	I
Group pressure	19966	60.30	II
To avail further loan	19831	59.49	III
Fear of legal action	19541	59.29	IV
Self Ethics	18990	58.41	V

According to Garrett Ranking results the foremost reason cited by the sample respondents is the availability of income. The second rank is given to the group pressure which based on Joint liability brings about the remarkable improvement in loan recoveries. Close proximity and familiarity of SHG members motivate them to pay the loan without default. Improved loan recoveries lead to improved loan recycling and continue access to borrowing. To avail further loan is the third reason cited for regular repayment. So that the next direct credit linkage (DCC) can be obtained and other members, who did not

receive the loan may also benefit. Fear of legal action also has motivated the sample respondents to repay the loans. Self Ethic is the last reason cited by the sample respondents.

XII. Findings of the Study

The SHG member had generated more income after joining SHG Scheme. The increased income level helped them to move above the poverty line. Therefore it is found that SHG Scheme has reduced the poverty of the member beneficiaries to a certain extent.

XIII .Conclusion

Thus the Indian Banking system has emerged as a dynamic system of promoting economic development through a state of art development and banking. Banks have a vital role to play in the reduction of poverty, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, ensure environmental sustainability and develop a global partnership for development. Banks have a vital role to play in the reduction of poverty, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, ensure environmental sustainability and develop a global partnership for development.

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AN ANALYSIS OF THE IN-SERVICE TRAINING PROGRAM UNDERTAKEN BY RMSA FOR SECONDARY SCHOOL TEACHERS OF AIZAWL DISTRICT

Lynda Zohmingliani
Department of Education, Mizoram University, Mizoram

Lalhmasai Chuaungo
Department of Education, Director, Human Resource Development Centre
Mizoram University, Mizoram

Gloria Lalchhanhimi
Department of Education, Mizoram University, Mizoram

Vanlalruati Chhangte
Department of Education, Mizoram University, Mizoram

ABSTRACT

In-service teacher training has been proved to enable teachers to educate in a more methodical and logical manner. This article provides a framework on the concept of in-service teacher training followed by a descriptive study of in-service teacher training under the RMSA's centrally sponsored secondary education. This descriptive study analyzes the frequency of secondary school in-service teacher training programs during the last 5 years before the setting up of SamagraShiksha. The study revealed some heart facts, including the need to stimulate secondary teachers' hours spent in in-service teacher training for professional growth, the need for teachers to apply the knowledge gained in the training to classrooms where actual interaction and learning environment will be shared with students, and the need for training programmes to be followed up on.

Keywords:*In-service teacher training, RMSA.*

Introduction

Education is a dynamic force that has the dual role of leadership as well as preserver. It leads a nation towards development and preserves the traditional values and heritage of cultures. All stages of education have their own unique features and importance of their own. No single stage can be omitted out due to irrelevance to the complete development of a man. The stages of education have been arranged to suit the chronological ages of human being in a normal development. As such, secondary education cannot be missed out of its important role in the normal or yet more advance development flow of a young man since it covers the crucial stage of life, i.e., between the ages 13 to 16 years of age. It is the start of the teenage years, where man stands in front of multiple choices of roads to life involving confusion and other mental challenges. To meet the mental challenges and physical needs of the child in this stage, secondary education is thus very important.

Due to this special nature of the students of secondary education, it is important that teachers constantly stimulate their minds in a positive way so as to plant positive roots for future growth. For this, teachers themselves need to be constantly revived and enriched with the latest developments in their fields. This can be a natural process for certain individuals that like to keep themselves abreast of times but can be a major challenge for some teachers who neither have the inclination or resource to do so. This is the stage where the government plays an important part through in-service training to uplift and reorient teachers towards new methods of teaching or new content in the syllabus. In order to enhance access to secondary education and improve its quality, the Government of India set up a flagship scheme called Rashtriya Madhyamik Shiksha Abhiyan (RMSA).

RMSA or otherwise also known as National Mission for Secondary Education is a centrally sponsored scheme of the Ministry of Human Resource Development, government of India, for the development of secondary education in Public schools throughout India. The mission was initiated in March 2009 and started

implementing its scheme right away from 2009-2010 for an efficient growth, development and equity for all. The scheme includes a multi-dimensional research, technical consulting, various implementations and funding support. Rashtriya Madhyamik Shiksha Abhiyan (RMSA) aims to increase the enrolment rate by providing a secondary school within reasonable distance of every home. It also aims to improve the quality of secondary education by making all secondary schools conform to prescribed norms, removing gender, socio-economic and disability barriers, and providing universal access to secondary level education.Apart from giving access and availability of quality secondary education, in-service teacher training plays a major role in improving the quality output of the pupil. One of the major concerns of RMSA Scheme is to provide in-service teacher education programmes to secondary education teachers teaching in high schools facilitated by RMSA scheme. The state government societies were established for the implementation of the RMSA Scheme. The share of Central Government has been released directly to the implementing agency. It is the teachers only who can shoulder the responsibility in promoting secondary education and can help in shaping the destiny of the nation by the education of young generation. Therefore, it can be said that teachers must be well-equipped of high academic and professional competencies.

In-service teacher education is a staff development education which is a deliberate and continuous process involving the identification and discussion of present and anticipated needs of individual staff for furthering their job satisfaction and career prospects and of the institution for supporting its academic work and plans and implementation of programs of staff activities designed for the harmonious satisfaction of these needs (Billing 1976). It encompasses all forms of education and training given to a teacher who is already of the job of teaching and learning.

It is important to equip teachers with new knowledge and skills to meet new challenges and reformation in education. In-service teacher training is a professional and personal educational activity to improve teacher efficiency, ability, and knowledge and acts as a motivational course in their professional work, as such, in-service teacher training can enhance the professionalism of teachers who contributed to achieving educational goals. In-service teacher training also promotes professional growth among teachers in order to promote excellent and effective teaching and learning environment for students. It also serves as a bridge between prospective and experienced educators to meet the new challenges of guiding students towards higher standard of learning and self-development.

What has always been the driving force behind changes that occur in the area of teaching and learning is the in-service teacher education program. It is vital that teachers keep up to date on the most current concepts, thinking and research in their fields. Moreover, new topics are being added in frequent intervals which often become a burden for teachers unless they go through in-service training for orientation to the new additions. This training equips them with much needed confidence in the classroom and also benefits the students by providing them with experienced and knowledgeable teachers who are well acquainted with old and new topics. This supports their lifelong learning as educators for the young students and also their role in the development of productive and dedicated citizens.

Secondary education offers basic education that students must learn before going entering higher studies. When we say secondary education, they have common subjects such as science, mathematics, English, etc. These basic subjects are used to improve the education system for children who want to have better education when they go to the next level of education. The vision for secondary education is to make good quality education available, accessible and affordable to all young persons in the age group of 14 to 18 years.

Secondary stage is an important area to be studied because this is the stage where students are yet to select their choice of subject. The right kind of educational experience would enable them to explore further and become worthwhile citizens capable of drawing national and international recognition. In order to provide this kind of experience to students,

teachers need to constantly update themselves and they get this experience from being actively re-energized through activities like in-service teacher training programs.

Related Literature

Kapoor and Imam (2019) found that, in-service teachers training programs conducted by RMSA are of great help to the teachers, as it enhances the teaching learning process. The study suggested that such programs should be conducted from time to time and should be made the integral part of the curriculum. Ulla and Winitkun (2018), in their study identified 22 Primary in-service teachers' beliefs, their needs and challenges they faced with regards to teacher training program in Thailand. It was found that the beliefs of the primary teachers were shaped by their previous attendance and experience on teachers' training program in the country. Engaging workshops, simple but relevant teaching strategies were reported to be the needs of these teachers in a teacher training program. AyvazTuncel and Çobanoğlu (2018) conducted a study on In-service Teacher Training regarding to the problems faced by the teachers as Learners. Since the scenario of the study set up was in turkey, the findings also related to the needs of the Turks. The findings include – (i) In-service teacher training did not make any contribution to some teachers and their personal development, (ii) Teachers need to update their knowledge and skills on curricula, psychology and pedagogy of the learners and new research on teaching and learning. Hence, they need appropriate in-service training.

Kang (2018) conducted a comparative study on the status of In-service Teacher Training Programs Facilitated by RMSA Scheme' and found out that – (i) There was a significant difference between the attending and not attending in service teacher- training programs, (ii) There was no significant difference in the participation in in-service teacher training programs, in the satisfaction with the contents of the modules, in the comparison of the effectiveness of resource persons as the subject experts and in their willingness to attend in-service teacher training programs relating with their subject-matter instead of general. Mishra (2016) in his study, 'In-service Training under Rastriya Madhyamika Shiksha ABhiyaan (RMSA): A Stock Taking of Social Science Teachers' Performance in Comparative Perspective' found out that (i) In-service teacher training program provided by RMSA has significant effect on the teaching methodology, use of Audio-Visual Aids and Evaluation Techniques of teachers, (ii) No effect of the in-service training was observed on the classroom management skills of the social science teachers.

From a case study conducted by Kumar (2017) in Kullu District of Himachal Pradesh, he found that In-service teacher training program organized by RMSA have brought change in the opinion of teachers about different aspect of teaching- learning process. As the module of the training program is sometimes decided by the state project office and not specific as per the need of in-service teachers in the district, there was a need for autonomy/flexibility to make change in the module as per the need of in-service teachers. The study also found that the training programs need to be experience-based, after identify needs of secondary school teachers in scientific way. There can be greater use of ICT for promoting innovation. A majority of senior secondary schools of the district are covered under ICT programme of RMSA, but there is a urgent need to cover all the independent High schools, so that students at this stage can be given exposure to ICT. The study found that the in-service training given to in-service teachers is proved quite effective. But it was observed that there was no considerable difference in the class room practices between trained and untrained teachers. So there is a need to strengthen the process of monitoring. Nath and Ayishabi (2012), in their study found that distance training methodology focusing more on learning than on teaching, on flexibility, autonomy, and collaborative work. However, institutional constraints (rigid time-tables, overcrowded classrooms) do not always leave much room for innovation. Teachers should provide opportunity to reflect on their own classroom practices, to improve as far as possible, and to engage in a life-long learning process of professional development and Distance Education is the best way to make

them update and capable to do so in a lifelong process.

An analysis of the related studies revealed that in-service teachers have good opinion and attitude towards in-service teacher training programs. In-service training has enabled teachers especially in their teaching methodology and evaluation techniques. Some studies have also showed that significant differences exists between teachers who attended in-service teacher training program and those who do not attend the said program in relation to their teaching qualities. From the studies reviewed, it can also be found that more engaging workshops, simple and relevant teaching strategies were the need of the hour.

Operational Definition of the Term Used

Training program: In the present study the term training program refers to the educational programs that are formed to equip teacher with knowledge and skills to become a better professional and keeps them up to date on trends that are pertinent to their job.

RMSA: The acronym RMSA in this study stands for Rashtriya Madhyamik ShikshaAbhiyan, is a centrally sponsored scheme of the Ministry of Human Resource Development, Government of India, for the development of secondary education in public schools throughout India.

Objectives of the Study

1. To find out the frequency of secondary school in-service teacher training programs during the last 5 years before the setting up of Samagra Shiksha.
2. To find out the percentage of secondary school teachers within Aizawl districts who have been trained under RMSA.
3. To suggest measures for improvement in in-service teacher training based on the finding of the research.

Delimitation

Owing to time constraints and restricted movement because of the pandemic, the present data only covered Aizawl district.

Methodology

Method of Study

The present study analysed the status of in-service training of secondary school teachers within Aizawl district. Therefore, information was collected on the basis of survey and reports majorly descriptive in nature.

Population: The population comprised of all the secondary schools operating in the district of Aizawl.

Sample of the Study: Following the norm in current research practices, sample was taken from not less than 30% of the secondary school teachers within Aizawl district in order to find out their attitude towards in-service teacher training taken up by RMSA.

Sources of Data: Data was collected from primary and secondary sources. Information regarding frequency of training and percentages of trained teachers were based on secondary source. Information on teachers' suggestions was collected from primary source.

Tools of data collection: Data was collected from:

i. Questionnaire prepared by the investigator to find out the attitude of secondary school teachers on in -service teacher training.
ii. Office files of concerned schools, SAMAGRA SHIKSHA, Aizawl district and DEO, Aizawl district.

Data Analysis

Data was analyzed based on the information garnered in a qualitative manner. However, descriptive statistics like percentages were employed for more specific analysis of data.

Data Interpretation and Discussion

Objective 1:To find out the frequency of secondary school in service teacher training programs during the last 5 years before the setting up of SamagraShiksha.

In order to find out the number of times in-service teacher training program was conducted, the investigator paid a visit to the SamagraShikshaAbhiyan office a number of times, and has been able to obtain the following data.

Table 1: Frequency of Secondary School In-Service Teacher Training Programs held during the last 5 years before the setting up of SAMAGRA SHIKSHA

Year	No. of training	Duration	Subject
2013	1 time	1 subject – 5 days each	Science, mathematics, English, social Science, Mizo
2014	1 time	1 subject – 5 days each	Science, mathematics, English, social Science, Mizo
2015	1 time	1 subject – 5 days each	Science, mathematics, English, social Science, Mizo
2016	1 time	1 subject – 5 days each	Science, mathematics, English, social Science, Mizo
2017	1 time	1 subject – 5 days each	Science, mathematics, English, social Science, Mizo

Source: SAMAGRA, Aizawl District, Zarkawt McDonald Hill, Aizawl.

Table-1 depicted a clear picture of the number of in-service teacher training programs in the secondary school level for the past 5 years before the emergence of SAMAGRA SHIKSHA, Mizoram. As it can be seen from the table, the teacher training programs havebeen organized once every year. The program covers all the academic subjects prearranged for the secondary school education i.e., Science, Mathematics, English, Social Science and Mizo subjects. The duration for the training period for each subject was 5 days each. Therefore, the duration for the training of in-service teacher took basically one month and a week.

Objective 2:To find out the percentage of secondary school teachers within Aizawl districts who have trained under RMSA.

Table-2: Year wise participation of English Subject Teachers' in in-service teacher training program (2013-2017)

Year	2013	2014	2015	2016	2017
No. of English Teachers	162	121	97	122	98
Percentage of decrease/increase (-/+)		(-) 34%	(-) 25%	(+) 20%	(-) 23%

Table-2gave a clear picture of the year wise participation of English Subject Teachers' in in-service teacher training program during the year 2013-2017. In the year 2013, there were 162 teachers from English subject who attended the training program. In 2014, 121 teachers participated in the training program, showing a decline of number of teachers by 34%. In the year 2015, there was a considerable decrease in the number of in-service teachers in this subject with only 97 teachers participated, the percentage of difference was as high as 25% from the previous year. But in the 2016, there was an increase in the number of teachers' participation in the in-service training; it was found that there were 122 teachers which rose in percentage from the previous year by 20%. In 2017, there was yet another decrease in the number of teachers who went for in-service training. There were 99 teachers who participated which resulted in the decrease in number from the previous year by 23%.

Table-3: Year wise participation of Mizo Subject Teachers' in in-service teacher training program (2013-2017)

Year	2013	2014	2015	2016	2017
No. of Mizo Teachers	148	129	99	115	89
Percentage of decrease/increase (-/+)		(-) 15	(-) 30	(+) 14	(-) 29

As it can be seen in table-3, thein-service training for Mizo subject follows the same trend of the English subject teachers. In the year 2013, the number of teachers who participated in the in-service teacher training program were counted tobe 148 in total, while in 2014, the number reduced to 129. The difference in the number of teachers within these two years was 15%. The number of teachers who participated in the in-service teacher training program in the year 2015 was 99 which showed that it had decreased by 30% from the previous year, and in 2016, it was found that the number of Mizo subject teacher participated in the in-service training increased to 115 which showed a 14% increase from the previous year. In 2017, the number of teachers

who received training reduced again to 89,showing a 29% difference.

Table-4: Year wise participation of Mathematics Subject Teachers' in in-service teacher training program (2013-2017)

Year	2013	2014	2015	2016	2017
No. of Mathematics Teachers	175	114	139	109	86
Percentage of decrease/ increase (-/+)		(-) 53%	(+)18%	(-) 28%	(-) 27%

With regarding to mathematics subject teachers, in 2013, there were 175 teachers who participated in the in-service teacher training program while in 2014, the number reduced to 114 teachers, as shown in table-4. The difference was quite high with a decreaseby 53%. In 2015, there were 139 mathematics teachers who participated in the training, showing an increased in percentage (18%).But again in 2016, the number of mathematics teacher who went for in-service training subsequently went downwards to 109 decreased by 28%. In 2017, there were 86 mathematics teachers participated for in-service training which made it a 27% of decrease from the previous year number of trainees in mathematics subject.

Table-5: Year wise participation of Science Subject Teachers' in in-service teacher training program (2013-2017)

Year	2013	2014	2015	2016	2017
No. of Science Teachers	162	119	133	103	77
Percentage of decrease/increase (-/+)		(-)17%	(+)11%	(-)29%	(-)34%

Table-5 revealed that there was a fluctuation in the number of teachers who had undergone in-service teacher training program between the years 2013 to 2017. In the 2013, there were 162 science teachers who attended the training, and then the number drop to 119 teachers in 2014, which made it a17% decrease. In 2015, there was an increase in the number of teachers which reached to 133, which was an increase by 11% from the previous year. In 2016, the number of teachers who attended the training for science subject decline again by 29%which come to 103 science teachers, and in the year 2017, the number of teachers who attended training continued to fall, only 77 teachers participated; this made it a huge fall by 34%.

Table-6: Year wise participation of Social Science Subject Teachers' in in-service teacher training program (2013-2017)

Year	2013	2014	2015	2016	2017
No. of Social ScienceTeachers	187	130	109	118	93
Percentage of decrease/increase (-/+)		(-)44%	(-)10%	(+)8%	(-)34%

Table-6 gave a clear picture of the year wise participation of Social Science Teachers in in-service teacher training program during the year 2013-2017. In 2013 187 social science teachers participated in the program, then, in 2014 the number reduced to 130, this was a decrease in the number of trainees for this particular subject from the previous year by 44%. In 2015, the number of teachers lessened again from the previous year, the number of teachers participated in this year was 109, which made it a 10% decrease from the previous year. In the year 2016, there was an increase in the number of teachers, it was found that 118 teachers participated, showing an increase by 8%. However In 2017, the number of teachers' participation fell considerably by 34% and counted 93 social science subject teachers who attended the in-service training.

Objective 3: To suggest measures for improvement in in-service teacher training based on the finding of the research.

From the questionnaire regarding 'suggestion for improvement', several recommendations for improvements have been received and therefore it was found that a majority(77%) responded to the items in a positive way. The feedback was also quite positive. However, the following points were suggested:-

1. **Regarding subject content**:

a) The modules should be updated to meet the present syllabus of the secondary level.
b) The resource persons should be acquainted with new techniques of teaching with innovative teaching aids.

2. **Regarding the impact of teaching:**

a) Subjects are not related to the current syllabus of the MBSE as such some training programs were not successful.
b) Providing hard or soft copy of whatever that has been taught in the training program so that it can be looked at again for self-improvement.
c) Proper coverage of the subject syllabus, as incompletion resulted in bewilderment.

3. **Regarding resource persons**:

a) Highly qualified resource persons should be provided
b) Advice from senior teachers should be taken regarding selection of resource person, so that the resource person may know what exactly what the teachers needed.
c) Resource persons and the training program should be more updated.

4. **Regarding general impressions**:

a) Timing of training should be kept in mind with the school calendar.
b) Training should be more organized and more updated otherwise it can be a waste of time.
c) Equal opportunities should be provided for all the teachers.
d) Training should be organized more frequently.

Discussion and Conclusion

As found in the present study, secondary in-service teacher training programs has been organized frequently even before the emergence of SamagraShiksha, Mizoram. For the past five years before SamagraShiksha came into being, the training program has been conducted every year for 5 major subjects in the secondary level viz., English, Mizo, Mathematics, Science and Social Sciences. But, at the same time, it is distressing to know that the number of teachers who have attended the in-service teacher training program for all the major subjects in 2013- 2017 has been decreasing This has become the phenomena as the students' enrolment increases (Directorate of School Education, 2020), and the teachers' challenges to meet the students' needs became more prominent.

This descriptive study found that in-service training is important for teachers' professional development as well as motivating them to apply what they learned in the training in their classroom. The content of the in-service teacher trainings should be current, practical, and tailored to the demands of the teachers to provide a successful and effective training. The programme should assist participants in developing their personalities and preparing them to face obstacles in their educational system. Teachers, in addition to this, must be active and willing to learn new things in order to benefit from the programme. When conducting a training programme, the amount of achievement should be based on the participant's reflections of their own classroom practises. The effectiveness of a training programme is determined by how far participants use what they learned in their training in the classroom. As a result, follow-up, which is frequently overlooked, must be incorporated into the training. Since the in-service teacher training programme is a yearly intervention of SamagraShiksha to improve educational quality, further study on how to improve the training programmes is needed to ensure their sustainability.

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A STUDY ON LONELINESS AMONG UNIVERSITY STUDENTS IN RELATION TO PSYCHOLOGICAL WELL-BEING

Jagdeep Kaur[1], D. J. Singh[2]
Department of Psychology, CT University, Ludhiana, Punjab, India

ABSTRACT

Globally psychological health is one of the most important issues in students. The focus of this research paper was to determine the correlation between loneliness and the psychological well-being of university students. A sample of 100 students was randomly selected to collect data. Loneliness Inventory developed by U. Meenaskhi and K. Krishan (2010) was used to assess the loneliness and Psychological Well-being Scale is developed by D.S. Sisodia and Pooja Choudary (2012) were used to assess psychological well-being. Results revealed that there is a highly significant difference between loneliness and psychological well-being. Other results indicate that males tend to have some loneliness issues as compared to females. Findings also reveal that males tend to have more psychological well-being as compared to females. It concludes that there is a strong connection between loneliness and psychological well-being in university males and females. The proper counseling session should be arranged for students for better psychological health.

Keywords: *Lonliness; Psychological well being; University Students*

1. Introduction

Over the past few years, studies on mental health, especially with university students, have been successful in drawing the attention of a large number of people as a result of society's newest concern psychological distress. The transition from secondary to higher education has resulted in changes in educational, social and emotional needs which have also led to psychological adjustment. Higher education levels produce a higher level of academic stress, diminish academic support, social discrimination throughout the transformation period and are probably implicated in long periods of financial debt. When the students move from school life to college or university life they feel more excited and distressful. It is often characterized by an increased risk of loneliness and other mental health issues. It also affects the psychological well- being the health of students. The reason behind these conditions may be the change in their behavior, attitude, adjustment problems, etc. when we review the literature on loneliness we find that there are various descriptions. According to these concepts, loneliness is an undesirable subjective psychological state that originates from an imbalance among an individual's current social relations and anticipated social interpersonal interactions. Being alone is a complicated, challenging and frustrating process.

1.1 Loneliness

Loneliness is both a reality and a sensation. Loneliness is, therefore, a universal human emotion because it is a psychological attitude. Lonely individuals feel incomplete, isolated and rejected. The human who feel loneliness often desire gentle connection. Yet their mentality prevents establishing good relationships with others problematic. People portray their thoughts and feeling of aloneness with words such as worry, apprehension, embarrassment and helplessness. these strong emotions can affect our behavior and actions. they can produce a downward spiral in which loneliness separates a person from relatives and family, making them feel lonelier. Loneliness might have an impact on how we perceive and experience social interactions. This might indicate that we are more worried about our social experiences and situations or that we are too readily aware of signs of social rejections. events at beginning of life, personality types and coping styles all influence the risk of loneliness in subsequent life.

1.2 Psychological well-being

Psychological well-being is used to describe a person's overall emotional health and general functioning. The researchers also found that the lack of distress does not necessarily mean that a person has high psychological well-being that is the feeling of happiness and doing well.

Individuals with a high level of psychological well-being state that they feel capable, happy well-supported and satisfied with life. The six factors model for psychological well-being is a theory elaborated by Carol Ryff that identifies six factors that contribute to the psychological well-being, contentment and happiness of an individual. Psychological well-being is composed of positive relationships with other people, personal control, self-reliance, a sense of purpose and meaning in personal life and growth of development.

2. Review of Literature

Cahyadi, M.D. (2019) studied the relationship between loneliness and psychological well-being among students who were studying in an international university. A sample of 20 international students was selected for data collection, age group between 18 to 28 years. UCLA loneliness scale and psychological well-being scale were used to collect the data for research. Results revealed that there was a weak negative relationship between both variables. Loneliness was low among students and psychological well-being was modest. However, in two aspects of environmental mastery and pleasant relationships with others, psychological well-being showed the strongest link to loneliness.

Ishaq et. al. (2018) investigated the moderating role of self-esteem in the correlation between university students' psychological well-being and loneliness. The sample of 330 students of the university was taken for research purposes, age group between 18 to 30 years. To evaluate the correlation between variables, Rosenberg's self-esteem (1965) and the Loneliness scale of University of California and Loss Angels were utilized. According to findings, there was a negative significant association between loneliness and psychological well-being. Self-esteem played a vital role as a moderator between loneliness and psychological well-being.

Bhagchandani, R.K. (2017) examined the impact of loneliness on college students in relation to psychological well-being. To collect data, 101 students were selected as samples. Ryff's questionnaire of psychological well-being and UCLA loneliness scales was selected to find the correlation between loneliness and psychological well-being. The findings revealed a significant correlation between loneliness and psychological well-being. There was also no significant effect of loneliness and psychological well-being between males and females.

Kaur, R. & Kanwar, V. (2017) Studied socio-personal determinants and level of loneliness, of undergraduate students in Ludhiana district Punjab. A sample of 400 students was selected for data collection. The perceived loneliness scale developed by Jha (1971) was used to measure loneliness among students. The result showed that students feel more lonely, whose parents were less educated as compared to graduate parents. Results also indicated that female students had a high level of loneliness as compared to male students.

Waghmare, R.D. (2017) Studied gender difference between psychological well-being in college students of district Jalna (M.S.) The sample of the study comprised 100 students. There were 50 males and 50 females among students. The Psychological Well-being scale developed by Devendra Singh Sisodia and Pooja Choudhary was used to collect data. A simple random method was used to select the data. Results found that there was a significant difference between male and female students on psychological well-being. Female students had high psychological well, efficiency, mental health and interpersonal relations than male students. On the other hand, Male students had high satisfaction and sociability than female college students.

Kaur, N. (2014) conducted studies of psychological well-being among college students. 200 art students and 200 science students were selected for data collection. Singh and Gupta's (2001) psychological scale were used to find the level of psychological well-being of students. The result indicated that there was no significant difference between male and female students. The highest level of psychological well-being was found in science stream students as compared to the art stream.

Roux, A.L. & Connors, J. (2001) examined loneliness among university students. A sample of 189 students was gathered from Charles Sturt University and 104 students' data was collected. The result showed that students of Charles Sturt University had a high level of

loneliness as compared to the university of the Free State. The result showed that Australian female students are equally reported to be more lonely than South Africa female students.

3. Objectives

- To study loneliness among university students.
- To study psychological well-being among university students.
- To study loneliness among males.
- To study loneliness among females.
- To study psychological well-being among males.
- To study psychological well-being among females.
- To study loneliness among university students in relation to psychological well-being.

4. Hypothesis

- There will be a significant relationship between loneliness and psychological well-being.
- There will be a significant relationship between males' and females' loneliness.
- There will be a significant relationship between males' and females' psychological well-being.

5. Methodology

5.1 Aim of the study

- The study aims to find out the loneliness among university students in relation to psychological well-being.

5.2 Sample

In the present study, a sample of 100 participants was randomly selected from the University of Ludhiana. The age group of the participants was between 18-24 years. Every participant was assured that their results will be kept confidential and will never be used for other purposes.

5.3 Tool

Loneliness Inventory developed by U. Meenaskhi and K. Krishan (2010) was used to assess the loneliness and Psychological Well-being Scale is developed by D.S. Sisodia and Pooja Choudary (2012) were used to assess psychological well-being.

5.4 Statistical Analysis-

Statistical measurements like independent sample t-test, mean and SD were conducted to find out the significant difference between means and correlation was used to see the relationship.

6. Results and Discussion

The primary objective of the study was to find the loneliness among the university students in relation to psychological well-being. The findings showed that there is a strong connection between loneliness and psychological well-being.

Hypothesis 1

H1 There will be no significant relationship between loneliness and psychological well-being.
H2 There will be a significant relationship between loneliness and psychological well-being.

t-test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Loneliness	2.36	100	.674	.067
	psychological well-being	3.95	100	1.104	.110

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Loneliness & psychological well-being	100	-.274	.006

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Loneliness - psychological well-being	-1.590	1.443	.144	-1.876	-1.304	-11.017	99	.000

For testing hypothesis 1, a t-test has been conducted on loneliness and psychological wellbeing. A test revealed that the Mean of these variables is -1.59, SD is 1.443 and SE is 0.144. At 95 % level of confidence and 5% level of error, the p-value is 0.00 since the p-value is less than 0.05, it states that H1 being the null hypothesis is rejected here and H2 being the alternative hypothesis is accepted and thus there is a highly significant relationship between Loneliness and Psychological well - being.

Correlation for the above hypothesis is negative i.e. -0.274 which reveals that there is an inverse relation between loneliness and psychological wellbeing. An increase in loneliness results in a decrease in psychological well-being and a decrease in loneliness level results in improved wellbeing.

Hypothesis 2

H3 There will be no significant relationship between males' and females' loneliness.

H4 There will be a significant relationship between males' and females' loneliness.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Gender	1.50	100	.503	.050
	Loneliness	2.36	100	.674	.067

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Gender & Loneliness	100	-.119	.237

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Gender - Loneliness	-.860	.888	.089	-1.036	-.684	-9.686	99	.000

For testing hypothesis 2, a t-test has been conducted on Gender and loneliness. The test revealed that the Mean of these variables is -0.860, SD is 0.888 and SE is 0.089. At 95 % level of confidence and 5% level of error, the p-value is 0.00 since the p-value is less than 0.05, it states that H3 being the null hypothesis is rejected here and H4 being the alternative

hypothesis is accepted and thus there is a highly significant relationship between Gender and Loneliness. To test the correlation and other statistical values, females were given a nominal value of 1 and males were given a nominal value of 2. Correlation using the same nominal values for the above hypothesis is negative i.e. -0.119, which indicates that males tend to have some loneliness issues as compared to females.

Hypothesis 3

H5 There will be no significant relationship between males' and females' psychological well-being.

H6 There will be a significant relationship between males' and females' psychological well-being

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Gender	1.50	100	.503	.050
	psychological well-being	3.95	100	1.104	.110

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Gender & psychological well-being	100	.118	.241

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Gender - psychological well-being	-2.450	1.158	.116	-2.680	-2.220	-21.158	99	.000

For testing hypothesis 3, a t-test has been conducted on Gender and psychological well-being. The test revealed that the Mean of these variables is -2.450, SD is 1.158 and SE is 0.116. At 95 % level of confidence and 5% level of error, the p-value is 0.00 since the p-value is less than 0.05, it states that H5 being the null hypothesis is rejected here and H6 being the alternative hypothesis is accepted and thus there is a highly significant relationship between Gender and Loneliness. To test the correlation and other statistical values, females were given a nominal value of 1 and males were given a nominal value of 2. Correlation using the same nominal values for the above hypothesis is positive i.e. 0.118, which reveals that males tend to have more psychological wellbeing as compared to females.

7. Conclusions

The test conducted to analyze the hypothesis for the study concluded that there is a highly significant relationship between loneliness and psychological wellbeing. Thus proper attention should be given to persons who tend to live alone and have few social interactions to enhance their psychological wellness and prevent them from the bigger future problems. On the other side, loneliness issues are being observed more in females as compared to males. The study revealed that females tend to have more psychological issues as compared to males and should be given proper counseling to help them overcome the issues at the right stage.

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A STUDY ON PSYCHOLOGICAL WELL-BEING OF YOUNG ADULTS WORKING IN PRIVATE SECTOR IN LUDHIANA

Jagdeep Kaur[1] and D. J. Singh[2]
Department of Psychology, CT University, Ludhiana, Punjab, India

ABSTRACT

The present study was aim to compare the psychological well-being of young adults working in the private sector in Ludhiana. The study was conducted on 100 young adults of which 50 were females and 50 were males. Psychological Well-being was assessed from a questionnaire created by Sisodia and Choundhary (2012) was used to assess psychological well-being. There were 50 items in this measure to assess the psychological well-being of working young adults. The result shows that there was a highly significant difference between gender and psychological well-being. The males have more psychological well-being than females. It concluded that females have more psychological issues than males.

Keywords: *Lonliness; Psychologicalwell being; University Students*

1. Introduction

The average young adult works for the majority of his or her life.Approximately a fifth to a quarter of the adult work (Campbell, Converse & Rodgers, 1976). Workplace stress and psychological difficulties are becoming increasingly prevalent worldwide. Businesses and organizations do not belong to the public sector belong to the private sector. The private sector consists of the business sector which aims to generate profit for the owners of the enterprise and the voluntary sector which includes charitable organizations. The public sector might provide services that may be taxable but non-payer cannot b excluded from using as well as services that benefits everyone rather than just the individuals who receive them. As a result of these changes, different private sectors have shown greater involvement in psychological well-being.

There is a significant difference between public and private sector undertaking in terms of structure and organizations, work schedules, workloads, job security, salaries, sense of stability in job and organizational commitment which consequently impact psychological well-being at a different level. With a hectic work schedule and changing technological environment, psychological well-being has begun to gain more attention. When employers are unable to fulfill deadlines, when there is excessive work and time is restricted to finish the task, and when additional conditions are present, stress is created.

Mental well-being is dependent on psychological well- being and they help people to achieve work-life balance. if an employee is content and happy will their employer, he or she is more devoted to the company and can easily manage their professional and personal issues.

Lack of organizational support, job overload, stresses, non-standard work hours, particularly lengthy work hours, are among the most commonly researched workplace stressors. Working for more than 11 hours might cause cardiac problems, which can have a detrimental impact on employees' health. Employee happiness has an impact on their productivity and performance.

Psychological well-being is a crucial indicator of a healthy lifestyle. If an employee is mentally unwell, he or she will behave badly at work and home. Anxiety and depression are caused by stress from work or other factors, resulting in poor job performance. Long-term and excessive stress can be harmful to an employee's health. Excessive stress causes burnout, which leads to individual and organizational losses.Job pressures have detrimental impacts on not just one's physical and psychological health, but also on one's family life, causing one to diverge from normal functioning. Excessive stress can lead to sudden cardiac death, TB, and diabetes, as well as psychological illnesses such as anxiety, depression, and behavioral problems.

Few people think that happiness is so important in our life. Since at least the ancient Greeks, this concept remains the subject of constant

controversy. Of course, such a debate would not start if people generally considered the issues unimportant. Since happiness has captured and continues to attract the interest of so many people, philosophers and many others discussing this concept have long wanted to find a way to measure happiness. Psychological well-being has been defined as "commitment to existing challenges in life (Keyes, Shmotkin & Ryff 2002, p. 1007).

Psychological well-being is defined as a state of happiness and satisfaction with personal experiences and participation in the workplace, feeling of achievement utility, possessions and lack of anxiety, frustration and stress, etc. among several other things. To concentrate on the word "subjective well-being", all these elements are hard to evaluate objectively. In adverse conditions, it may be sustained but in a good situation, it may be destroyed. It is correlated to but not contingent on somatic and neurological factors.

Generally, young adults are energetic, healthy, and focused on forming friendships, dating and having children. During this stage, they should have to complete their important developmental goals while balancing between employment and family commitments. Stress has become a psychological problem in our present era, where everybody is struggling for success to live up to their expectations. Every person these days wants more and more attainable pleasure, resulting in stress among people who are competing to achieve their goals. In this modern era, where everyone strives for superior performance in their fields of work or at home everyone can encounter stress.

Positive psychological functioning is identified by Ryff (1989) in six dimensions as self-acceptance, positive interpersonal relationship, self-reliance, environmental control, the purpose of life and personal growth. It's about how people evaluate their existence. The assessments could be cognitive or emotional. The cognitive evaluation is when a person gives a conscious judgment of one's life satisfaction that is based on information. Psychologically, males and females experience life differently as well women and men differ not only physically, but also psychologically. Women and men have very different ways of interacting dealing with relationships, expressing themselves and coping with stress. Since industrialization, urbanization, social mobility and social legislation in India have been growing; the Status of women has been changing due to physical, physiological and psychological attributes. Women have shifted from household duties to higher-level professions after spreading education and awareness. Rapid changes in lifestyle, competitive market environment and industrialization have changed the environment completely. Gender difference occurs due to biological and psychological differences. Life satisfaction levels for men and women vary. When these differences interact with the environment or situations of the organization, they can lead to different results like good interpersonal relationships at work and outside, effective communication skills and some other factors such as a more forgiving attitude towards employees.

Autonomy, environmental mastery, personal, purpose in life, pleasant relationships with others, and self-acceptance are all components of psychological well-being.

Autonomy: It entails the denial of anything about the person by the individual, as well as the power to make decisions on one's own. Internal forces regulate actions, whether mental or physical, without the help of external persons. Self-actualizes are characterized by independent functioning and resistance to enculturation. Although the fully functional individual is dependent on others, he or she feels or herself capable of performing any type of labor.

Environment mastery: It refers to an individual's capacity to regulate or manipulate complicated environmental phenomena. Here, we're worried about the atmosphere as well as job mastery. It entails a more reasonable shift of surroundings that is both pleasing to the individual and acceptable to the environment. It comprises the ability to transform one's surroundings via physical and mental activity to improve or develop oneself. When one has sufficient/adequate information, abilities, and tactics to deal with a wide variety of environmental phenomena in various

situations, he finds himself in a better functioning condition.

Personal Growth: To attain complete psychological functionality, one must not only accomplish full physical growth but also continue to develop one's potential, grow and expand as a person with the support of this physical and mental growth. The urge to actualize oneself and achieve one's potential is fundamental to personal development. Personal development activities include activities that improve awareness and identity, develop talents and potential, build human capital and facilitate employability, improve quality of life, and help people achieve their goals.

Personal development comprises the acquisition of well-liked and acceptable features. It entails making the best use of one's assets to attain one's ambitions and objectives. Such a person, without a doubt, becomes a role model for others. Individuals with the capacity to convey their internal sentiments, objectives, and formal and informal actions for the development of others in roles such as teacher, guide, counselor, manager, life coach, or mentor are examples of people who have experienced personal growth. In the context of institutions, personal development refers to the strategies, programs, instruments, procedures, and assessment systems that facilitate human growth at the individual level.Personal growth is very important in every field of life from the above it is concluded that personal growth is very important for psychological functioning.

Purpose in life: We all have a life's purpose that gives us a feeling of direction and participation. To achieve one's life's purpose, one must set several little goals. Individuals' sense of purpose in life differs, and this is critical for psychological well-being to work well. Maturity is also defined as having a clear understanding of one's life's purpose goals, such as being productive and creative or obtaining emotional integration later in life. As a result, someone who functions positively has objectives, intents, and a sense of purpose, all of which contribute to a sense of meaning in life.

Positive relations with others: This component highlights the necessity of warm, trustworthy interpersonal relationships. The ability to love is seen as an important aspect of mental wellness. Self-actualizes are regarded as having great sentiments of empathy and having a positive impact on all humans. The ability to relate warmly to people is viewed as a sign of maturity. Adult developmental stage theories also place a premium on forming deep bonds with people and receiving advice and direction from others. As a result, the value of healthy interpersonal relationships is often emphasized in psychological well-being ideas.

Self-acceptance: It is characterized as a key aspect of mental health, as well as a trait of self-actualization and maturity. Acceptance of one's self and past life is another theme in life span theories. As a result, maintaining good psychological health. Accepting oneself despite flaws is known as self-acceptance.

2. Review of literature

Kaur, B. & Singh, A. (2014) the present study aimed to measure the dimensions of burnout among school teachers concerning their psychological well-being. 400 school teachers were selected for data collection. There were 200 males and 200 females in the group. Maslach Burnout Inventory (MBI, 1986) is created by Maslach, Jackson and Schwa and PGI General Well-being Inventory is developed by SK Verma & Amita Verma was used to assess the burnout and psychological well-being among teachers. The study found that there were no gender differences in burnout and the psychological well-being of teachers. There was also no relationship between the burnout of teachers and their psychological well-being.

Saqib, B. & Zilli, A.S. (2015) examined Psychological well-being among public and private undertakings in Aligarh. 100 participants were selected as samples for data collection. Psychological well-being scale prepared by Carol ryff was used to collect data.

Raj, A. & Devi, M.S. (2018) studied the psychological well-being among Hyderabad's young adults working in private sectors of India. 60 young adults in which 30 males and 30 females were used to collecting research data. A psychological scale designed by Sisodia and Chaudhary was used to find psychological well-being in young adults. 20-40 years age young adults were randomly

selected. Results revealed that there is a significant difference between gender and psychological well-being. It also shows that due to overwork and stressful life women are facing more psychological problems.

Mahipalan, M. & Sheena, S. (2019) assessed the impact of spirituality on subjective stress and psychological well-being. Additionally, the study also examined the mediating role of stress in the spirituality-well-being relationship. Data was collected from 322 secondary school teachers using a structured questionnaire. Results showed a positive relationship between spirituality and PWB but an inverse relationship between job stresses. Furthermore, subjective stress was considered seen as an important mediator in the relationship between spirituality and wellness.

3. Objective

1. To compare the psychological well-being of working young adult males and females in the private sector.

Hypothesis

1. There will be a significant gender difference in psychological well-being among working young males and females in the private sector

Method

In this research study, a descriptive survey method was employed to find the psychological well-being of young adults working in the private sector.

Participants

A randomized sample of 100 working young adults in which 50 males and 50 females were included for data collection in the present study. The age group of selected data was between 20-40 years. Every participant was assured that their responses will be kept confidential and will never be used for any other purposes.

Tool used

Devendra Singh Sisodia and Pooja Choundhary (2012) was developed a Psychological Well-being questionnaire that was used to assess psychological well-being. There were 50 items in this measure to assess the psychological well-being of working young adults.

Statistical Analysis

To find out research objective data were analyzed by t-test.

4. Result

The t-test was designed to assess the difference of significance between gender and psychological well-being. The result of the analysis of the variables used in the study is presented in the following tables.

Hypothesis testing

H1 There is no significant gender difference in psychological well-being among working young males and females in the private sector

H2 There is a significant gender difference in psychological well-being among working young males and females in the private sector

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Gender	1.50	100	.503	.050
	Psychological Well Being	2.87	100	1.098	.110

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Gender & Psychological Well Being	100	-.302	.002

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Gender - Psychological Well Being	-1.370	1.338	.134	-1.636	-1.104	-10.237	99	.000

For testing the hypothesis, a t-test has been conducted on Gender and psychological well-being. The test revealed that the Mean of these variables is -1.370, SD is 1.338 and SE is 0.134. At 95 % level of confidence and 5% level of error, the p-value is 0.00 since the p-value is less than 0.05, it states that H1 being the null hypothesis is rejected here and H2 being the alternative hypothesis is accepted and thus there is a highly significant relationship between Gender and Psychological well-being. To test the correlation and other statistical values, females were given a nominal value of 1 and males were given a nominal value of 2. Correlation using the same nominal values for the above hypothesis is negative i.e. -0.302, which indicates that males tend to have more psychological wellbeing as compared to females.

5. Conclusion

The study concludes that female adults in the private sector tend to have more psychological issues as compared to males and should be given proper counseling to help them overcome the issues at the right stage to avoid greater problems at higher stages.

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METHODOLOGIES OF CREDIT CARD FRAUD DETECTION: COMPARISON ANALYSIS

Heena Kochhar[1] and Yogesh Chhabra[2]
[1,2]Department of Computer Applications, CT University, Ludhiana, Punjab, India

ABSTRACT

The global fraud losses related to credit cards are in the billions of dollars each year. Banks are always enhancing their fraud detection systems, yet fraudsters are finding new ways to hack them. With that in mind, preventing and detecting credit card fraud have become a high priority. Data mining is proving to be highly beneficial in detecting financial fraud, and banks face a major challenge when it comes to handling big and complex databases of financial data. There has been much research on credit card fraud detection methods already. In the case of accuracy, the hybrid classifier is suggested, which is superior to the majority voting method. This Paper introduces the knn-naive Bayes hybrid model. The proposed technique is compared to others in terms of various performance criteria such as accuracy, precession, recall, and f1score. Furthermore, the findings show that when compared to other approaches in terms of performance metrics listed above, the proposed method outperforms with exceptional performance attributes.

Key-words: - *Accuracy; Credit card fraud; Fraud detection system; Hybrid classifier; k-nearest neighbor; Machine learning; Naive Bayes*

1. Introduction

As a result of increased computer and Internet usage, credit cards have become more popular. They are also easy to use, which has made them an essential element of electronic commerce. Fraudsters, on the other hand, may commit millions of dollars in fraud each year by using credit transactions for convenience. Businesses and financial institutions are now faced with an increasing
number of fraudulent attempts and need automated fraud detection technologies[2].
Manual identification of fraudulent patterns in transaction data proved hard as the quantity of data sets expanded. Because of this, tools such as data mining, artificial intelligence, and machine learning are used to find patterns in huge datasets and categorize transaction records as authentic or fraudulent. Data mining techniques are making important contributions to fraud detection in the financial sector, owing to the complexity of financial data, and data mining approaches can mitigate adversarial effects. Data mining is essential for detecting financial fraud since it can search for hidden patterns in massive amounts of information [3]. There are several roadblocks to creating a successful fraud detection strategy. One of the issues is that there is a large number of unbalanced data sets, irrelevant features, and poor detection accuracy. Combining the outputs of numerous base classifiers to generate a composite result is becoming more common. These methods extend the execution time of smart techniques, which harms accuracy and other performance metrics [7]. Financial organizations face a huge challenge in developing an accurate and economical technique for identifying credit card fraud.
In this paper, KNN and Naïve Bayes are combined to develop a hybrid classifier that can identify credit card fraud. The main classifier is conceived to be KNN, while the meta-classifier is Naïve Bayes. The technique's success is evaluated using real-world data sets and compared to the efficacy of alternative machine learning approaches using per-performance evaluation criteria.The remaining of the article is structured in this manner. The following section discusses similar studies. Section three outlines our proposed intelligent strategy for detecting credit card fraud, section four discusses the outcomes of tests, and section five compares the proposed system to existing state-of-the-art systems. Finally, part five summarises the study's results.

2. Related Work

There are numerous solutions to the problem that is required to be solved. There are several options for tackling the issue that has to be resolved. Sohony et al. propose an ensemble model that combines the best features of Random Forest and Feed-Forward Networks to identify fraud with accuracy. This method, according to experimental findings, appears to be superior to other well-known strategies. However, the project's focus is limited to data

with numerical values; yet in a more general scenario, for example, one where datasets have text values[5]

Natarajan proposed a method to identify and recognize fraudulent transactions. This approach is based on advanced clustering and classification After taking a closer look, the results showed that the proposed Support vector machine with the apriori algorithm method outperformed the existing hidden Markov model by a significant degree[6].

Randhawa et al. presented the concept of standard models and hybrid models built by AdaBoost and majority voting approaches were tested using public credit card data, as well as a real data set. The majority voting method achieved the best MCC score of 0.942 when 30% noise was added to the data set, demonstrating that the majority voting technique maintains its performance stability even in the face of noise[7]

Thennakoon et al. suggest a new credit card fraud detection method that detects four distinct types of fraudulent transactions. The four machine learning models with the greatest predictive value for recognizing the four fraud patterns (Risky MCC, Unknown Web Address, ISO-Response Code, and Transaction above $100) were Logistic Regression, Naive Bayes, k nearest neighbor, and Support Vector Machine. The models demonstrated accuracy of 74%, 83%, 72%, and 91%, respectively.There is a need to work on increasing prediction levels in order to obtain a better level of prediction since created machine learning models currently have an average level of accuracy[8].

More et al. suggested a Random forest classifier-based approach for detecting credit card fraud. The learning approach was subsequently used to rank the fraudulent alert generated by the classifier. It was discovered that compared to a rule-based technique, which is time-consuming and expensive, the proposed system performed better on a larger dataset[9]

RB and KR proposed a deep learning-based approach for detecting credit card fraud. These techniques include k-nearest neighbors (KNN), and artificial neural networks (ANN), support vector machines (SVM) to help predict fraud before it happens. Then separate supervised machine learning from deep learning techniques to identify fraudulent and non-fraudulent transactions. Use an artificial neural network that outperforms the unsupervised learning algorithms in terms of accuracy (approximately = 100%) With a true positive rate of 81%[10].

Tanouz et al. propose different machine learning-based classification algorithms. Due to an imbalanced data set and a high amount of false findings, the results were highly unreliable. All of the algorithms showed little variation, although it may be suggested that if these algorithms are trained with additional real-world data, their efficiency and accuracy will improve[11].

Rakhshaninejad et al. proposed an ensemble-based weighted voting technique for detecting fraud. Due to the dataset's imbalance, the proposed technique split it into three segments: regular, fraudulent, and suspicious. The Random Forest classifier is used to narrow down the list of essential characteristics for each dataset. The results of this investigation indicated the highest levels of precision, recall, and F1-score. This result was achieved by resolving the unbalanced dataset problem using feature selection and weighted voting. [13].

By combining the LightGBM parameter with Bayesian-based hyperparameter optimization, Taha and Malebary created a better light gradient boosting machine. Two sets of real-world public data were used in this technique. In contrast to previous approaches, their methodology surpassed in terms of accuracy. The suggested system's accuracy is 98.40 percent, AUC is 92.88 percent, Precision is 97.34 percent, and F1 is 56.95 percent [14].

3. Proposed Hybrid classification approach

The suggested KNN and Nave Bayes classifiers are combined to form a hybrid classifier. KNN is used as the base classifier, while Naive Bayes is used as the meta-classifier. A connection between an attribute and a target must be established using KNN, which computes the distance between the two as a feature. After that, the distance value is input into the Naive Bayes classification model. Certain performance parameters like recall, precision, accuracy, and execution time are calculated to evaluate the performance. The algorithm's goal is to improve fraud detection

accuracy while also minimizing computing complexity.

3.1 Classification techniques

- **K-nearest algorithm:** The K-NN algorithm saves all available data and classifies each new data point according to its similarity to the previous one. This implies that new data can be easily classified using the K-NN algorithm as it is generated [21]. When analyzing a data set, it's critical to choose the proper k-value to avoid overfitting and underfitting. To optimize the model, we utilize the k-nearest neighbor method to estimate future values from historical ones [17]
- **Naive Bayes:** NB is a classification technique based on supervised learning. It is a probabilistic model that enables the solution of analytical and predictive problems[12]. The advantage of the NB classifier is that it requires only a small number of values from the trained dataset to guess the methods and changes in the required variables for classification. The NB classifier can be used to predict labels on previously unseen datasets[16

3.2 Proposed Framework Design

The system architecture in the diagram below shows us a full view of the proposed system. The architecture displays how the implementation starts with the input of classification data, followed by data reading and application of the knn (k nearest neighbor) method to the data set, which results in a distance value that is then used as a new feature. The data is subsequently divided into two subsets: train and test data. The result is then fed into a Naive Bayes classifier for performance assessment.

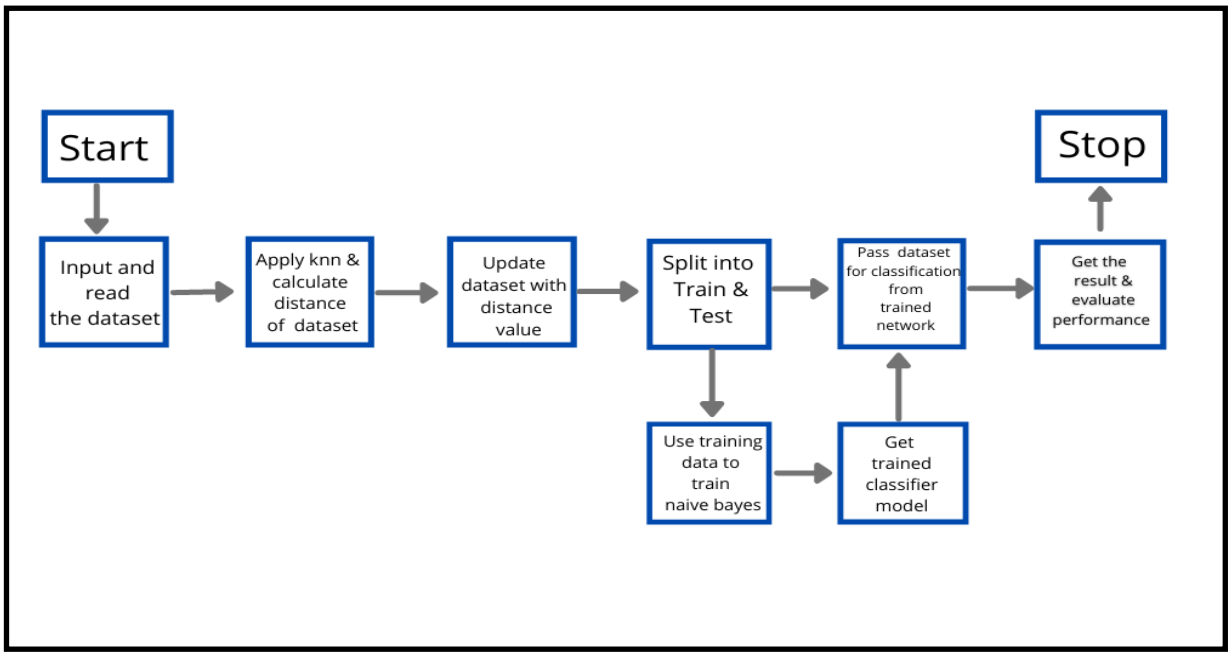

Figure 1: Design of proposed system

- **Dataset:** A dataset for use in the suggested system was collected from www.kaggle.com. A transaction's validity is determined by its target class, whereas the remaining 30 columns are characteristics.
- **Research implementation:** An Intel Core i5 CPU with a clock speed of 1.5GHz was used in the experiments, as well as Python 3.3.8 and Anaconda Spyder software.
- **Programming language:** We utilized Python as a programming language to build the suggested system. For machine learning implementation, Python is a great language to use because of its many packages and modules.
- **Packages and libraries** This is how the proposed system makes use of various Python libraries and packages:

➢ **Numpy:** numerical analysis programming language allows us to perform numerical

calculations iPython. The Numpy package is an excellent choice when working with multidimensional arrays or linear algebraic structures.

- **Pandas:** The Pandas programming language is used to create data analysis and manipulation tools. This program is used to load and read a file. When working with data, it's quick and adaptable.
- **Scikitlearn:** This is a Python package for predictive tests, as well as a machine learning model package.

3.3 Proposed algorithm

3.4 Evaluation Parameters

Table 1: Confusion Matrix

	Positive (Fraud)	Negative (Normal)
Positive (Fraud)	True Positive (TP)	False Negative (FN)
Negative (Normal)	False Positive (FP)	True Negative (TN)

This study makes use of four evaluation metrics, including recall, f1score, and precision. Table 1 shows the confusion matrix that was used to calculate each of them.

4. Proposed Algorithm's Results and Evaluation

Table 2 present the performance evaluation of the Hybrid classifier. Better results have been generated while using both techniques. For the evaluation of the performance of experiments, various performance metrics like accuracy, score, recall, and precession are used.

Table 2: Result of the proposed strategy

Algorithm	Accuracy	Precision	F1-score	Recall
Proposed hybrid	99.43%	99.75%	99.57%	99.43%

5 Comparison of Proposed system with other state of art techniques

In this part, we evaluated our created model by comparing it to other prior research on the dataset.

Algorithms	Accuracy	Precession	Recall	F1 score	Reference
Random forest(RF)+ Neural network(NN)	99.95%	85.85%	86.73%	NA	[5]
Support vector machine (SVM)	72.3%	65.5%	79.8%	67.7%	[6]
Adaboost and majority voting methods	94%	NA	NA	NA	[7]
Naive Bayes(NB) K Nearest Neighbor(KNN) Linear regression(LR) Support vector machine	83% 72% 74% 91%	NA	NA	NA	[8]
Random Forest Technique	97%	88%	60%	69%	[9]
Support vector machine	93.49%	97.43%	89.76%	NA	[10]
K Nearest Neighbor(KNN)	99.82%	71.42%	0.0393%	NA	[10]
Artificial neural network (ANN)	99.92%	81.15%	76.19%	NA	[10]

Logistic regression(LR)	95.16%	95.34%	91.11%	93.18%	[11]
Random forest(RF)	96.77%	100%	91.11%	95.34%	[11]
Naive Bayes(NB)	95.16%	100%	86.66%	92.85%	[11]
BFV(Behavior feature vector)	90%	NA	NA	NA	[12]
Ensemble-based method	99.97%	87.785%	97.708%	92.213%	[13]
Optimized light gradient boosting machine Dataset 1 and 2	98.40% 98.35%	97.34% 28.33%	40.59% 91.72%	56.95% 43.27%	[14]
Adaboost without time	94.9%	95%	95%	95%	[15]
Linear R with time	93.9%	95%	94%	94%	[15]
Proposed Technique	**99.43%**	**99.75%**	**99.57%**	**99.43%**	

Table 3: Comparison of Proposed system with other state of art technique

As shown in Table 3, Our method was more precise than those used in previous research. Recall indicates the proportion of fraud samples that the classifier classified as fraudulent. In comparison to other methods, our method performed exceptionally well in this regard. Additionally, the precision value, which indicates the percentage of correct predictions, demonstrates a significant result. Our approach outperformed [7,18] by a wide margin across all assessment criteria. It's important to point out that our results much outperformed those achieved using earlier approaches.

6. Conclusion

Credit card fraud has become a major issue in today's e-commerce world. Many studies used techniques like data mining, artificial intelligence, and machine learning to develop fraud detection systems with the aim of reducing financial losses and increasing customer trust. By developing methods for detecting credit card fraud, financial institution's and economic resources' security is improved, and customers' credit cards are safer to use. This study demonstrated that combining knn and naive Bayes with the feature extraction method produced the best results. Additionally, our proposed method was compared to several previous studies, which demonstrated the proposed method's superiority to other previous methods. The results of this study demonstrated the highest accuracy, precision, recall, and F1-score criteria. In future work, the proposed technique will be used and get evaluated for the testing of performance metrics.

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IMPACT OF EMOTIONAL INTELLIGENCE & SELF-EFFICACY: THE EMPIRICAL STUDY UPON THE PSYCHOLOGICAL ASPECTS AMONG BANK EMPLOYEES POST COVID-19

Ramneet Kaur[1], and Kawal Nain Singh[2]
Department of Commerce, CT University Ludhiana, Punjab, India

ABSTRACT

Performance of employees is determined by various factors which are within their control or beyond their control. Some factors are related to their work place and some factors are related to their own behavioral factors like attitude, personality, perception, values, leadership, motivation, stress, organizational commitment and last but not the least is emotions. Many organizations have started giving consideration to the distinct and new variables like Emotional Intelligence and Self – Efficacy at their work place. All these variables depend upon the inner state and urge of an individual. The particular event could bring joy to one's life and the same event could bring sorrow in another's life. COVID- 19 pandemic is the serious and the deadliest situation of our time and the greatest challenge we have ever faced in our life. This pandemic situation creates devastating effects on the social, political, economic environment etc. COVID-19 impacts the employees at their workplace a lot as it creates a situation which has deep and long lasting effects. Here comes the matter of concern which provides the base for the research. Through this research paper, an overview on the impact or effect of psychological variables i.e. Self-Efficacy & Emotional Intelligence over the performance of private sector as well as public sector bank employees serving in Ambala Cantt and Ambala City in state Haryana. Standardised scale of Emotional Intelligence (EIS-HPD) worked out by Anukool Hyde, Sanjyot Pethe and Upinder Dhar on 10 factors (awareness of self, empathy, self motivation, stability of emotions, relationship management, integrity, development of self, value orientation, commitment and altruistic behavior) consisting of 34 items and Scale based on self report estimation of Self- efficacy based on 5 point scale had been employed in order to conduct this study upon the psychological aspects of bank employees Post COVID-19. The outcome of this study revealed that there was a medium degree of positive relationship between Emotional Intelligence & Self-Efficacy. Variables were chosen based on the earlier literature done by various researchers

Keywords: *Emotional Intelligence, Self- Efficacy, Job Performance, COVID- 19, Psychological aspects, Workplace*

1. Introduction

Emotions are the motivating forces which may affect the thought process of an individual. Apart from intelligence, emotions are also responsible for job performance and bringing satisfaction in one's life. Due to the outbreak of COVID-19 pandemic the Indian economy has been hit hard. No state or Union Territory has been spared by the pandemic, with the sole exception of Lakshadweep. (State Finances: 2020-2021). COVID-19 has impacted a lot and has various spatial dimensions in India. The one dimension among them is banking penetration where COVID-19 put an adverse impact on state wise performance of bank branches and their employees employed in them. This lockdown situation has put an adverse psychological effect on the mindset of bank employees and their working. Performance of employees is determined by various factors which are within their control or beyond their control. Some factors are related to their work place and some are related to their own behavioral factors like attitude, personality, perception`, values, leadership, motivation, stress, organizational commitment and last but not the least is Emotions. Success at a workplace is somewhat dependent on Intelligence Quotient (IQ) employees are having or we can say on their reasoning ability. Apart from these reasoning tests, one must also prepare oneself psychologically as well as emotionally. For preparing ourselves to handle difficult situation in life we must have the different level of intelligence, which is termed as Emotional Intelligence. (Singh, 2015). This paper will explore the impact of psychological factors among the bank employees in Post COVID-19 situation. The two researchers named Peter Salovey and John Mayer has propounded the concept of emotional intelligence initially in their article titled, "Emotional Intelligence" in 1997. They explained EI as the potentiality to express one's emotions and feelings, understanding them to get knowledge and regulating emotions to generate cognitive and intellect skills. This term has been universalized by famous psychologist Daniel Goleman in his book

"Emotional Intelligence: Why it can matter more than IQ in 1996 (Goleman, 1996). He described Emotional Intelligence as the capability to recognise our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships (Goleman 1998). Aristotle had given the quote for Emotional intelligence where he explained how to control the anger by using one's intellect but at that time he was not able to give it technical name. Later on it has been familiarized by Mayer and Salovey in 1997 and afterwards well explained by Daniel Goleman in his book written by him. He explained this term by quoting Aristotle words for controlling one's anger through intelligence or an intellect power.*"Anybody can become angry that is easy but to be angry with the right person and to the right degree and at the right time and for the right purpose and in the right way that is not within everybody's power and is not easy* (Aristotle Quotes.(n.d.) Brainly Quote.com). He termed Emotional Intelligence as the management of own emotions as well as other's emotions.

Components of Emotional Intelligence

According to Daniel Goleman's model, There are basic five key elements embedded in it: awareness of self, regulating the self, socialisation skills, empathy and motivation.(Dhani.P et.al).

They can be explained in detail as follows:

1. Awareness of self- It is the potentiality to acknowledge our own emotions and discern its effect on others in order to lead the decisions. People with high EI are aware of themselves very well. They are very much confident in their deeds and hence know how to control their emotions. People who have awareness about themselves are able to identify their strengths and weaknesses and can undertake SWOT analysis very effectively. This will help them to improve their performance at personal as well as professional career.
2. Regulating the self: It is the capability to regulate our own emotions and behavior which are emerging in ourselves when we are facing tough circumstance. They are not making impulsive decisions. They always think and act according to the situation.
3. Social skill: It is the socialization process where human beings communicate with each other both verbally and non- verbally. It is a good sign of high EI. The people having good social skills believe in team spirit. They are able to build a rapport with others and maintain relationships.
4. Empathising others: It is the capacity to acknowledge what other people are fellingand putting oneself in their position at will. Person with high empathy are excellent in making good relationship with others. They perceive the things in an open environment and are honest in all aspects.
5. Motivation: It is the ability to work consistently towards the accomplishment of goals. People with high EI are self motivated and have urge to win in all typical situations. They love to take challenge and work efficiently in order to perform better.

In order to grow as a leader, one must know how to manage these areas. The more we manage these constructs, the higher our Emotional Intelligence will be. In the workplace, the most important factor which has its utmost importance is person's Emotional Intelligence (Van Jaarsveld, 2003). Any person can increase their EI with productive training. Apart from Emotional Intelligence, another parameter that affects the performance of the employees is Self-Efficacy.

The next variable to be studied is Self Efficacy. In a lay man language "Self efficacy is related to person's self confidence he or she has in order to accomplish their personal or organizational goals". Self efficacy is also termed as self-concept, self awareness and self perception. It is the faith or conviction in one's own capability to achieve the goals. An American psychologist born in Canada named Albert Bandura has written various books and originates the term Self-Efficacy. Self Efficacy is defined as the capacity of executing courses of action to deal with particular situations (Bandura 1977). In a nutshell, an individual having high Self-Efficacy will be having more confidence to accomplish his task. An individual will be more confident and self motivated in fulfilling his dreams if he perceived self efficacy an essential and important factor in his life.

2. Review of Related Literature

The review of literature not only provides the glimpses of the previous studies but also laid down the foundation for the research scholars to know the direction in which the research is moving.

Munshi and Hanji (2015) reported in their research that Emotional Intelligence and work relationship is interrelated with each other. They have taken well being, self control, emotionality and sociability as an independent variable and work performance as dependent variable in their research. This study indicated the beta score which showed that there was statistically positive and significant relationship of EI with work performance of personnel working in Sales department of Retail stores situated in Karnataka.

Sharma and Pandey N (2015) investigated the co- relational study on HDFC bankers in relation to two variables i.e. Emotional Intelligence and Job Satisfaction. It was revealed through their study that there exists a positive and cogent relationship between these two variables taken for the intensive study. Employees who were having high EI were committed to their job and totally satisfied with the compensation package paid to them. They were having good interpersonal skills as compared to employees having low EI.

Khandekar and Sharma (2017) investigated the study to have a comparison between players of Chhattisgarh according to gender. They used EIS-HPD, a self administering test comprising of 34 items and 10 factor scale developed by Anukool Hyde, Sanjyot Pethe and Upinder Dhar to assess the Emotional Intelligence among the male and female players at university level. They found that there was high Emotional Intelligence among male players in nine dimensions except self motivation as compared to female counterparts.

Pal (2017 stressed on stress, coping, self-efficacy, resilience and social support among students of Punjabi University. This paper explained through her research that there is no significant mean difference in the stress level of students in relation to gender and location. This study also found that coping skills of male and rural students are better than female and urban students of Punjabi University situated at Patiala.

Bandi and Chauhan (2019) concluded in their study that the most important and an intangible factor which may affect the employee performance is Emotional Intelligence. They found that Employees having high Emotional Intelligence tends to have better work performance and hence committed to an organization.

Kaur and Sharma (2019) explained the factors which are affecting emotional intelligence and work performance and their impact on the performance. They opined that high EI enhance job satisfaction and ultimately leads to organizational commitment and reduced labor turnover and absenteeism.

3. Objectives of the Study:

1. To analyse the performance of bank employees in relation to Emotional Intelligence in Post COVID 19 situation at their work place
2. To analyse the performance of bank employees in relation to Self- Efficacy in Post COVID-19 situations at their work place
3. To explore the relationship existing between Emotional Intelligence & Self-Efficacy

4. Hypotheses of the Study

H_{o1}**:** There exists no significant mean difference in performance of bank employees in relation to the psychological variable i.e. Emotional Intelligence.

H_{a1}**:** There exists significant mean difference in performance of bank employees in relation to the psychological variable i.e. Emotional Intelligence.

H_{o2}**:** There exists no significant mean difference in performance of bank employees in relation to the psychological variable i.e. Self -Efficacy.

H_{a2}**:** There exists significant mean difference in performance of bank employees in relation to the psychological variable i.e. Self- Efficacy.

5. Sources of Data Collection

This correlation study is based on primary data which was conducted among bank employees working in Public and Private Banks of Haryana in District Ambala Cantt and Ambala City. A questionnaire based on emotional intelligence and self report estimation of Self-

Efficacy were being employed to conduct this study. EIS-HPD developed by Anukool Hyde, Sanjyot Pethe and Upinder Dhar comprises of 10 factor scale with 34 items. It has been administered in order to assess the working performance of bank employees in relation to Emotional Intelligence. The dimensions which were studied in this study were awareness of self, empathy, self motivation, stability of emotions, relationship management, integrity, self development, value orientation, commitment and altruistic behavior.

6. Data Analysis and Interpretation

For the purpose of the study a total of 60 employees were selected which comprises of 30 employees from public banks and 30 from private banks. Independent T-test and Correlation analysis has been applied to the data along with descriptive statistics. The hypotheses had been tested separately using means, t-ratios and coefficient relation. The tabular presentation of the results deals with the nature of variables which has been divided into following section:

1. Section 1:- This section deals with the descriptive statistics to study the nature of variables and their distribution .
2. Section 2:- This section deals with the differential analysis to compare the difference between variables like Emotional Intelligence and Self-Efficacy.
3. Section 3:- This section deals with the correlation analysis to explore the interrelationship between variables

a. **Descriptive Statistics –** In this study, descriptive analysis was undertaken in order to explore the nature and distribution of variables. The description of scores were in respect of public and private bank employees (n=60). Weighted Average Score and Standard Deviation has been worked out to ascertain the nature of distribution of scores on the Emotional Intelligence and Self-Efficacy.

i. Discussion based on Weighted Average Score and Standard Deviation.

Table 1

Variable	N	Weighted Average Score	SD
Emotional Intelligence (EI)	60	143.1	14.13
Self-Efficacy (SE)	60	32.08	5.14

Table 1 present the descriptive statistics of the research variable. The weighted average score of EI as well as SE was found to be 143.1 and 32.08 respectively. Similarly the S.D of EI as well as SE was found to be 14.13 and 5.14 respectively.

Differential analysis – In this section, efforts have made to make a comparison between Self-Efficacy and Emotional Intelligence among bank employees. T-ratio has been computed to test the hypotheses of the study.

Discussion based on Weighted Average Score, SD and t-value

Table 2

Variable	N	Weighted Average Score	SD	t-value
Emotional Intelligence	60	143.1	14.13	57
Self- Efficacy	60	32.08	5.14	

Table 2 reveals that the weighted average score of Emotional Intelligence is 143.1 and Self-Efficacy is 32.08. With the help of t-ratio, computed t-value between these two psychological variables was found to be 57 which is quite statistically significant at level of 0.50.

b. **Correlation Analysis-** This analysis has been undertaken in order to show the inter-relationship that will arise between EI and SE with the help of coefficient of correlation (r).

i. Discussion based on Correlation Analysis

Table 3

Variable		N	r
Emotional Intelligence (EI)	Self-Efficacy(SE)	60	**+ 0.5599**

Table 3 reveals the impact of Emotional Intelligence & Self- Efficacy on the performance of bank employees. Correlation analysis has been done in order to know the relationship between them. As hypothesized, there was statistically significant and positive inter- relationship between Emotional Intelligence & Self-Efficacy r = 0.5599 ($p < 0.5$).

Conclusion

- The emotionally intelligent employees are able to keep their emotions under control and are able to adapt in all circumstances which in turn helps them to perform well in Post COVID-19 situations.
- The co-relational study between two psychological variables i.e. Emotional Intelligence & Self-Efficacy indicated the significant association between these two parameters. Accuracy in the work totally depends upon these two variables taken for the in-depth study. Higher the scores, the more efficient the bank employees will be in doing their work even after the outbreak of COVID-19.
- This study also revealed that Employees who scored high in both scales are said to perform better in their work. It also states that employee with high EI and SE possesses good team spirit and high integrity in comparison to those with low EI & SE even during pandemic of COVID and post COVID-19.

Limitations of the Study

The focus of present research paper was to explore the impact of Emotional Intelligence and Self Efficacy among the bank employees. The study was delimited in the following manner:

1. Banking sector have been considered to be stressful and challenging one. Hence due to time constraint, the responses of the employees might be biased.
2. Only occurrence of two psychological variables i.e EI and SE were analysed. This study could have been conducted with other psychological parameters also which might affect employee performance
3. Due to time constraint, the number of respondents was restricted to 60 which is one of the biggest limitations of this study. If the sample would be larger, than the results would have been more satisfactory and relevant

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CROWD FUNDING & P2P LENDING: CREATIVE DISRUPTION IN INDIANMICRO STEEL INDUSTRY

N. Sachdev[1] and K.N. Singh[2]
[1,2] Department of Management, CT University, Ludhiana, Punjab, India

ABSTRACT

Purpose-A specific goal of the study is to gain a better knowledge of the perceptions of the owners of the Micro Steel Industry about the use of various FinTech instruments to meet their financial needs. **Methodology/Design/Approach-**The study takes a quantitative approach where a total of 150 primary responses are collected using a structured questionnaire. The results of the study are analysed using statistical tools of chi-square tests, Tables , Pie Charts & Percentages. **Findings-**This research reveals that respondents' awareness of the benefits offered by FinTech instruments as a credit supply for their businesses is relatively low, and that the benefits of FinTech instruments should be highlighted more extensively in order to determine the satisfaction levels of respondents with regard to adopting FinTech. **Originality-**According to previous research, a number of researchers have focused on various aspects of FinTech use and implementation. However, studies on emerging economies are scarce, despite a high demand for them. This is a first-of-its-kind attempt in the Micro Steel Industry, focusing on the state of Punjab from a FinTech point of view. *The Steel Industry makes significant contributions to the development of our country, which is why India is the world's second-largest steel manufacturer, with output reaching 111.2 MT (million tonnes) in 2019. Micro Enterprises in the steel industry are the primary drivers of monetary growth and job creation in both developed and developing countries across the world. In many industrialised and emerging nations, this industry has been hailed as a key driver of economic growth and social progress.FinTech is an abbreviation for Financial Technology. It is being used as a noun to refer to FinTech start-ups, as well as a verb to refer to FinTech companies. Financial Technology businesses are those that use technology to improve the efficiency and effectiveness of banking and financial transactions. This may be accomplished by altering the way consumers pay for products and services orby offering online investment and lending capabilities.*

Keywords*: FinTech, GDP, NSP, DGFT, IISI, P2P, SME's*

Introduction

TheSteelIndustry makes significant contributions to the development of our country, which is why India is the world's second-largest steel manufacturer, with output reaching 111.2 MT (million tonnes) in 2019.The availability of indigenous resources such as iron ore and cost-effective labour has fueled the expansion of the Indian steel industry. Micro Enterprises in the steel industry are the primary drivers of monetary growth and job creation in both developed and developing countries across the world, according to the World Bank.

Micro Enterprises in the steel sector are the backbone of an economy, allowing it to sustain an acceptable growth rate while also creating job possibilities for its citizens. In many industrialised and emerging nations, this industry has been hailed as a key driver of economic growth and social progress. The contribution of Micro Enterprises to the Indian economy in terms of job creation, reducing regional inequalities, promoting equitable economic development, and increasing the country's export potential has been nothing short of spectacular. Despite some infrastructural deficiencies and challenges such as a lack of institutional credit and insufficient market linkages, this sector has achieved remarkable growth in terms of the number of people employed, the amount of money invested, the scale of production, and the amount of money contributed to the national GDP. Specifically, the research makes an effort to concentrate on the enormous growth potential and possibilities available in India for development of the Micro Steel sector, to identify key problems and obstacles, as well as to provide recommendations for addressing these issues and challenges.

The term "FinTech" is used in a broader sense when finance collaborates with technology to produce better goods and procedures. Financial Technology is abbreviated as FinTech. FinTech start-ups are referred to as nouns, and FinTech companies are referred to as verbs. There is no official definition of FinTech because the term is evolving within its scope and has moved beyond banking to encompass other services such as insurance, mutual funds, and personal financial

management.

Financial Technology businesses are those that use technology to improve the efficiency and effectiveness of banking and financial transactions. This may be accomplished by altering the way consumers pay for products and services – or by offering online investment and lending capabilities.There are a number of different ways in which these technology firms are innovating in the financial sector. Online automated wealth management is provided by this company (primarily using low-cost index funds).

The micro steel sector has made a major contribution to the nation's industrial output in recent years. The Indian steel industry is extremely up to date, with steel mills that are state-of-the-art in their operation. A continuous renovation and upgrading of older plants, as well as increased levels of energy efficiency in new and existing facilities, have always been the company's goals.

Here are five different platforms that facilitate the flow of financial resources for Micro Steel Enterprises

1.Indifi Technologies is a Gurgaon-based company that provides a leading platform for small companies to get loan finance. The most significant innovation in approach that Indifi is providing is the ability to develop and provide loan solutions based on the kind of company that the micro industry is involved in. Thanks to technological advancements and increased access to data, the platform assists in the development of a cost-effective and scalable credit distribution system tailored to the needs of a particular sector. In addition, the improvement in access to credit, as well as the experience that borrowers have in terms of the speed with which their loans are approved and disbursed, and the applicability of collateral-free loans and loan products to their business requirements, are distinguishing features.

2.LendingKart Finance Limited (previously AadriInfin Limited) is an Indian non-banking financial company that specialises in small and medium-sized enterprise (SME) financing. The firm aspires to revolutionise small business financing by making it easier for SMEs to get loans more quickly and simply. The firm utilises technology and analytics techniques to evaluate the creditworthiness of small companies quickly and correctly, evaluating thousands of data points from a variety of data sources.

3. Capital Float Is an online platform that helps SMEs in India with working capital loans. There are a number of flexible, short-term loans available that can be used to support inventory purchases, fulfil new orders, or improve cash flow cycles. Their mission is to address the market gap by providing innovative and flexible financing options for SMEs that are delivered in an efficient and customer-friendly manner.

4. KredX was established to assist businesses in meeting their short-term financial requirements through the sale of unpaid bills (raised against bigger companies) to a network of buyers/investors that includes banks, nonbank financial institutions (NBFIs), wealth managers, and retail investors.Theplatform assists businesses in maintaining cash flow by releasing cash that has been held in the form of bills on their books.

5. Neo Growth Retailers that utilise Neo Growth's technology platform to accept credit/debit cards or other digital payments from customers are eligible for unsecured loans from the company. NeoGrowth loans are short-term and hassle-free, with the option of making daily payments, which is a critical component in guaranteeing customer happiness with the loan. Using a social impact approach, A key objective of the business strategy of Neo Growth is the creation of a positive social impact on the financial lives of small and medium-sized business merchants throughout India, more than half of whom are creditworthy but have been denied access to loans based on traditional underwriting methods up to this point

Crowdfunding

The goal of Crowd Funding is to raise modest sums of money from a large number of people. Its technological accessibility distinguishes it. This technology-based platform links the entrepreneur and the investor, giving information on investment prospects. These platforms provide not only operating capital but also provide strategic help to businesses.

Crowd Funding may be divided into four categories:

1. Crowd Funding using a reward system

This strategy is based on determining a return for a specific quantity of investment. This incentive, which the fundraiser determines, might be in the form of an interest rate on the amount invested or a particular amount of money. This serves as a motivator for investors.

2. Crowd Funding based on equity

Using an internet platform for Crowd Fundraising, the firm seeking money distributes shares to investors and offers them the opportunity to become a shareholder in the company. The firm first raises capital from private equity, angel investors, and financial institution loans. Once the company is financially successful, it can sell its stock to the general public.

This approach is hazardous, necessitating regulation. There is currently no legislative framework to govern the legal status and authorization of platforms that generate equity-based Crowd Funding.

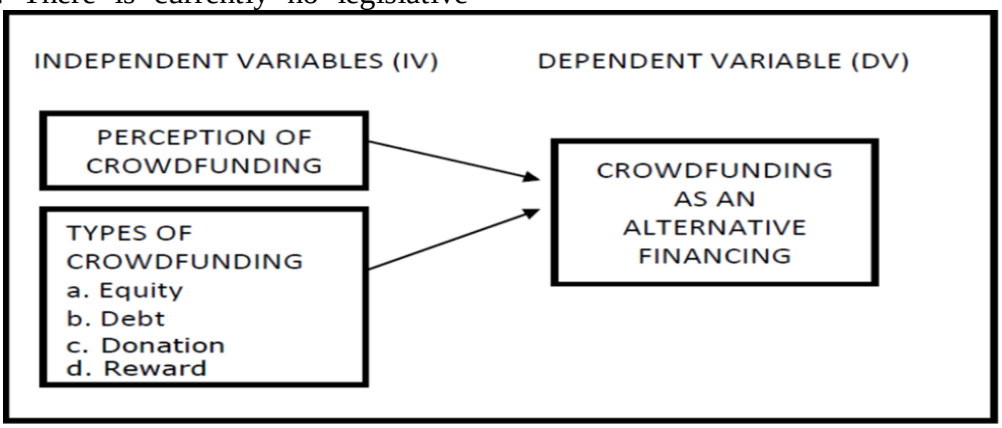
3. Crowd Funding based on donations

This strategy entails approaching investors and requesting money for a charitable initiative. It is a simple way to raise cash. The industry is motivated by social good and may or may not tie prizes to donated money. This approach raises funds for specific research projects, disaster assistance, or social purpose groups.

***4.* Crowd Funding based on debt**

Debt-based Crowd Fundraising is analogous to taking out a loan from a bank. Instead of paying them a portion of the earnings, the companies borrow money from individuals and pay them interest on the money borrowed.

In a nutshell, Crowd Funding



Crowd Funding (Figure 1)

Need for Crowd Funding

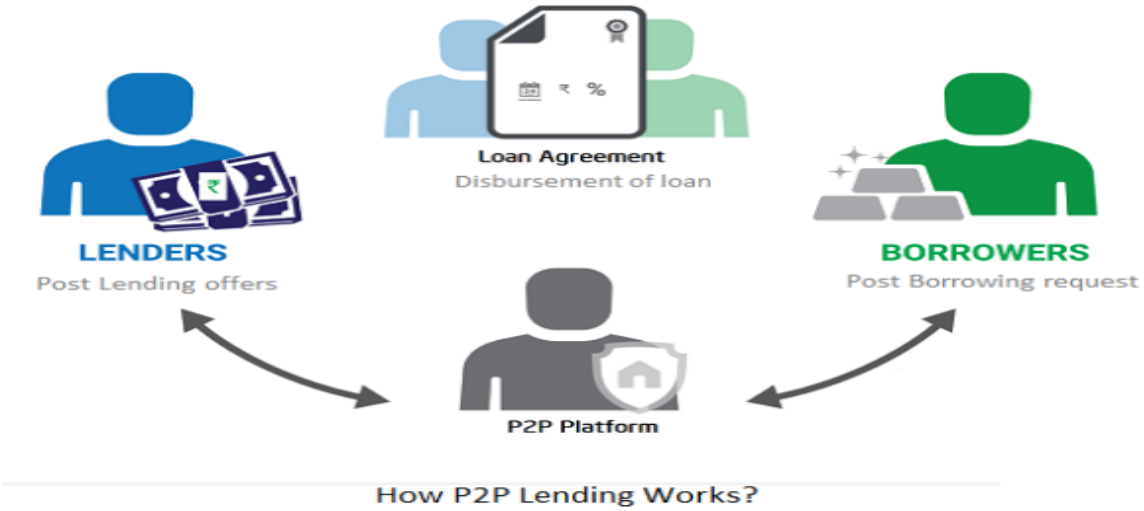
Crowd Funding not only assists 's with financial aid but also allows individuals to simplify their business's traditional approach. Typically, entrepreneurs spend months combing through numerous sieves to filter their company processes. However, through Crowd Funding initiatives, these aspirants can explore their businesses in new ways while also gaining access to more invested individuals who are eager to assist them in growing.

Ketto, Catapult, BitGiving, ImpactGuru, and other prominent Crowd Funding businesses in India have supported the aspirations of numerous aspiring entrepreneurs.

With the government's emphasis on Digital India, Crowd Funding is undoubtedly the next big thing, catalyzing micro, small, and medium-sized company financing. Micro Steel Industry must make a severe choice about the influx of cash, from adopting cutting-edge technology to embracing digital in every manner feasible. With a variety of Crowd Funding alternatives accessible to small and medium businesses, it is recommended that entrepreneurs use these opportunities and enable money for their companies.This strategy pulls into the collective efforts of a big group of people, primarily online through social media and Crowd Funding platforms, and utilizes their networks for increased reach and visibility.

Peer-To-Peer Lending

Websites connect borrowers directly to lenders, known as investors, who loan money to qualified applicants. It's an alternative to borrowing money from a bank or a more traditional online lender. Each website sets the rates and the terms (sometimes with investor input) and enables the transaction. The best peer-to-peer lending websites offer multiple types of loans and have competitive interest rates and low fees. They have varying minimum and maximum loan amounts and lend money for a variety of different reasons. The best sites have a streamlined application process and highlight their borrower qualifications upfront.



Peer-To-Peer (Figure2)

Initiatives by Government

The following are some of the other recent government efforts in this sector:

• The government implemented a Steel Scrap Recycling Policy with the goal of reducing imports, which in turn helps to encourage micro businesses. The Steel Scrap Policy was announced on November 7, 2019, and it outlines the duties and responsibilities of the various actors.

• The Ministry of Steel established a working group to produce Model Guidelines for Safety Practices in the Iron and Steel Industry. This will help to guarantee that safe procedures are implemented.

in all iron and steel production facilities, big and small, regardless of size. Its primary responsibility is to maintain a safe and healthy working environment while protecting employees from any dangers and risks on the job.

• The government of India's emphasis on infrastructure and the resumption of road projects is contributing to the increase in steel demand. Furthermore, it is anticipated that continued development in the rural economy and infrastructure would contribute to an increase in the need for steel.

• By fostering the development of an internationally competitive steel sector, the National Steel Policy aspires to make India a globally competitive steel manufacturer. The National Steel Plan (NSP) calls for a capacity of 300 million tonnes (MT) of steel production and a per capita steel consumption of 160 kg.

The Ministry of Steel is assisting it by establishing the Steel Research and Technology Mission of India (SRTMI), which will be funded initially with Rs 200 crore (US$ 30 million) and would spearhead R&D operations in the iron and steel industry.

For steel import monitoring, an institutional framework in collaboration with the Directorate General of Foreign Trade (DGFT) has been proposed. This would be a fully online system for pre-registration of steel imports that were planned in the future. Having access to this information would be advantageous to the Indian steel industry, since it would allow it to respond more quickly to market conditions.

Steel Industry In India

The steel industry in India has been around for

almost a century. The steel industry is growing in many parts of the globe. For a number of years, it has benefited from the unusually strong growth of the Asian economy in general (mainly India). The rapid increase in demand for steel is being driven by the economic modernization processes taking place in these nations.As a minor Iron and Steel producer, India produced about a million tonnes per year at the time of independence (MT). In due time, the government concentrated its efforts primarily on the development of the basic steel sector, where crude steel accounted for a significant portion of overall steel output.

The steel industry was subjected to a tightly controlled regime prior to the implementation of economic liberalisation reforms. This regime was primarily comprised of regulations such as the restriction of large plant capacities, price regulation; and the requirement for producers to obtain a government permit in order to increase production capacity

A new chapter of growth and development for the steel industry has begun as a result of liberalisation, during which a significant number of restrictions were removed, some immediately and others over a period of time, according to the International Steel Institute. The development of the local Micro Steel industry has led to the integration of the global steel sector. Due to this, private companies have been able to expand their operations, embrace new, lower-cost technology, and boost their worldwide competitiveness.

Since then, the contribution of the private sector to overall production has been rising in India. The expansion of the private sector has resulted in significant increases in all areas of the steel industry, including capacity, output, exports, and imports.

The potential for the Micro Steel sector is enormous, and industry estimates suggest that the business will continue to expand fairly in the future years, owing to the high demand for stainless steel in the building of new airports and metro rail projects, among other things. The government of India intends to significantly increase the country's steel production capacity via the modernisation of the country's current steel facilities.

It is clear that this, in conjunction with other measures undertaken by the government, has provided a significant push for private sector involvement and expansion within the steel industry. A significant number of new/green-field steel factories have been built in various areas of the nation, while older units are being updated and extended. These facilities are based on cutting-edge technology that are both cost-effective and environmentally friendly.

This proposition may be applied to the Indian iron and steel industry. A bulk of the industry's production is done by the public sector. Additionally, India's steel industry may be classified into two kinds of producers: integrated producers and secondary producers, based on the routes of production each uses.The integrated producers are those who are directly or indirectly engaged in the process of turning iron ore into steel production. Indian steel production, according to the International Iron and Steel Institute (IISI), is the world's second-largest in the globe, behind only China in terms of output. According to the International Iron and Steel Institute, the cost of raw materials and energy will continue to be a significant issue for the global steel industry in the foreseeable future (IISI). According to the Indian Steel Association, the production of high-value-added products, the expansion of production capacity, the upgrading of manufacturing processes, and the achievement of cost-effective production in an environmentally friendly manner have been the primary focus areas of Indian iron and steel producers in recent years.

There have been no shortages of iron and steel supplies in the nation since the liberalisation process began. As part of the first phase, the government intends to raise production capacity from million tonnes per year to 300 MT (Million Tons) in the first phase, which is expected to be completed by 2030-31. With a current manufacturing capacity of 140 million tonnes, India contributes for more than 7% of total world steel production, while accounting for about 5% of total global steel consumption. In the fiscal year 2019, the steel industry in India increased by 5.69 percent.

Micro Enterprises in the steel sector have had difficulty obtaining financing in recent years. Fortunately, a fast-expandingFinTech industry

has swiftly stepped in to fill this need, and traditional banks are exploring a range of cooperation methods with the new entrants to bridge the gap.In spite of the fact that small companies have welcomed the much-needed expansion of funding options, these creative FinTech lenders have raised concerns about transparency and the hefty fees they charge borrowers.

It examines the present situation of small company lending, the reasons for the ongoing low-dollar loan gap, the solutions being pioneered by creative FinTech lenders, and the major issues about supervision and regulation. A new generation of FinTech firms is being formed in an effort to enhance the financial services presently provided by conventional financial institutions.

Gap in Research and Formulation of the Problem

In the field of Financial Technology, Peer to Peer (P2P) Lending & Crowd Funding platforms are emerging as alternatives to traditional banking and financial institutions in order to reduce the barriers to credittransactions that are currently encountered by traditional banks and financial institutions. This study provides a solution for the Micro Steel Industry, which has had difficulty obtaining finance due to the complexity of its business strategy. The steel industry was subjected to a tightly controlled regime prior to the implementation of economic liberalisation reforms, which included regulations such as large plant capacities being reserved only for the public sector under capacity control measures, price regulation, and the requirement for producers to obtain a government permit in order to increase production capacity.

A new chapter of growth and development for the steel industry has begun as a result of liberalisation, during which a significant number of restrictions were removed, some immediately and others over a period of time, according to the International Steel Institute. Consequently, the local Micro Steel sector has become more market-oriented and integrated with the global steel industry as a result of this growth. This has enabled private companies to expand their operations and embrace new, cost-effective technology in order to improve their competitiveness both locally and internationally.

Review of Literature

Deepthi.R(2020) discovered that it is difficult to obtain money in India without providing enough security, particularly for small and medium-sized enterprises (SMEs) in the steel industry borrowings. Because of the tiny size of the company, it is forced to take on an unreasonable amount of credit risk. The significance of FinTech financing methods becomes apparent in this context. It contributes to the transparency of company information on a real-time basis, thus offsetting the drawback of having a small size. Providing loans themselves, becoming financial product aggregators, or linking Micro business in steel industries to banks and financial institutions are some of the ways that FinTech firms assist Micro Enterprise in steel industries today.

In order to provide steel industries with the advantages of formal financing, it is critical that FinTech and banks collaborate and create new and tailored digital solutions. This research focuses on analysing the role of FinTech firms in funding micro scale in the steel sector in India.

Vinay Kandpal(2019) As the market becomes more globalised and the financial sector grows, more and more people are migrating away from the usage of cash and toward the use of a cashless transaction system. The cashless system is not just a prerequisite of the current order, but it is also a necessity. Over the last few years, India's efforts to expand financial inclusion have yielded a mixed bag of results. As a result of a concerted legislative and regulatory effort, the number of bank accounts available has increased dramatically. However, the adoption of formal financial services other than savings accounts, as well as the utilisation of these accounts, has proven to be extremely challenging. Furthermore, the government's recent initiatives, including as demonetization and the shift to cashless transactions, would encourage further innovation and the entry of new firms into the sector. The amendments to the Financial Act demonstrate indisputably the government's,

Reserve Bank of India's, and financial institutions' intention to retain a strong BFSI in order to foster steady economic development.

Miguel Soriano(2018) In order to determine which characteristics are most critical for FinTech startups in order to succeed, Miguel conducted research. His and his colleagues' multi-level framework of variables includes elements of a company's business strategy, internal resources, and strategic alliances, which influence the success of new enterprises, as assessed by financial performance metrics. They have discovered that the framework may effectively forecast fresh business endeavors'.A total of 2 billion individuals, or almost half of the world's adult population, as well as about 200 million micro, small, and medium-sized businesses (s) would be anticipated to remain without formal access to financial goods and services in the coming years

Takeh and Navaprabha (2017) Utilised a variety of data sources to evaluate the impact of capital structure on a group of firms over a five-year period from 2007 to 2012. Data was examined using multiple regression models, correlation matrices, ANOVAs, and descriptive statistics.

Charan Singh(2016) Finance for micro, small, and medium-sized businesses (s) has been a subject of concern for a variety of stakeholders, including entrepreneurs, financial institutions, and government agencies. Following a thorough investigation, it was determined that the capital structure of the company in question had a significant impact on its financial performance. According to the correlation study's findings, there has been a long-standing negative association between capital structure and financial performance indicators, financial institutions, and government organisations. The study's main purpose was to uncover the numerous challenges that small and medium-sized firms (SMEs) in the steel industry face while seeking funding at different stages of their life cycle. This study is the first of its type to focus on these characteristics. The study goes on to see if an entrepreneur's lack of financial understanding is a significant barrier to identifying and utilising accessible financing options.

G. Popli's et al(2015) It goes without saying that the steel industry is one of the most essential and vital industries in the growth and development of a country. It has long been regarded as the foundation of civilisation across the cosmos.The amount of steel consumption per capita in a country is a significant predictor of the country's socio-economic development.Steel output has increased at a rate of about 33 percent per year in India during the past five years, according to official figures. A new worldwide marketing plan launched by Mr. Narendra Modi, our esteemed Prime Minister, in September 2014 is known as "Make in India." There is a goal to this plan, which is to attract investments from companies all around the globe.

With this plan, the primary goal is to achieve the objectives of employment creation, enforcement in the secondary and territorial sectors, and eventually, the goal of making India a self-sufficient and dominating nation in the world. The purpose of this study is to make a modest effort to determine the scope and viability of attracting foreign direct investment into the Indian steel industry.

Shanmugam & Kavitha (2014) Working capital is critical to the success of a company's operations and must be managed effectively. The majority of businesses have an informal working capital strategy, and the size of the business has an impact on the overall working capital policy and approach, which may be cautious, moderate, or aggressive. The study's main goal is to examine the practices of the industry as they relate to the working capital policies of the companies that were chosen.

Anilbhai(2013) sought to analyse the financial performance of two Indian steel companies, SAIL and JSW. During a five-year period, from 2008 to 2012, the researchers performed their investigation. In order to assess the profitability, liquidity, and management effectiveness of the two units, various financial instruments and techniques were used, and the hypothesis that the units were profitable was tested using a t-test. According to the results of the study, SAIL surpassed JSW in terms of profitability, liquidity, and management efficiency throughout the whole time period under consideration. According to

the results of the study, JSW should lower its cost of goods sold as well as its operating expenses. Also suggested was that JSW seek to maximise the use of its whole production capacity and fixed assets to the maximum degree feasible in order to improve its overall performance.

Sinku and Kumar(2012) Attempted to assess the company's financial performance (SAIL). All of the research was done using secondary data sources, and no primary data sources were used.The data was tabulated, analysed, and interpreted using a number of financial metrics, as well as the Multivariate Discriminate Analysis (MDA).

Bhunia and Khan(2011) They ran into some obstacles when they attempted to investigate the link between liquidity management and profitability in 230 Indian private sector steel businesses. The findings were analysed using multiple correlation and regression analysis to model indicators of liquidity management and profitability as a linear regression system. The descriptive data revealed that the debt liquidity and solvency positions were satisfactory, but that the liquidity issue had no effect on the organization's profitability, which was surprising. Several regression analysis revealed that the link between working capital management and profitability is weaker than previously believed.

Source of Data

Primary Data

The study relied heavily on primary data collected from respondents via structured questionnaires and interviews.

The survey was administered to senior executives and business owners in the manufacturing industry.

Personal interviews were also conducted with the managers and owners.

Secondary Data

Secondary data is accessed from:

(A) Various articles and publications from the Central bank, state, and municipal governments.

(B) Various publications by foreign governments, international organisations, and their affiliates.

(C) Publications in the technical and commerce fields.

(D) Reports and publications from numerous business and industry groups, banks, stock exchanges, and
other organisations

(E) Public data, historical papers, and other published sources of information.

Research Methodology

A combination of primary and secondary sources of information was used in the suggested research project. When selecting the best source of financing via peer-to-peer lending and crowd funding, Micro Steel Industry preferences took the following things into consideration: Loan Process, Interest Rate, Process Cost, Loan Amount, and Loan Application Flexibility are all important considerations. Micro Steel Industry preferences take into account the following variables as well as the previous ones: We were able to assess the adoption of P2P Lending Platforms and Crowd Funding under the FinTech umbrella by using these five criteria as independent variables. It is hoped that as a result of this research, recommendations for P2P and Crowd Funding companies for future implementation will be generated, as will recommendations for the government regarding regulations to optimise the use of P2P lending and Crowd Funding platforms to support the development of the Micro Steel Industry

Target Population

The study included units from Bicycle, Fasteners, Automobile and Scooter parts**,** Machine tools, Hand tooland Agricultural Machinery located in Punjab, India**.**

Objective Of Study

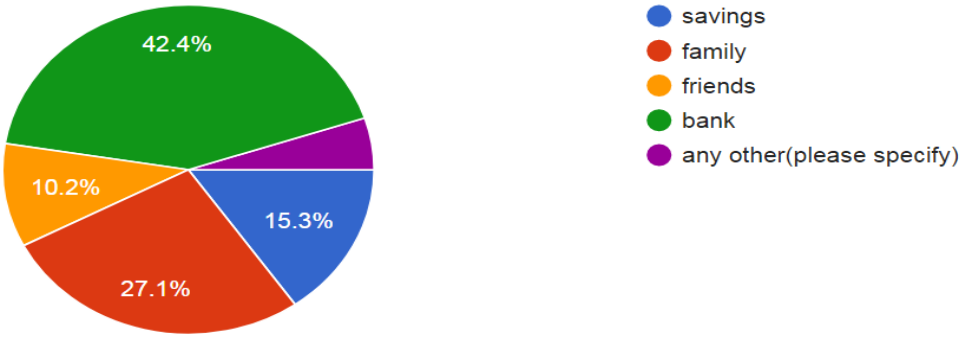
1. To examine the influence of FinTech awareness on Micro Enterprise in steelsector.
2. To analyze the importance of FinTech in Micro Steel industries in the presentscenario.
3. To explore the problems encountered by micro scale steel industries for attaining financial assistance.

Results And Data Analysis

Source of Initial Capital (Figure No. 3)

In comparison to other sources of financing such as savings, friends, and family, the

majority of Micro Steel Industries companies got their first funding from banks. The frequency with which banks provide starting capital is 42.4 percent. Entrepreneurs were in favour of handling money via family and friends in a majority of cases (37 percent). Personal savings were favoured as a source of financing by a small numberof entrepreneurs**.**



Selection Of Credit Supplier (Figure No. 4)

According to the findings of this research, the overwhelming majority of respondents selected their credit provider because they thought the credit supplier would offer the best credit terms and conditions for their specific circumstance. In addition, the probability of it happening is 35.6 percent. It was found that 28.8 percent of respondents selected their supplier because it was a standard financial institution for their business, and 8.5 percent chose their supplier because they thought this credit provider would provide the lowestinterest rate

.

Usage Of Finance (Table No. 1)

USAGE	Percent
• Land andbuildings	9.44%
• Vehicles/Rollingstock	9.44%
• Computer hardware &software	2.23%
• Other machinery and equipment	16.50%
• Working capital such asinventory	30.02%
• Debtconsolidations	6.69%
• To grow thebusiness	25.68%

The majority of entrepreneurs in the micro steel sector need loans for various reasons, including working capital, expansion, and the purchase of equipment. Few of them require finance for land & building.

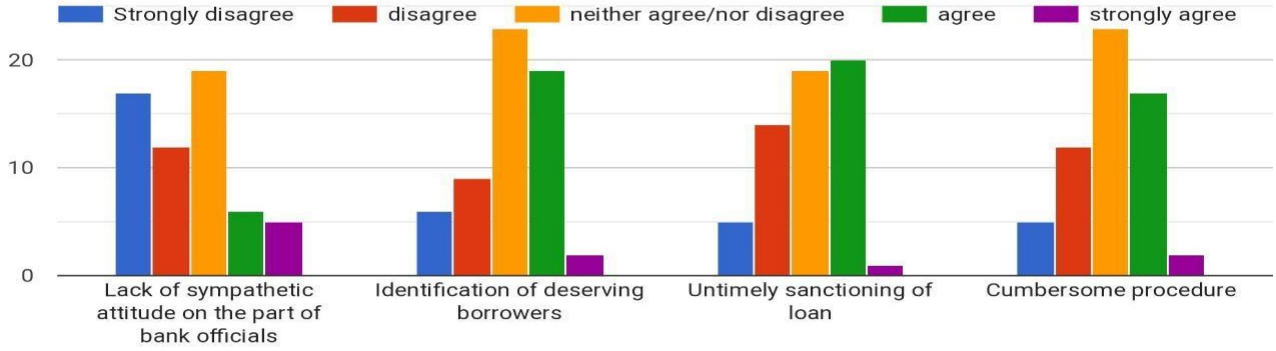
Disbursment Of Loan

The majority of the Micro Steel industry was denied a loan on time as they anticipated, with the frequency of this occurring at 72.5 percent. There are just a handful of units that got their

loans on time or even quicker than they anticipated.

Factors For Sanctioning Loan(Figure No. 5)

Most of the entrepreneur strongly agrees that the main problems in accessing the bank loan are lack of sympathetic attitude on the part of bank officials as compare to other problems. There are some other problems which are faced byMicro Steel enterprises are identifications of ultimately sanctioning of loan and cumbersome procedures.



Requirements For Sanctioning Loan (Table No. 2)

	Frequency	Percent
Rigid	129	86%
Flexible	21	14%

Most Entrepreneurs have classified requirements for sanctioning of loans by banks are rigidrather than flexible.This is due to cumbersome procedures, processing time, processing charges, audited balance sheets, compulsory statutory compliance and collateral requirements.

Rate of Interest (Table No. 3)

Rate of interest	frequency	Percent
High	105	70%
Moderate	45	30%
Total	150	100%

Loan from financial institutions, rate of interest is high or moderate. Most entrepreneurs feel that rate of interest charged by banks are high for Micro Steel industry as compared to Large Industries.

Financial Inclusion

According to research conducted most of the respondentsstrongly agreed that obtaining finance for business takes no more time/efforts as compared to 4/5 years ago and on the other side most of respondentsstrongly disagree that the range of different financial products forMicro Steel industry have improved in recent years.In measuring the awareness of FinTech among the respondents, a number of factors corresponding to the decision to undertake banks as the most common reference for sourcing capitals is enquired for. The chi-square tests results are as follows-

Chi-Square Tests Results Forthe Six Factors Of Fintech Attributes(Table No. 4)

Variable	**p-value**
Flexibilities of Norms	0.213
Terms & Conditions	0.001
Service Quality	< .001
Mode of Repayment	< .001
Rate of Interest	0.527

From the above analysis in **Table 4**it is seen that for the variables, quality of service, terms and conditions and mode of repayment, the p-values are less than 0.05 which indicates that there are statistically significant relationships of thesevariables with the reason of the respondents in choosing the particular form of capital in their business. This means that the FinTech users can make the respondents aware about their positive points to the Micro Steel Industry in Punjab focusing especially on their service quality, repayment options and the terms and conditions to make them interested towards getting their businesses funded using the FinTech instruments.

Influence of Bank Loan

It's analyzedthat availability of finance will haveinfluence in launching new division and introducing new products and entrepreneur feels that introduction of new technology will increase competitiveness and will create value addition in Micro Steel industries.

Conclusion

A relevant point to mention is that, despite the fact that Micro Steel Industry Entrepreneurs have a bank account, they tended to do their business in cash. However, as a result of the recent abolition of SBNs, the vast majority of them have started to route their transactions via their personal bank accounts. As a result, banks have a tremendous potential to use data mining methods and use the results to evaluate the loan requirements of small business owners. It goes without saying that such an activity must be complemented by financial literacy initiatives - in order to ensure that borrowers use credit for productive purposes and that they do not resort to cash transactions. Hence a FinTech enabled banking system should facilitate in which a Micro Steel Entrepreneur receives an online bank credit that they use to purchase goods from the wholesale market, sells them within a specified time period, receives payments in electronic form (mobile money), pays back the bank loan, and has the surplus credited to an associated savings account. When these savings are pooled, a portion of them is automatically transferred to a micro investment. I am certain that a healthy cooperation between FinTech companies and financial institutions may expedite the realisation of this goal.

The era of FinTech is here, and incumbent banks have no time to waste if they want to remain competitive. Banks that do not make the transition to a new-age digital bank swiftly face the danger of being obsolete in the near future. For this, they would need to recruit the necessary expertise and establish an atmosphere in which that talent could innovate and be flexible. The development of the FinTech ecosystem must be seen as an opportunity rather than a threat by the banking industry. It is clear that open banking presents tremendous possibilities as well as significant difficulties.

On the one hand, it will encourage more innovation in the financial sector, thus addressing some of the problems that Micro Steel companies are now facing, particularly the issue of limited access to financing. Opening the door to external players (some of which will be smaller, less resilient, and unregulated) will, on the other hand, almost definitely result in some issues, particularly in terms of cybercrime and fraudulent activity. Also, it is important not to overlook the substantial expenditures needed to enable the technology that underpins open banking, such as the updating of infrastructure and security hardware and software, as well as the human resources required to ensure that they are effectively operated.

It seems unlikely that doing nothing will be an option. Regulations will be implemented eventually, and competitors, both incumbents and new entrants, will react in a timely and appropriate manner. As a result, financial institutions should proceed with caution and caution while implementing open banking.

Another area where FinTech has been able to create a name for itself is in the field of risk assessment and evaluation. Risk analysis is essential for every company, but it is particularly important for companies in the industry of lending to small and medium-sized enterprises (SMEs). FinTech are used by banks and financial institutions in order to develop a risk profile of customers. This will enable to offer loans based on this risk profile. In addition to this, risk profiles are also

responsible for the creation of an individual's credit profile. FinTech can offer an accurate risk profile of customers in the shortest amount of time feasible because to the use of sophisticated mathematical models and algorithms that operate at a speed.

While banks continue to see FinTech as competitors, win–win scenarios are becoming more common and should be publicised more often. It will also be necessary to gain experience on the job before a more comprehensive opening can be implemented. This will aid in the development of a culture of innovation inside a company and guarantee that it does not fall too far behind the competition. While no one method is appropriate for every situation, the actions that must be followed ultimately rely on the market, the consumers, and government regulations.

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IMPACT OF SOCIAL MEDIA MARKETING ON HOTEL BRANDING--AN INVESTIGATION OF HOTELIER'S PERCEPTION

Dolly Dhamija[1] and Baljit Kaur[2]

[1,2] Department of Hospitality Management, CT University, Ludhiana, Punjab, India

ABSTRACT

Purpose *The study is undertaken to determine the influence of social media marketing on hotel branding in the Indian hospitality sector from the perspective of the hotelier.* ***Design/Methodology/Approach****The impact of social media marketing on hotel branding is depicted in a conceptual form. However, before applying"Structural Equation Modelling","Exploratory Factor Analysis" and"Confirmatory Factor Analysis" have been applied to investigate the factors and validate the measurement model.The information was collected through a questionnaire from 470 respondents, who were General Managers, Marketing Managers and Department Heads of 77-star hotels in Delhi/NCR(5*Deluxe, 5*, 4*&3*).****Findings*** *According to the findings,Social Media Marketing has a substantial influence on hotel branding.* ***Practical Implications****This study will help the hotel managers in the application of various Social media marketing practices for creating & enhancing the brand awareness of the hotel for the overall profitability of the business.* ***Originality/Value****This is a one-of-a-kind study,as no other research has been conducted particularly for the Indian market's star hotels.The findings will help the hotel business in enhancing its digital presence by recommending the benefits of social media marketing in terms of brand awareness.* ***Limitations*** *The present study is just confined to hotels in Delhi/NCR and hence carried on a limited population.To adequately depict the intrinsic research, a more extensive study with a larger sample size, a greater range of variables and/or in any other location of the country may be conducted***.**

Keywords*: Hotel, Brand, social media, Branding, Social Media Marketing, Structural Equation Modelling*

Abbreviations Used

AMOS	**Analysis of Moment Structures**	**SM**	**Social Media**
CRM	**Customer Relationship Management**	**SMM**	**Social Media Marketing**
E-WOM	**Electronic word of Mouth**	**WOM**	**Word of Mouth**
GDP	**Gross Domestic Product**		

Introduction

Indian Hotel Industry

Every business, including the hotel industry, relies on marketing to succeed. Marketing is concerned when buying and selling goods or services. The entire concept of acquiring and selling has become increasingly complex as a result of Liberalization, Privatization, and Globalization (L.P.G), and to compete in today's cutthroat market, social networking has emerged as a significant tool for marketers. The hospitality and resort business is one of the fastest-growing, and it is always adjusting to innovations. Hotels in India have earned a reputation for themselves as a major contributor to the expansion of the service sector and, by extension, the Indian economy. According to WTTC, India was placed tenth among one hundred eighty-five nations in terms of the GDP contribution from travel and tourism in 2019. Travel and tourism's share of GDP during 2019 was six dot eight per cent of the entire economy, approximately Rs. 13,68,100crore (US$ one ninety-four dot thirty billion). Hotels from across the world are extending their presence in India, which is predicted to account for roughly fifty per cent stake pertaining to India's tourism and hospitality industry by 2022.

Social Media Marketing and Hotel Branding

Many industries, including tourism, recognize the increasing reliance on digital technology (Buhalis et al., 2019; Camilleri, 2018). User-driven technologies known as social media have grown significantly in popularity over the past decade, leading to the formation of online communities and increased conversation and opinions and user-generated content are both encouraged **(Voramontri&Klieb, 2019).**This online communication tool has impacted clients' daily lives as well as the way businesses are conducted **(Dollarhide& Drury, 2021)**. When it comes to promoting user engagement, most social networks have built-in capabilities that allow users to like, comment, and share information they find

interesting **(Venkateswaran et al., 2019)**. SMM is referred to as "methods for advertising products, services, or brands using the internet, by attracting the interest of groups of people who discuss them, make suggestions about them, etc. online", **(Cambridge Dictionary, 2021)**. In most SMM strategies, the goal is to attract customers to share a company's postings to increase brand awareness and reach out to potential clients **(Simic' et al., 2019)**. When it comes to marketing and business, SM is a powerful instrument **(Iblasi et al., 2016)**. For this reason, According to their target audience, available resources, and goals, businesses must select which social media platforms are best suited for them before they can begin using them**(Iblasi et al., 2016)**. Companies can utilise social media to market and sell their goods and services for little or no money at all **(Iblasi et al., 2016; Dwivedi et al., 2020; Sharma &Kalra, 2020)**. We believe that digital transformation is a need for hospitality organisations to survive and grow in today's competitive climate **(Lam and Law, 2019)**. Corporate operations would suffer if new technologies weren't put to good use.

Review Of Literature

Advertising a product or service by tying it to a well-known brand is known as "branding" **(Merriam-Webster, 2021).** Apart from social networking, SM has become a powerful digital marketing tool that can be utilised to promote one's brand and products in a variety of ways. Ads can be delivered to a large audience quickly via social media, which lowers costs and ensures that their messages are delivered to the intended audience and this makesSM one of the most economical ways to get your message out there.Advertisers should not miss the opportunity to present these sophisticated discussions on the web, where they can reach the greatest number of potential customers when compared to print or television media marketing(**Gary Henderson**, **2020**).

Customers have a stronger association with famous brand names that are more familiar to them, and as a result, they're more prone to pick those brands over the others. Every brand has its distinct selling point, acknowledges what it stands for, and can be distinguished from others. As a result, creating a distinctive and memorable brand for a business is necessary that will aid in the process of increasing brand awareness and securing a long-term market position **(Durden, 2019)**. Social media has created a new market for companies to showcase their impressions, forming a more favourable environment for them to grow their status, appearance, and dependability**(Venkateswaran et al., 2019)**.

Brands might expand brand mindfulness by keeping dynamic in friendly spaces regularly visited by their objective clients and fusing web-based media into their marketing mix **(Tuten, 2021).** For businesses, there are many advantages to building an online presence, including simplicity of entrance and accessibility, low operational expenses, and broader reach when compared to a traditional company. Social media is used by nearly half of internet users to investigate product and service brands **(We Are Social, 2021)**.

Additionally, brands leverage social media influencer marketing to strengthen their brand authority, broaden their reach, and build trust, awareness, and long term associations with their clients **(Venkateswaran et al., 2019)**. Social media influencer marketing is becoming increasingly popular among businesses as a means of strengthening their brand image, promoting their products, and generating traffic and sales to their websites and blogs **(Jin et al., 2019)**.Celebrity endorsement and social networking services are used in conjunction to develop a new kind of online marketing approach **(Jin et al., 2019).** Even more enticing to small firms with limited finances, it is a low-cost marketing technique for brands **(Silvia, 2019).**

To exhibit and promote their products or services, or grow a marketing campaign at little cost,SM platforms can be used**(Iblasi et al., 2016; Dwivedi et al., 2020;Sharma &Kalra, 2020)**. Businesses can publish as many images and videos of their items as they like once they've created an account, which is normally free of charge **(Sharma &Kalra, 2020).** According to the authors **(Shamsudeen Ibrahim & Ganeshbabu, 2018; Vestola&Vennström, 2019)**, paid promotions on these networks are more cost-effective than traditional marketing and can help firms raise their conversion rates. With regards to resulting

organization uses, firms are bound to perceive a critical profit from venture and have more noteworthy monetary adaptability.

Every post made to a company's social media pages allows them to reach out to past, present, and potential clients **(Iblasi et al., 2016; Venkateswaran et al., 2019)**. Having a big number of social media fans lends credibility to a brand by providing social proof, which can greatly increase conversion rates **(Silvia, 2019)**. SM can also be used to create and sustain a company's brand reputation by the creation of memorable content and the maintenance of a consistent and engaging online presence across a wide range of platforms **(Venkateswaran et al., 2019).**

WOM (Word of Mouth Marketing) is a term used to describe how people utilise social media to generate, access, and share information with a wide range of people, including those they know and those they don't **(Herhausen et al. 2019; Stephen and Lehmann 2016).** EWOM is seen by purchasers as profoundly sound and reliable data (Cheung et al., 2019), which clarifies why customers progressively assess item attributes via looking through the EWOM accessible via online media stages **(Sijoria et al., 2018).** This additionally clarifies researchers' desire to demonstrate EWOM's value in developing consumer-brand relationships, and so shaping customers' positive attitudes toward the brand**(Kudeshia and Kumar, 2017)**.

After collaborating with internet personalities that fit their target audience to promote their products, companies quickly realised the importance of influencer marketing **(Saima& Khan, 2020)**.

SMM enables companies to receive direct feedback from customers, allowing them to spot issues or complaints and, as a result, more meaningful adjustments are made based on customer desires, disapprovals, and recommendations for future products, speeding up innovation and creation of new items **(Venkateswaran et al., 2019).**

Objective:

To determine the impact of SMM on hotel branding in the Indian hospitality business from the perspective of the hotelier.

Hypotheses:

The research proposes a hypotheses to examine the influence of social media marketing on hotel branding. Following are the proposed hypotheses:

H_{1a} Interaction impacts hotel branding.

H_{1b} Engagement impacts hotel branding.

H_{1c} Recommendationimpacts hotel branding.

H_{1d} Electronic Word of Mouth impacts hotel branding.

H_{1e} Association impacts hotel branding.

H_{1f} Quick and Effective impacts hotel branding.

H_{1g} Visibility impacts hotel branding.

Research Methodology:

Sampling:

Hotels with a star rating (5* deluxe, 5*, 4* and 3*) in Delhi/NCR were selected for the study. The list of hotels was taken from the official website (https://tourism.gov.in/) of the Ministry of Tourism, Govt. of India and is enclosed in APPENDIX A. A survey methodology was chosen due to its perceived efficiency in reaching a large number of respondents. The questionnaires were administered to individuals having different job titles from General Manager to Director of Sales and Marketing and Departmental Heads. Depending on the organizational structure, there were a variety of respondent positions. Prior permission was taken from the HR department of the respective hotels by sending an official letter. Participants were contacted ahead of time and informed of the research purpose of the current study. Following **Creswell's (2016)** purposive sampling technique, these respondents were chosen for their involvement in policy formation and strategy planning, as well as their awareness of social media marketing. 539 questionnaires were disseminated in 77-star category hotels, out of which, 497 responses were obtained. 27 questionnaires were found with either unengaged or incomplete responses. Hence the final sample size of the present study was determined as 470.

Research Instrument

The researcher developed the questionnaire after conducting a thorough

assessment of the literature. Opinions of experts from academia, as well as industry and the conclusions of the secondary data, serve as the basis for the questionnaire's design. The questionnaire for the study was designed in four phases. The researcher first prepared a questionnaire with 60 items, based on past research. To ensure the questionnaire's content validity, it was examined in two stages. The questionnaire was initially examined by academic experts. The questionnaire was examined in the second round by senior hotel industry executives. The researcher scheduled appointments with managers at their convenience to obtain their thoughts and critical recommendations. In general, several issues were detected during both rounds, resulting in the entire omission of certain elements and slight modifications to certain questions. The third stage involved pilot testing the study instrument with 50 respondents. Cronbach's alpha, a technique for reliability testing was used to conduct a consistency study to determine its dependability and the Cronbach's alpha coefficient value of 0.845 indicated that all items had satisfactory reliability. A number greater than 0.7 is regarded as dependable and acceptable **(Pallant, 2005; Sekaran&Bougie, 2016)**. Finally, the researcher designed a fifty-fouritem questionnaire for the study.The final questionnaire consisted of five sections. To begin with, demographic information such as gender, age, education and employment title was requested from respondents. The second section of the survey asked about the hotel's demographic composition. In the third, fourth, and fifth sections, the main survey questions (totalling fifty-four items) were asked. Interaction, Engagement, Recommendation, Electronic Word of Mouth, Association, Quick and Effective, and Visibility were among the topics covered in the survey.The reactions were evaluated utilizing a five-point Likert scale going from Strongly Disagree (1) to Strongly Agree (5).

Statistical Analysis Technique

Cronbach's alpha, a technique for reliability testing was used to conduct a consistency study to determine its dependability**.**Structural Equation Modelling (SEM) has been used to analyze the data. However, "Exploratory Factor Analysis" and "Confirmatory Factor Analysis" have been applied before the application of SEM to explore the factors and to authenticate the measurement model. AMOS 20.0 was utilised to analyse the data used in the study.

Analysis and Interpretation:

Table 1: Demographic Profile of the Hotels

Type of Hotel	Frequency	Percentage
Chain Hotel	56	72.73
Independent Hotel	21	27.27
Star Category		
5 star Deluxe	28	36.36
5 star	23	29.87
4 star	16	20.78
3 star	10	12.99
Age of Hotel		
0-5	10	12.99
6-10	42	54.55
11-15	14	18.18
Above 15 years	11	14.29
Number of Employees		
Less than 50	10	12.99
51-100	25	32.47
101-150	16	20.78
151-200	12	15.58
More than 200	14	18.18
TOTAL	**77**	**100**

Source: Primary Data

In terms of hotel organisation**(Table 1)**, 56 hotels (72.73 %) are chain hotels and 21 hotels (27.27%) are independent hotels. In terms of age of the property, 10(12.99 %) hotels existed for 5 years, 42 (54.55 %) existed for 6 to 10 years, 14(18.18%) existed for 11 to 15 years and 11(14.29 %) hotels existed for more than 15 years. In terms of staff, 10(12.99 %) hotels have less than 50 employees, 25(32.47 %) have 51 to 100 employees, 16(20.78%) have 101 to 150 employees, 12(15.58 %) have 151 to 200 employees and 14(18.18 %) have more than 200 employees working in the organisation.

Table 2: Demographic Profile of the Respondents (N=470)

Gender	Frequency	Percentage
Male	382	81.28
Female	72	15.32
Prefer not to say	16	3.40
Age (Years)		
Below 30	4	0.85
30-35	22	4.68
36-40	184	39.15
Above 40	260	55.32
Marital Status		
Unmarried	102	21.70
Married	309	65.74
Prefer not to say	59	12.55
Education Qualification		
Diploma Holder	20	4.26
Graduate	37	7.87
Post-Graduate	336	71.49
Others	77	16.38
Monthly Income (Rs.)		
Below 30000	7	1.49
30000-35000	33	7.02
35001-40000	128	27.23
Above 40000	302	64.26
Job Position		
General Manager	72	15.32
Director of Sales & Marketing	68	14.47
Marketing Manager	120	25.53
Departmental Head	168	35.74
Others	42	8.94
Experience		
Less than 5 years	46	9.79
5-10 years	88	18.72
More than 10 years	336	71.49
TOTAL	**470**	**100**

Source: Primary Data

Table 2 represents the distribution of the sample concerning the demographics used in the study.

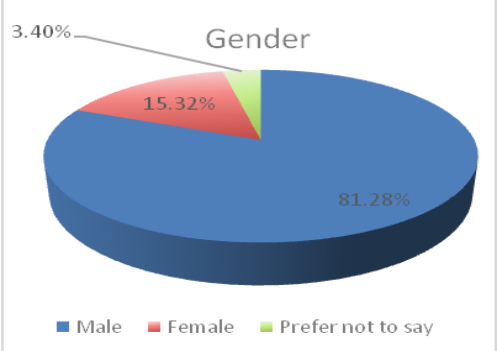

Figure 1: Gender of Respondents

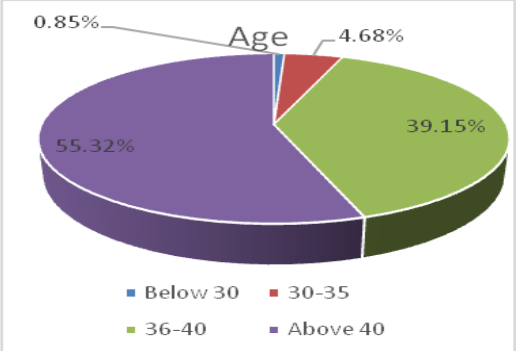

Figure 2: Age of Respondents

In terms of the gender of employees (See Fig 1), 382 (81.28 %) are male, 72 (15.32 %) are female and 16 (3.40 %) employees prefer not to disclose their gender. In terms of the age of employees(See Fig 2), 4(0.85 %) employees are below 30 years, 22 (4.68 %) are between 30-35 years, 184 (39.15 %) are between 36-40 years and 260 (55.32%) employees are above the age of 40 years. In terms of marital status, 102(21.70%) employees are unmarried, 309(65.74%) employees are married and 59 (12.55 %) employees did not prefer to disclose their marital status. In terms of educational qualification, 20(4.26 %) employees are diploma holders, 37(7.87%) hold a graduate degree, 336(71.49 %) hold a post-graduate degree, while 77(16.38 %) employees hold other qualifications. In terms of job position, 72 (15.32 %) hold the position of General Manager, 68(14.47 %) hold the position of Director Sales & Marketing, 120(25.53%) hold the position of Marketing Manager, 168(35.74%) hold the position of Departmental Head and 42(8.94 %) hold other position in the organisation. In terms of experience, 46 (9.79%) employees have experience of less than 5 years, 88(18.72 %) employees have experience of 5 to 10 years and 336 (71.49 %) employees have experience of more than 10 years.

Table 3: "KMO and Bartlett's Test of Sphericity" and "Measure of Sampling Adequacy"

"Kaiser-Meyer-Olkin Measure of Sampling Adequacy"		.905
"Bartlett's Test of Sphericity"	Approx. Chi-Square	14616.373
	Df	561
	Sig.	.000

The Kaiser-Meyer-Olkintesting was done to study whether the factor analysis was feasible. The KMO Measure of Sampling Adequacy should be better than 0.7 when doing factor analysis. The current sample's KMO**(Table 3)** is 0.905, which means that data is fit for applying factor analysis, and the "Bartlett's Test of Sphericity" (with a higher value of chi-square= 14616.373, degree of freedom= 561 and p= 0.000) also depicts the sampling adequacy for applying factor analysis.

Variance Explained by Factors

The "principal component analysis" method was applied for factor extraction and it was found that 34 variables form 7 Factors, based on the Eigenvalues (>1). The factors explained the variance of 15.405 %, 12.465 %, 12.104 %, 11.169 %, 10.822 %, 9.980 %, and 6.367 % respectively .The total variance explained is 78.3 %, which is sufficient for the requirements of Factor Analysis.

Reliability

The dependability of the factors was calculated using the "Cronbach's Alpha". The values of reliability for 7 constructs were found 0.966, 0.912, 0.942, 0.908, 0.905, 0.937, and 0.845 from construct 1 to 7 respectively**(Table 4)**. The criteria of minimum value of Cronbach's Alpha (α >0.7) was fulfilled.

Table 4: Constructs, Factor Loadings and Reliability

Constructs	Scale Items	Factor Loading	Cronbach's α
INT	INT1	.888	.966
	INT2	.886	
	INT3	.886	
	INT4	.879	
	INT5	.866	
	INT6	.860	
QE	QE1	.890	.912
	QE2	.842	
	QE3	.823	
	QE4	.810	
	QE5	.801	
	QE6	.783	
VIS	VIS1	.863	.942
	VIS2	.854	

	VIS3	.848	
	VIS4	.820	
	VIS5	.814	
EWOM	EWOM1	.894	.908
	EWOM2	.791	
	EWOM3	.777	
	EWOM4	.763	
	EWOM5	.744	
ENG	ENG1	.830	.905
	ENG2	.830	
	ENG3	.823	
	ENG4	.793	
	ENG5	.768	
REC	REC1	.898	.937
	REC2	.869	
	REC3	.858	
	REC4	.776	
ASO	ASO1	.793	.845
	ASO2	.767	
	ASO3	.765	

Source: Primary Data

INT: Interaction, QE: Quick &Effective, VIS: Visibility, EWOM: Electronic word of Mouth, ENG: Engagement, REC: Recommendation, ASO: Association

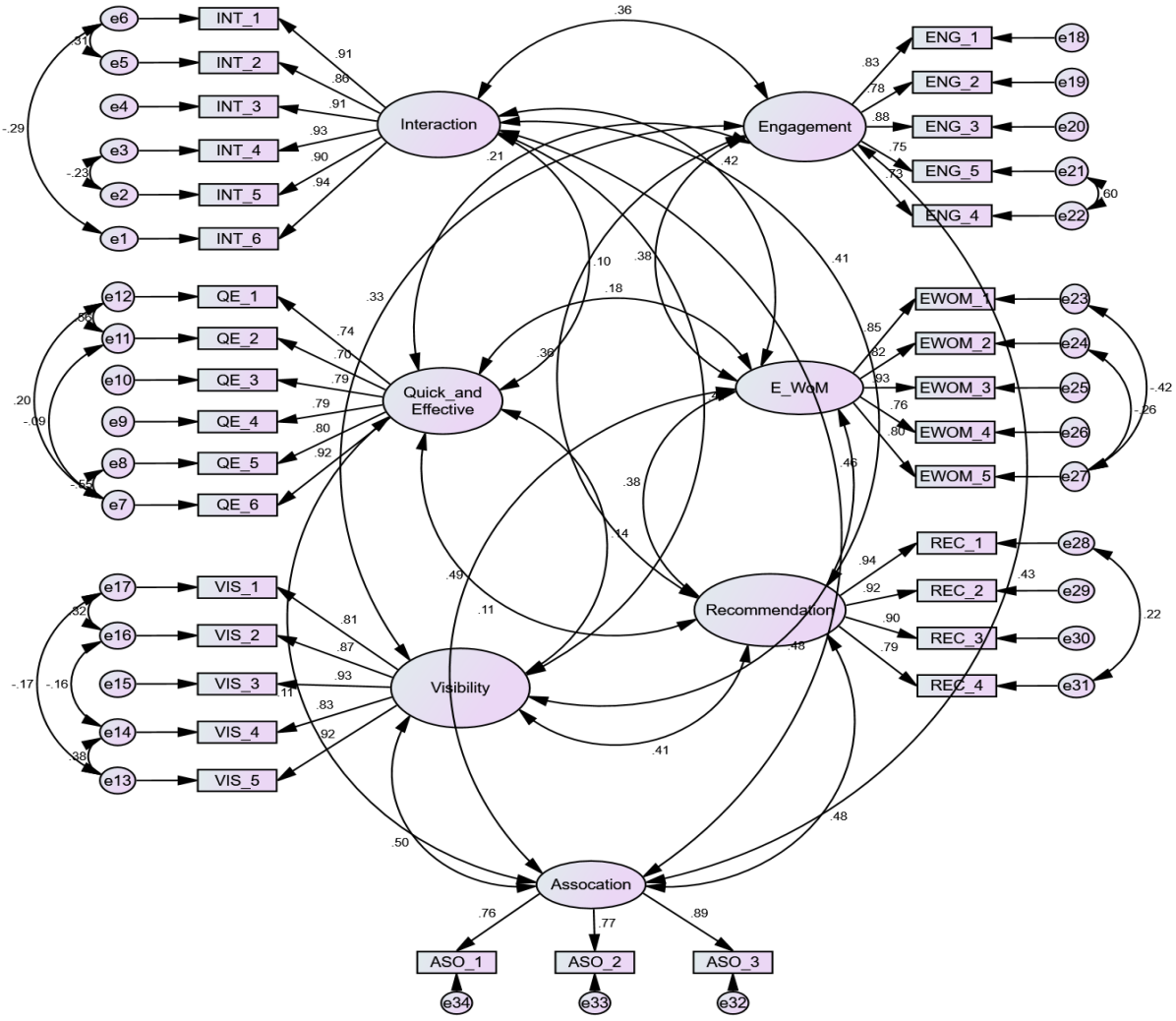

Figure 3: Measurement Model

A measurement model is a description of measurement theory that demonstrates how constructs are operationalized through sets of measured items. Confirmatory factor analysis is used to determine a measurement model's dependability. In contrast to exploratory factor analysis, CFA enables the researcher to specify which variables correspond to which factor before the investigation (Hair et al., 2007). According to Salisbury et al. (2001), CFA assists the researcher to identify both the actual relationship between items and factors and their links.

Table 5: Model Fit Indices

Indices	Recommended Value	Model Value	Fulfilment of the Criteria
CIMIN/DF	< 3	2.138	"Yes"
CFI	> .95	0.961	"Yes"
AGFI	> .80	0.864	"Yes"
NFI	>.90	0.930	"Yes"
TLI	> .95	0.956	"Yes"
RMSEA	<.05	0.49	"Yes"

Table 5 shows the model fit indices, which were used to measure the First Order CFA of the Independent Variables. The Model Values were compared with the Recommended Values. The Model Value of minimum discrepancy per degree of freedom (CMIN/DF) is 2.138 whoserecommended Value is (< 3) which shows that the specifications of the Model Fit indices have been fulfilled. Adjusted goodness-of-fit index (AGFI) model value is (0.864), above the cut off 0.8 as recommended by **Chau and Hu (2001)**.The values of Comparative fit index, Tucker- Lewis index and Normed fit index are 0.961, 0.956 and 0.930 respectively. All of these values were above the threshold of 0.9 **(Bagozzi and Yi, 1988; Byrne, 2013; Hair et al., 2006; Ho, 2006)**. Further, the root-mean-square error of approximation (RMSEA) is (0.49) which is below the threshold .05 as recommended by **Lomax and Schumacker (2012).**After conducting a literature review, it can be stated that the model constructed in this study was able to fit all of the data perfectly.

According to the structural model's hypothesis testing, results are shown in Figure 4. Table 7 includes the standardised regression weights and the findings of the hypothesised effects study.

Table 6: Validity Measures of 1st Order CFA "Measurement Model"

Constructs	Reliability (CR)	Average Variance Extracted (AVE)	Maximum Shared Variance (MSV)	Average Shared Variance (ASV)
Interaction	0.966	0.828	0.214	0.144
Engagement	0.896	0.635	0.187	0.124
Recommendation	0.936	0.787	0.226	0.142
Electronic Word of Mouth	0.919	0.694	0.242	0.162
Association	0.849	0.654	0.254	0.189
Quick and Effective	0.911	0.631	0.046	0.022
Visibility	0.940	0.758	0.254	0.159

Table 6 shows the validity measures of the measurement model. It is found from the table that composite reliability is greater than the acceptable limit of 0.7**(Carmines, E. G. & Zeller, R.A, 1991).** It establishes the "convergent validity". Similarly, the Average Shared Variance (ASV) is above 0.5 which also determines the convergent validity. However, the Average Variance Extracted (AVE) is above Maximum Shared Variance (MSV) and Average Shared Variance (ASV) which establishes the discriminant validity.

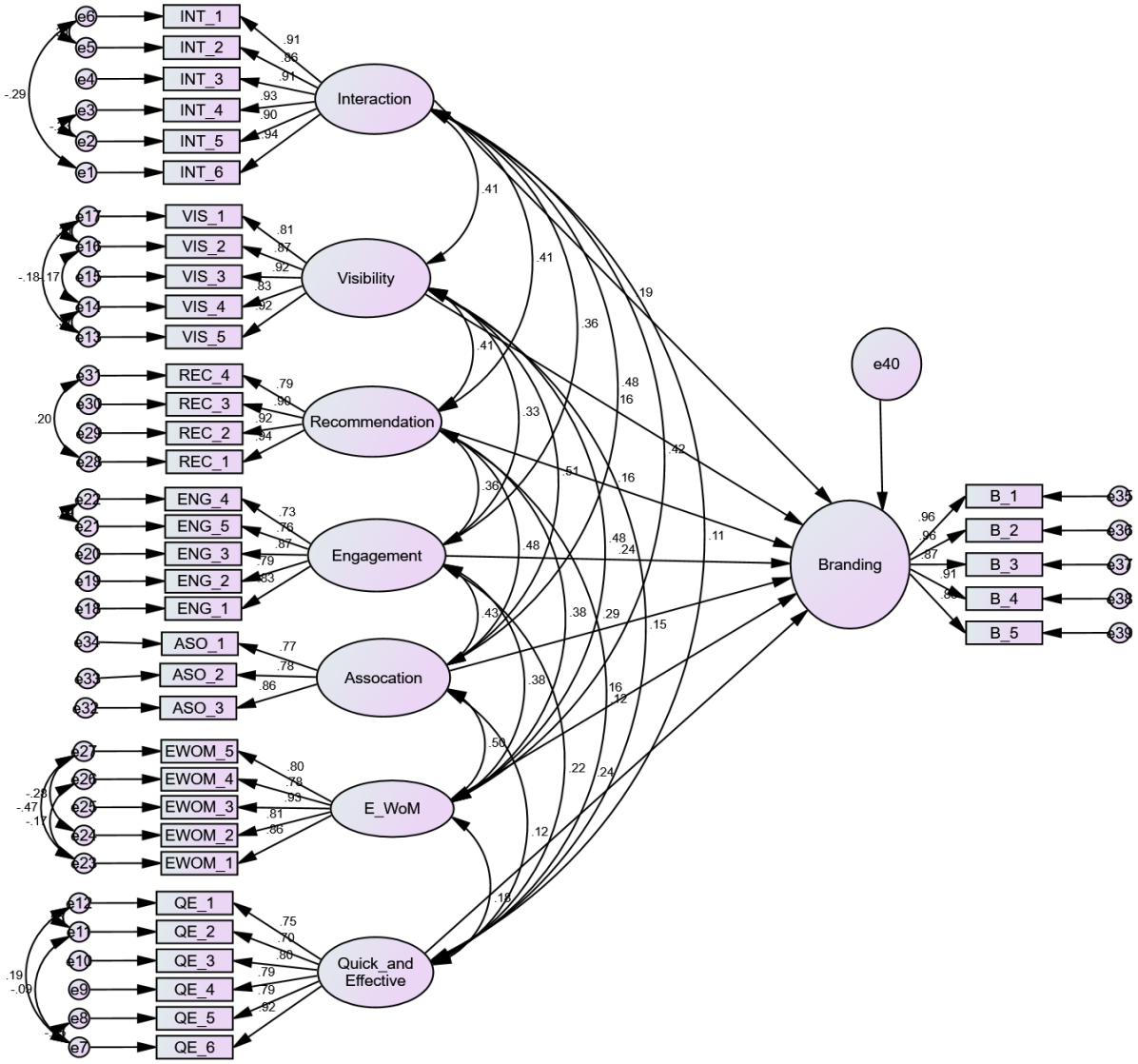

Figure 4: Structural Model

Table 7: Path Coefficient

Path	Estimate	S.E.	C.R.	P	Hypothesis Result
Branding <-- Interaction	.194	.023	8.288	***	Supported
Branding <-- Engagement	.216	.022	9.782	***	Supported
Branding <-- Recommendation	.143	.021	6.877	***	Supported
Branding <-- Electronic Word of Mouth	.154	.024	6.428	***	Supported
Branding <-- Association	.289	.030	9.717	***	Supported
Branding <-- Quick and Effective	.228	.020	11.453	***	Supported
Branding <-- Visibility	.153	.023	6.653	***	Supported

Figure 4 shows the Structural Model for the study. Table 7 presents the Unstandardised coefficient under the 'Estimate' column and Figure 4shows the standardized estimates. According to Table 7, all paths were statistically significant because their p-values were below the standard significance level of 0.05. Therefore, the hypotheses: $H1_a$, $H1_b$, $H1_c$, $H1_d$, $H1_e$, $H1_f$, and $H1_g$ were supported. Association, Quick and Effective and Engagement have the maximum influence of SM Marketing on Hotel Branding followed by Interaction, Visibility, Electronic Word of Mouth and Recommendation.

Findings and Discussion

Finding out how social media marketing (SMM) impacts hotel branding was the study's primary objective. Validation of the model was done using a SEM technique, and the influence of SMM was evaluated. The advantages of factor analysis and path analysis are combined in SEM. To find out if the observed variables completely describe the latent variables, this method is used. Additionally, SEM outperforms other multivariate approaches since it is capable of simultaneously estimating the number of interrelated dependence relationships. It indicates whether or not the proposed model is appropriate for representing a proposed notion and conceptual relationships between variables. The CFA results indicate that the observed variables are sufficient of the latent variables Engagement, Visibility, Electronic Word of Mouth, Recommendation, Association, and Quick and Effective. The structural model analysis results indicate that the suggested model for determining the influence of SMM on hotel branding is a good fit. Additionally, the proposed hypotheses relating to the variables are statistically supported.The results show that 'hotel branding' is significantly influenced by Social Media Marketing, which includes various components such as Interaction, Engagement, Recommendation, Electronic Word of Mouth, Association, Quick and Effective and Visibility. All proposed hypotheses ($H1_a$, $H1_b$, $H1_c$, $H1_d$, $H1_e$, $H1_f$, and H1g) were found to be accepted.

Conclusion:

The current research aimed to determine how SMM affects hospitality branding. The findings suggest that different components of Social Media Marketing, such as Interaction, Engagement, Suggestion, Online Word of Mouth, Association, Quick and Effectiveness, and Visibility, have a substantial impact on 'hospitality branding.' Customer interactions and communication appear to aid in the development of consumer loyalty to hotel brands. Social media is a cutting-edge technology that enables hotel companies to take a proactive approach to maintain client connections. By monitoring customer postings on brand sites, hotel marketers may determine the most essential aspects of their businesses. It is critical to keep up with the latest social media and technological breakthroughs to prosper in a highly competitive world. Hotels may use customer engagement to distinguish themselves from the competition and develop loyalties on a long-term basis. Customer engagement aims to strengthen bonds between brands and potential customers, transforming a business transaction into a long-term relationship. This continual connection is essential for the business, whether it is a consumer contacting a firm or a corporation sharing information with its followers. The study's findings also revealed that word-of-mouth on the internet has a major impact on SMM.WOM among potential consumers on the internet spreads rapidly and efficiently, and it has a higher level of trustworthiness. Social media users immediately give comments and suggestions about hotel services, influencing future tourists' decisions. Social media marketing for hotels is critical for increasing visibility, increasing direct bookings, and raising brand awareness**.**SM has changed the style of marketing and is vital for the overall profitability of the hotels. The future of hotel marketing highly depends on social media.

Theoretical Implications

One of the few empirical investigations on the subject that examines how social media marketing affects hotel branding is presented in this research, making it a valuable contribution to the marketing literature. There has been no similar study done in the Delhi/NCR region in India to date, therefore this is a pioneering effort for the hotel sector there. In this study, it was found that SMM had a substantial impact on hotel branding.

Managerial Implications

The results will be useful to get an insight on SMM and will help the hotel managers to understand how SMM is more effective in the current tech-savvy environment andhas a significant impact on the hotel's branding. The results will also be useful in directing the hotel's staff efforts towards the effective implementation of SMM. The study provides managers in the hotel sector with a handful of useful information to utilize.

Limitations And Scope For Further Research

The current study is limited to hotels in Delhi/NCR and hence has a small sample size. A more extended study with larger sample size, a wider variety of variables, and/or in any other place of the country may be undertaken to adequately highlight the inherent research. Along with hotels, restaurants can be included in the survey to learn more about the importance of SMM in the branding and revenues of the hospitality industry .

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Appendix A

List Of Star* Category Hotels In Delhi/Ncr

S.NO	NAME OF HOTEL	CATEGORY OF HOTEL	NUMBER OF ROOMS
1	THE OBEROI, NEW DELHI	5*D	220
2	ITC MAURYA, NEW DELHI	5*D	437
3	ANDAZ, NEW DELHI	5*D	530
4	LE MERIDIEN ,NEW DELHI	5*D	358
5	THE LEELA AMBIENCE , NEW DELHI	5*D	480
6	WELCOM SHERATON, NEW DELHI	5*D	220
7	THE OBEROI, NEW DELHI	5*D	220
8	SHANGRI-LA's EROS HOTEL	5*D	324
9	THE METROPOLITAN HOTEL	5*D	178
10	THE LEELA PALACE, NEW DELHI	5*D	254
11	VIVANTA BY TAJ-DWARKA	5*D	250
12	ROSEATE HOUSE,NEW DELHI	5*D	216
13	THE PARK, NEW DELHI	5*D	220
14	J W MARRIOTT, AEROCITY, NEW DELHI	5*D	523
15	HYATT REGENCY,NEW DELHI	5*D	1024
16	THE GRAND,NEW DELHI	5*D	390
17	RADISSON BLU PLAZA, NEW DELHI	5*D	261
18	THE LODHI,NEW DELHI	5*D	68
19	VIVANTA BY TAJ,NEW DELHI	5*	88
20	PARK PLAZA,SHAHDARA,NEW DELHI	5*	91

21	HOTEL SEVEN SEAS,NEW DELHI	5*	70
22	MAIDENS HOTEL,NEW DELHI	5*	51
23	HOLIDAY INN	5*	265
24	HOTEL PICCADILY,NEW DELHI	5*	228
25	HOLIDAY INN,NEW DELHI	5*	196
26	JAYPEE SIDDHARTH, NEW DELHI	5*	94
27	THE CLARIDGES HOTEL,NEW DELHI	5*	132
28	HOTEL ALOFT,NEW DELHI	5*	253
29	PRIDE HOTEL	5*	378
30	HOLIDAY INN,AEROCITY	5*	265
31	AMBASSADOR IHCL SELEQTIONS	5*	88
32	RADISSON BLU,DWARKA	5*	217
33	RADISSON HOTEL,NOIDA	5*	88
34	CROWNE PLAZA,NOIDA	5*	398
35	COUNTRY INN AND SUITES BY CARLSON,GHAZIABAD	5*	216
36	RADISSON BLU,FARIDABAD	5*D	124
37	LE MEREDIAN,GURGAON	5*D	285
38	ITC GRAND BHARAT,GURGAON	5*D	104
39	THE OBEROI,GURGAON	5*D	204
40	THE LEELA AMBIENCE GURUGRAM	5*D	412
41	HYATT REGENCY,GURGAON	5*D	451
42	TAJ CITY CENTRE,GURGAON	5*D	208
43	TRIDENT,GURGAON	5*D	136
44	RADISSON BLU MBD HOTEL,NOIDA	5*D	127
45	JAYPEE GREENS GOLF & SPA RESORTS, NOIDA	5*D	170
46	VIVANTA BY TAJ,FARIDABAD	5*	286
47	HERITAGE VILLAGE RESORT SPA,MANESAR,GURGAON	5*	154
48	THE GATEWAY RESORT ,DAMDAMA LAKE,GURGAON	5*	78
49	CROWNE PLAZA HOTEL,GURGAON	5*	234
50	ANYA HOTEL,GOLF COURSE ROAD,GURGAON	5*	116
51	HOTEL AMANBAGH,ALWAR	5*	40
52	HOTEL CITY PARK, NEW DELHI	4*	58
53	PARK INN BY RADISSON,NEW DELHI	4*	68
54	RADISSON BLU MARINA HOTEL,NEW DELHI	4*	90
55	CROWNE PLAZA ,NEW DELHI	4*	183
56	EDEN PARK HOTELS PVT.LTD,NEW DELHI	4*	30

57	HILTON GARDEN INN,NEW DELHI	4*	115
58	SVELTE HOTEL AND PERSONAL SUITES,NEW DELHI	4*	97
59	CROWNE PLAZA,ROHINI	4*	183
60	LALIT HOTEL, FARIDABAD	4*	35
61	FORTUNE SELECT GLOBAL,GURGAON	4*	107
62	HILTON GARDEN INN,GURGAON	4*	201
63	CLARENS HOTEL,SEC-10,GURGAON	4*	32
64	BEST WESTERN RESORT COUNTRY CLUB,GURGAON	4*	117
65	PARK PLAZA ,GURGAON	4*	45
66	CLARENS HOTEL,SEC-29,GURGAON	4*	32
67	HILTON GARDEN INN,GURGAON	4*	201
68	HOTEL THE MANOR,NEW DELHI	3*	12
69	HOTEL BROADWAY,NEW DELHI	3*	26
70	MM CONTINENTAL HOTEL,AMBALA	3*	48
71	RAMADA GURGAON CENTRAL	3*	94
72	LEMON TREE HOTEL, TARUDHAN VALLEY,MANESAR	3*	70
73	SKYCITY HOTEL,GURGAON	3*	55
74	COUNTRY INN AND SUITES BY CARLSON,GURGAON	3*	73
75	FORTUNE PARK ORANGE,GURGAON	3*	96
76	LEMON TREE,MEWAT	3*	70
77	ARAVALI RESORTS,REWARI	3*	29

Source: Ministry of Tourism, Govt. of India (2021)

A STUDY ONTHE REVOLUTIONARY FINANCIAL INCLUSION PROGRAM "PRADHAN MANTRI JAN DHAN YOJANA"

Harvinder Singh and Kawal Nain Singh
Department of Management, CT University, Ludhiana, Punjab, India

ABSTRACT

One of the most important mission for inclusive growth is financial inclusion. It refers toensure the availability ofmaximum financial product such as banking, insurance, credit, and payment facilities to the vast sections of the society. The current paper contextualises Prime Minister Narendra Modi's largest mission, the PMJDY, which was introduced on August 15, 2014. (PMJDY). This article also tries to assess the progress done so far with PMJDY in the modern context of financial services for the disadvantaged. Moreover, the study alsoexamines,how thetotal number of beneficiaries, money deposited by them in bank account and number of RuPay card linked with PMJDY bank account are correlated with each other.

Keywords: *Pradhan Mantri Jan DhanYojana (PMJDY), India, Financial Inclusion*

Introduction

Financial inclusion refers to households' accessibility and use of financial institution-provided financial services.Financial inclusion is a prominent topic in research due to its importance in boosting emerging countries' economic development. It is underlined that financial inclusion and alleviating poverty in emerging nations are inextricably linked (Sylla et al.,2006).

Financial inclusion became more important in India since the RBI announced in its financial credit strategy of 2006-07 that it would bring many of the population's previously excluded segments into the banking fold (Srikanth, 2013). As component of the financial inclusion programme, the RBI has launched a number of schemes. It includes the development of Post Office Savings Banks, Regional Rural Banks, and Self-Help Group, among other things. PMJDY scheme is one of the most important efforts aimed at achieving financial inclusion.

This nationwide project's goal is to assurance that each and every family in the nation has a bank account and availability to most of financial products that financial institutions provide. It aims to provide key banking services such as simple access of these services to every household in the nation by opening bank account. Under this technique, bank accounts are typically opened with no balance.

The Benefits given by PMJDY Scheme

The beneficiary will receive some particular benefits from PMJDY,theseare following;

(1) Overdraft facility up to Rs. 10,000
(2) Direct benefit of govt. schemes transfers to the beneficiary's account.
(3) Interest on the balance available in bank account,
(4) Accidentaland Life Insurance Covered of Rs. 2 lakhsand Rs. 30,000 respectively.
(5) Zero balance requirement,
(6) Money transfer across India and Overseas
(7) RuPay debit card

Financial inclusion became more important for India's financial system's inclusive growth since the PMJDY was implemented. Inclusive growth is one of our economic policy's goals, but achieving it will be a monumental effort due to the numerous hurdles that it will face. Bridging the gap between the many segments of the society who are excluded to financial services, increasing financial education, and boosting loan delivery channels to boost economic growth are the challenging issues in financial inclusion (Sharma and Kukreja, 2013). However, if the bulk of the population remains unbanked, inclusive growth will be limited. Bank services have touched the majority of people in developed nations, but just 20% of the population in emerging economies, according to Peachey and Roe (2006). As a result, it's critical to research financial inclusion through the PMJDY. Furthermore, under PMJDY, gaining admittance to a bank account is not a difficult process; the true challenge is determining whether the bank accounts are operational and in continuous use.

Review Of Literature

Sonu (2019) findsin his research that the PMJDY scheme is fairly outstanding in a short period of time until November 30, 2016.The majority of states had met their hundred percent target as set out in their allotment. Some basic issues are depicted as roadblocks in the scheme's roadmap. However, no one can disagree that PMJDY has the potential to serve as a "Raambaan" for bringing financial inclusion to every disadvantaged home in emerging India.

Kumar(2018)reveals in his study that the government of India has made steps to promote financial inclusion, including priority lending, the lead bank plan, bank nationalisation, the Swabhimaan strategy, and the PMJDY. This article compares and contrasts the PMJDY scheme with a previous similar scheme.

Sangeet (2017)indicates in his analysis that PMJDY-induced deposit growth converts into capital formation when savings and investments are channelled. As a result, economic growth occurs.

Agarwal et al (2016),The study focused on the progress of PMJDY and data that was entirely derived from secondary sources. The conclusion reached was that financial inclusion allows people to access services they previously couldn't, allowing them to connect with the upper echelon of society, allowing them to become financially and socially stronger.

Shettar (2016) The study's goal was to examine the current state of PMJDY and the scheme's overall progress, as well as to identify challenges. The study's recommendations were that the government make budgetary provisions for poverty eradication and that more financial literacy centres be installed to bring financial inclusion among peoples.

Agarwal et al (2015)employed descriptive research and collected primary data for his study, with the goal of learning about the need and present status of PMJDY in India. He came to the conclusion that India has a great need for a financial inclusion strategy, and his conclusion was based on the fact that the total numbers ofaccounts in rural areas is higher than in urban areas.

Hussan (2015) The purpose of his research was to determine the need for the plan in the Indian setting, as well as the factors that made the scheme more appealing. Secondary data was gathered from a GOVT publication and a research piece. The study concluded that this scheme is an integrated model to bringing comprehensive financial awareness to all households, as well as attracting a large population and eradicating poverty, and that full support from the government, banks, and other financial institutions is required for its success.

Ramasethu (2015) His research focused on understanding the PMJDY in the context of India and identifying techniques for successfully implementing the plan. His article was based on secondary data, and the conclusions reached were that it not only alleviated poverty but also reduced corruption at the grass-roots level, and that the necessary changes to the RuPay Debit card scheme and life insurance policy had improved the scheme's appeal.

Objective Of The Study

1. To investigate the current status of India's Revolutionary Financial Inclusion Program, the PMJan Dhan Yojana.
2. To examine the relationship between the number of beneficiaries, account balances, and the number of RuPay debit cards issued.

Database And Methodology

The current study is based on secondary data. The research isdescriptive in nature. The information was gathered through the PMJDY website (https://pmjdy.gov.in/) from year 2015 to Jan., 2022. Data was also gathered from previously published papers, articles, and journals. After acquiring the necessary information and ensuring compatibility, provision for concordance. Following that, analysis is carried out using a table and a graph plot to compare various year-over-year statistics and analyse improvement. Various descriptive statistical tools have been used to analyse the result.

Result and Findings

The scheme was launch in 2014, since 2014 to January 2022, numbers of accounts opened are

increasing continuously day by day. The goal at the time of inception was to enrol over 7.5 crore households in the system and open their accounts. The goal was largely met, and in fact, the reality far exceeded the expectations. The performance of the PMJDY as of January 12, 2022 is seen in Table 1.

Table 1: Status of PMJDY as on 12/01/2022(All figures in crores)

Bank Name / Type	Beneficiaries at rural and semiurban bank branches	Beneficiaries at urban and metro bank branches	Total Number of Beneficiaries	Deposits in Accounts	RuPay Debit Cards issued to beneficiaries
Public Sector Banks	21.90	13.14	35.04	121,398.89	26.84
Regional Rural Banks	7.08	1.03	8.11	31,496.30	3.43
Private Sector Banks	0.70	0.59	1.29	4,662.35	1.10
Grand Total	**29.68**	**14.76**	**44.44**	**157,557.54**	**31.37**

Source: PMJDY website. (https://pmjdy.gov.in/)

In Table 1, the category wise distribution of total accounts opened in bank categories with the rural and urbanbreak is given along with the total number of RuPay debit card. It is evidentthat the totalaccount opened is more in the Public Sector bank (35.04 core Accounts) with a deposit of 121,398.89 lakh crore. The PublicSector banks alsoissued about 26.84crore numbers of RuPay debit card to its beneficiaries. This is followed by the Regional Rural Banks,wherein about 8.11 accounts were opened with a deposit of 31,496.30 lakh crore. The total number of RuPay debit cardissued is about 3.43 crore.The Private Sector bank, although last in the hierarchy, too opened about 1.29 crore accountsunder PMJDFY against which about 1.10 crore RuPay debit card was issued and with a deposit of 4662.35lakh crore.

Table 2: Descriptive statistics of PMJDY (2015 - 2022)

Date	Total Beneficiaries	Growth Rate in Beneficiaries	Deposits inAccount (inLakh)	Growth Rate in Deposits	Number ofRuPay DebitCard	Growth Rate in RuPay Debit Card
14 Jan., 2015	11,31,37,733	-	8,89,920.29	-	9,68,52,890	-
13 Jan., 2016	20,19,42,062	78.49%	30,10,845.19	238.33%	17,05,02,625	76.04%
11 Jan., 2017	26,68,18,237	32.13%	69,02,716.56	129.26%	21,00,19,727	23.18%
17 Jan., 2018	30,97,46,048	16.09%	73,68,971.62	6.75%	23,35,30,428	11.19%
16 Jan., 2019	33,89,26,475	9.42%	87,93,456.65	19.33%	27,00,09,407	15.62%
15 Jan., 2020	37,86,71,675	11.73%	1,12,13,655.40	27.52%	29,82,61,778	10.46%
13 Jan., 2021	41,65,26,640	10.00%	1,37,19,593.18	22.35%	30,64,52,303	2.75%
12 Jan., 2022	44,44,15,679	6.70%	1,57,55,753.83	14.84%	31,37,23,195	2.37%
CGR	**-**	**292.91%**	**-**	**1670.47%**	**-**	**223.92%**
MEAN	**30,87,73,069**	**-**	**84,56,864.09**	**-**	**23,74,19,044**	**-**
VARIANCE	**1.246**	**-**	**2.560**	**-**	**5.765**	**-**

Source: PMJDY website. (https://pmjdy.gov.in/)

Table 2, Gives a clearer picture of progress in PMJDY scheme of various components and on year-on-year basis.With respect to total number of accounts opened, the compound growth rate (CGR)was 292.91% for the period 2015 to 2022. But if we see the growth rate year by year it slightly decreased from 78.49% in 2015 to 6.70%in 2022.The CGRin case of deposits in accounts was 238.33%for the period 2015 to 2020. 14.84% in 2022. Similarly, the annual growth was also decreasing for deposits in account from 238.33% in 2015 to 14.38% in 2022. In case of RuPay debit card issued, the CGR is 223.92% for the period 2015 to 2022. The Growth rate of numberof RuPay debit card also decreased from 76.04% in 2015 to 2.37% in 2022. Incase of absolute coverage, however, thenumbers are increasingtremendously in all the aspect for all the banks.

The mean number of beneficiaries was 30,87,73,069 for the period 2015–2022 with a variance of 1.246. In the case of deposits in

PMJDY bank accounts, the mean was 84,56,864.09 lakhs with a variance of 2.560. The mean of number of RuPay debit cards was 23,74,19,044 and the variance was 5.765.

The growth rate in total beneficiaries, deposits in accounts and RuPay debit card issued for the period 2015 to 2022 is shown in the following figure 1

Figure 1: Growth rate of PMJDY

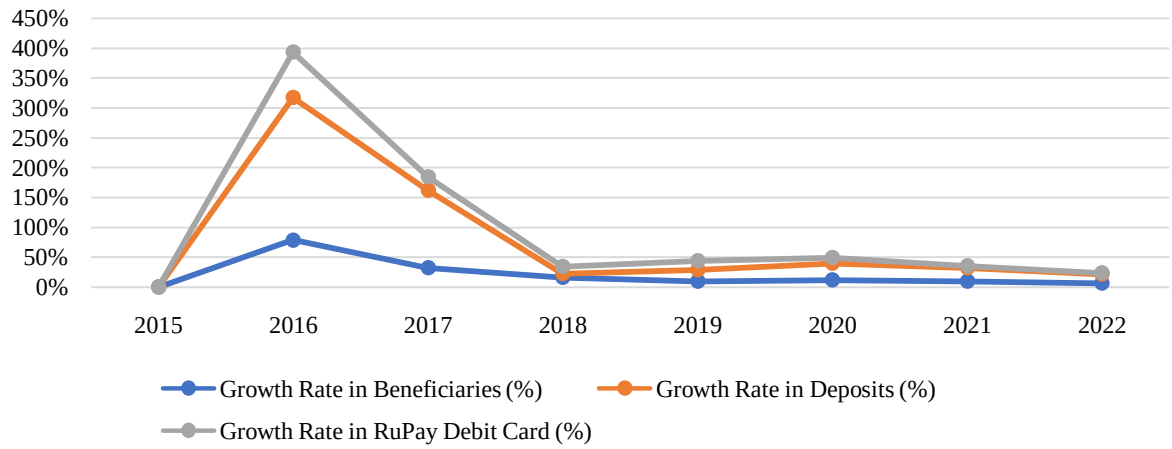

Table 3: Correlationsbetween Beneficiaries of PMJDY, Deposits in Bank Account and RuPay Debit Card

Variables	Number of Total Beneficiaries	Deposits in PMJDY Accounts	RuPay Debit Card Issued
Number of Total Beneficiaries	1		
Deposits in PMJDY Accounts	0.971	1	
RuPay Debit Card Issued	0.990	0.932	1

The correlation matrix results as presented in table 3, shows that the relationship between beneficiaries of the PMJDY plan, bank deposits, and RuPay debit cards issued. The number of total beneficiaries and the amount of money in accounts had a 0.971 correlation. The least correlated variables of the scheme were the number of total beneficiaries and RuPay debit cards issued, which had a correlation of 0.932, while the most correlated variables were the number of total beneficiaries and RuPay debit cards issued, which had a correlation of 0.990.

Conclusion

The PMJDY is one of the major steps that has been meticulously implemented to provide financial product to the disadvantaged groups. It promotes financial inclusion and contributes to the nation's inclusive growth. Before to the PMJDY, there were a variety of financial inclusion policies in place, but none were as successful as the PMJDY. More than 44.45 crore bank accounts opened and 31.37 crore RuPay debit card have been issued in India as a result of successful formulation and execution by prioritising the objective. This scheme is really successful in providing direct benefit transfers from the government in both rural and urban areas. Until now, the PMJDY has performed admirably and has aided in achieving the aim of complete financial inclusion.

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ARCHAEOLOGICAL HERITAGES RELATED TO BABA BANDA SINGH BAHADUR

Ravinder Kaur[1] and Seema Parihar[2]
Department of History, CT University, Ludhiana, Punjab (India)

ABSTRACT

"In every faith and every land, whenever men have become corrupt, despotic and tyrannical, God sends a scourge like me to punish them and teach them a lesson"*, it was spoken by Banda Singh Bahadur a great Sikh hero in reply to a question put to him by Mohammad Amin Khan, the author of Siyarul-Mutakherin when he went near him to ask as to why he was waging war against the Mughals. He was given five arrows by the Guru as a blessing for the battles ahead. Banda Bahadur took over the military leadership of the Sikhs after the death of Guru Gobind Singh. On embracing Sikhism he became a staunch Khalsa Sant-Soldier of the 10th Guru, who followed the teachings of the Gurus in theory and practice by living a pure and simple life. Banda Bahadur's courage was unparalleled. He possessed a most fearless and undaunted spirit. W.L. M' Gregor, in his The History of the Sikhs wrote, "Banda Bahadur was a man of undaunted valour and bravery." Banda Bahadur was tortured to death by order of the Mughal Ruler Farrukh Siyar on June 19, 1716 in Mehrauli near the Qutub Minar. There are various heritage sites at present which gives an insight into the life and struggles of Baba Banda Singh Bahadur. The present research paper looks into those struggles through these heritage sites and literature. The two major heritage sites being discussed in this paper are Chappar Chiri and Lohgarh Fort Sadhaura.*

Keywords: *Baptism, strategy, archives, unattainable, guerrillas, memorials.*

Introduction

Banda Singh Bahadur, birth name Lachman Dev, was born on 27 October 1670 and died on June 9, 1716), was a Sikh warrior and a commander of Khalsa army. Banda became disciple of Guru Gobind Singh and was given a new name, Banda Singh Bahadur, after the Baptism ceremony. Sikhism was founded by Guru Gobind Singh Ji. He was the tenth Guru of the 17th century in the Punjab region of northern India. The practice of faith was founded by Guru Gobind Singh Ji on April 13, 1699. The first five people, named Pure Ones, and then baptized Gobind Singh Ji into the Khalsa scroll, giving the Khalsa order, which is about 300 years old.

Sikh history is closely related to the history of Punjab and the socio-political situation in the northwestern Indian subcontinent in the 16th century. From the rule of India by the Mughal emperor Jahangir (1605-1627), Sikhism got into conflict with the Mughal rule because they influenced the political success of the Mughals while loving the saints of Islam. Mughal leaders killed many prominent Sikhs because they disobeyed their orders and opposed the Sikhs' persecution.

Among them were 10 monks, 10 Sikhs were tortured and executed (Guru Arjan Dev and Guru Tegh Bahadur) and many close relatives of the gurus who were brutally killed (such as their 7- and 9-year-old sons). Of Guru Gobind Singh along with many other Sikh dignitaries were tortured and killed such as Baba Banda Singh Bahadur (1716), Bahi Mati Das, Bai Sati Das and Bahi Dayala by the Mughal leaders for refusing their orders and to oppose the persecution of Sikhs and Hindus. Sikh later devised its own strategy against Mughal hegemon.

The emergence of the Sikh Union under misguided rule and the Sikh Empire under the reign of Maharaja Ranjit Singh (1792-1839) was characterized by religious tolerance and interfaith with Christianity, Islam, and Hinduism in power. The founding of the Sikh Empire in 1799 was generally considered to be the aesthetic of Sikhism in politics. During its existence (from 1799 to 1849), the Sikh empire came to included Kashmir, Ladakh, and Peshawar.

Banda Singh Bahadur fought the Mughals until his last breath. He was one of the most important names in Indian history. Banda Singh Bahadur, also known as Lachman Das, Lachman Dev or Madho Das, was born in 1670 and died in June 1716. Sikh military leaders waged an offensive against Indian Mughal leaders. He is a famous figure of Sikh history.

Guru Gobind Singh appointed him Khalsa's political leader during his lifetime. It is a great

mystery under what name Banda Singh Bahadur Khalsa Panth leader lived before his appointment. According to information on the life of Banda Singh Bahadur, he was a very proud Bairagi *sadh* and lived a luxurious life. He became a *sadh* after killing a pregnant deer in one situation. After becoming a *sadh*, he mastered magic and martial arts. Because of his magical abilities, he used to insult all the saints who came to his camp. One day in Nanded Sahib, Gobind Singh met this *sadh*. No miracle of Madho Das (Narayandas) can go face to face with Guru Gobind Singh during and after the meeting.

After this incident a strong and positive impression of Guru Gobind Singh was left on Baba Banda Singh Bahadur. He became a disciple of Guru Gobind Singh and Guru Gobind Singh appointed him leader of the Khalsa, who later served the Khalsa with all his might and mind. Arriving in Punjab, he overthrew the Mughal rule from Punjab and surrounding areas and established Khalsa law. After establishing the state, he developed his strength. Banda Singh Bahadur played an important and significant role in the history of medieval India. He was not only a source of Khalsa or an unusual supporter of Guru Gobind Singh, but also a great political opponent who fought against oppression and support against the brutal and unjust rule of the Mughal authorities. The life and achievements of Banda Singh Bahadur, with special references to current and near-present sources are available. This study sheds light on his achievements and expansion beyond Punjab through various sources kept in archives, museums and libraries outside and outside of Punjab.

Chappar-Chiri: (Baba Banda Singh Bahadur War Memorial)

CHAPAR CHIRI is a twin village in Ropar district along Kharar-Banur road, now officially named Banda Singh Bahadur road. This area is the site of a historic battle. Gurdwara Baba Banda Bahadur is located between two villages on the side of the metal connecting road that joins them. Battle had occurred around here on May 12, 1710, between the Sikhs led by Banda Singh Bahadur and Wazir Khan, the *faujdar* emperor of Sirhind. The latter was killed and the Mughal army escaped.

The Sikhs occupied Sirhind on May 14, 1710. The battle was a step towards the founding of first Sikh Raj in India in 1711, but no memorial remains to commemorate historical events until 1950, when the two villages were jointly established. In 1970s a new hall was added where Guru Granth Sahib now sits. The old building is being used for the primary school. Another small room recently built refers to the Baba Banda Singh Bahadur Library. Gurdwara is governed by a committee representing both villages.

On this place memories of the war were inaugurated in 2011. Design ideas are taken from the history page. It is said that when Wazir Khan learned that Banda Singh Bahadur had arrived, he chose the site for a normal war on one side and a rough ground on the other. Keeping a normal, comfortable place for himself, he left a difficult ground for the Sikh forces. Banda Bahadur used it wisely as an opportunity to climb the highest mountains and observe the range of enemies. With an innovative war strategy, Banda Bahadur's forces used existing mounds as defenses. Sikh soldiers hid behind these mountains and won the war by attacking guerrillas.

Lohgarh Fort

Lohgarh Fort, has witnessed three battles between Baba Banda Singh Bahadur’s forces and the Mughal army. The fort, believed to be the largest in the world, lived out of the ground like an unforgettable iron for the previous generation, unattainable but standing apart by solid rock. It has remained unnoticed for about 300 years - this is its claim to fame, believing that the ruined fort was witnessed by three battles between Baba Banda Singh Bahadur forces and the Mughal army. Lohgarh Fortress includes fortified walls, barracks, barracks, stone towers, millers, flour mills, and large clay drums for storing grain. Many carved stones were also found there. Banda Singh Bahadur successfully used the Lohgarh as a tactical retreat or defensive phase when his forces were unable to resist the Mughal offensive in Sadhaura. When the Mughal forces combined with the Rajputs and Jats outnumbered his forces, and the battle

was even more suicidal, he would withdraw his forces to Lohgarh after a day of defensive action to stop the enemy forces. This tactic was successfully used in the Battle of Lohgarh in 1710 C.E. and 1713 C.E.

Sadhaura:

Banda Singh Bahadur is known to have stopped the Zamindari and Taluqdari systems while he was active and given farmers their own land. It seems that government officials at all levels have become addicted to extortion and corruption, and the entire system of governance and order has been overthrown.

Local tradition recalls that people from Sadaura district came to Banda Singh to complain about the evil of their landlord. Banda Singh Bahadur ordered to Baj Singh to open fire on them. People were shocked at the bizarre response to their representative and asked him what he meant. . He told them that they should not have been treated better when thousands of them were still allowing themselves to be roamed by a handful of Zamindars. He defeated the Sayyids & Shaikhs in the Battle of Sadhaura. The Battle of Sadhaura was fought between the Sikhs and the combined forces of the Sayyids & Sheikhs in Sadhaura in 1710. It resulted in a victory for the Sikhs when Banda Singh Bahadur defeated Osman Khan. . Banda Singh Bahadur also appointed his own governor of Sadhaura. Gurudwara was built to commemorate Baba Banda Singh Bahadur with Sikh Nishan Sahib planted by Baba Banda Singh Bahadur himself.

The Dargah of Khwaja Bakhtair Kaki

A 50-foot high pillar of stone over-looks this Dargah of Khwaja Bakhtair Kaki, which now houses a Gurdwara in the memory of the supreme sacrifice made by Baba Banda Singh Bahdur, the great Sikh hero. There are the evidences of pillar with the steel hook from which, it is believed, he was hanged and had his skin peeled off. On the place there is another Gurdwara in an improvised room in the courtyard of an adjoining site. At present it lies amid ruins.

This Gurudwara marks the site of the martyrdom of Banda Singh Bahadur.

Conclusion

Banda Bahadur occupies an important and significant place in the history of Sikhism. He was not only a staunch believer in the Khalsa and dedicated student of Guru Gobind Singh, but also a great freedom fighter who fought the fall and farmed against the tyranny. Many of us know that Baba Banda Singh Bahadur was Great Sikh warrior. Banda Singh Bahadur fought the Mughals until his last breath. He is one of the most important names in Indian history. Guru Gobind Singh appointed him as the political leader of Khalsa for the rest of his life. He was from Bairagi Sadh, an arrogant man who lives a luxurious life. He became a Sadh after killing a pregnant deer in one situation. After becoming a sadh, he mastered magic and martial arts.

No due importance has been given to the heritage sites related to Baba Banda Singh Bahadur in the past. It was only until recent years that the memorials at Chappar Chiri and Lohgarh were built from ashes again. Sadhaura-Yamuna Nagar stretch is yet to receive its due importance.

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LIFE AND ACHIEVEMENTS OF BABA BANDA SINGH BAHADUR IN VARIOUS SCRIPTS

Ravinder Kaur[1] and Seema Parihar[2]
Department of History, CT University, Ludhiana, Punjab (India)

ABSTRACT

This research paper deals with the Literature related to Baba Banda Singh Bahadur. Banda Bahadur involves a significant and crucial spot in the History of Medieval India. He was not just an incredible sincere of Khalsa or extraordinary supporter of Guru Gobind Singh but additionally an extraordinary political dissident who battled for the oppressed and proletariat against the tyrannical and imperious rule of Mughal authorities. The study will include life and achievements of Baba Banda Singh Bahadur with special references to his contemporary and near contemporary sources. The present research paper looks into the prominent works related to Baba Banda Singh Bahadur.

Keywords: *Khalsa Panth, Sikhism, Punjab*

Introduction

Many of us know who Baba Banda Singh Bahadur was, the great Sikh warrior. Banda Singh Bahadur fought the Mughals till his last breath. He is an important name in the Indian history

Banda Singh Bahadur, also called Lachman Das, Lachman Dev or Madho Das, was born in the year 1670 and died in June 1716. He was the Sikh military leader to wage an offensive war against the Mughal rulers of India.

He is the famous personality of Sikh History. Guru Gobind Singh had appointed him as the political leader of Khalsa during his lifetime. It is a great mystery under what name Banda Singh Bahadur, the leader of Khalsa Panth lived before his appointment. According to the information available Banda Singh Bahadur's life, he was a Bairagi Sadh, who was very arrogant and lived a life of luxury. He became Sadh after killing a pregnant deer in a penance. After becoming a Sadh, he had become very proficient in magic and mantras. Due to his magical abilities, he used to insult every saint, who came to his camp. One day at Nanded Sahib, Guru Gobind Singh met this sadh. No miracle of Madho Das (Narayan Das) could go in front of Guru Gobind Singh during and after this meeting. He became disciple of Guru Gobind Singh and Guru Gobind Singh appointed him as the leader of Khalsa, who in the later period served Khalsa with all his mental and physical strength. After arriving in Punjab, he overthrew the Mughal rule from Punjab and in the areas surrounded by and established the Khalsa rule. After establishing the state he developed his strength.

Banda Singh Bahadur played significant and crucial role in the history of Medieval India. He was not just an incredible source of Khalsa or extraordinary supporter of Guru Gobind Singh, yet additionally an extraordinary political dissident who battled for the oppressed and proletariat against the tyrannical and imperious rule of Mughal authorities.

Prominent Writings and Sources related to Baba Banda Singh Bahadur

This research seeks to analyze the information in historical writings as well as the information given in other literary sources of the contemporary period and modern times.

Persian Script

The first and most important Persian text is found in the newspaper "*Akhbar-e-Darbar-e Mu'alla.*" This is a collection of news which was sent daily or weekly or fortnightly or monthly by the Mughal government spies from all over the country to the king's court. In Punjab also, spies of the Mughal government were stationed at various places. These informants, in the same way that Banda Singh Bahadur watched or listened to the struggle, sent a

report to the king's court (*Darbar-e-Mu'alla*). Thus Akhbar-e-Darbar means news of the king's court.

Muhammad Qasim is one of the first Persian contemporary writers to narrate the struggle of Banda Singh Bahadur in his *Ibaratnama*. He saw and heard about the struggle of Banda Singh Bahadur. There is another source with the same name. The author of this work is Mirza Muhammad. He had also named his writing Ibaratnama. It was a vassal of the Mughal Empire. It continued from 1703 CE. to 1719 CE., and up to that years the incidents are recorded. This detail is based on the eyewitness accounts of the author.

Mohammad Hadi Kamvar Khan is also a contemporary writer who completed his work in 1724 CE. He had written the complete history of the Mughal dynasty in the inscription named as Taj Ki Raat Us Salat in Chagta. He was a government servant of the Mughal government. So its information is also largely based on government reports but some incidents are also based on information it has seen and heard with its own eyes.

There are also two contemporary writings, *Fatuhatnama* "A" *Samadi* and *Asrari Samadi*, but the authors names are not mentioned on that. These writings mainly deal with the conquests of Abdus Samad Khan, Governor of Lahore (1713 to 1726 CE). It is believed that the writer was Abdus Samad Khan's own Munshi Jyot Prakash, who was involved in the army besieging Banda Singh Bahadur around the fort of Gurdas Nangal.

The other two Persian writings are Mut *Khawab Ul Lubaab* , written by Kafi Khan and Mirat-ae-Varidat written by Mohd. Safi Warid in the year 1731 and 1734, respectively, these writings mainly involved Mughal History, which also includes Baba Banda Singh Bahadur in it.

Urdu Script

Some of the work in Urdu includes, Ahmad Shah Batalvi wrote his work in 1824-25 CE. It was written in Urdu and the main narrative is on Sikh history. One chapter in this book is dedicated to Baba Banda Singh Bahadur. This text is translated into Punjabi by Punjabi University, Published by Patiala.

The next mention is given by Maulvi Bute Shah in his writing *Tareek-e-Punjab* in 1844 -45 CE. It is also a text primarily describing Sikh history. Some pages are also given in connection with Banda Singh Bahadur. Though this work is still unpublished, but its Punjabi translation is in the library of the Department of Punjab Historical Studies, Punjabi University, and Patiala.

English Script

Baba Banda Singh Bahadur is also find mention in English scriptures. One of the most important contemporary writings in English is the letter of John Sarman and Edward Stephenson in which he writes about the incident, where he released Banda Singh Bahadur's fellow prisoners from prison and executed them on the platform in front of the Kotwali. While seeing the killings on March 10, 1716 CE., he wrote to his boss, President and Governor Fort William at Calcutta about the incident. This is a one page letter and it tells the story of the murders witnessed and heard from the people. The importance of this letter is also lies in that was written by a non-Sikh and a non-Indian person. So it is not about any sectarian or regional jealousy. It describes the determination and unshakable faith of the slain Sikhs, how Singh was sacrificing his life while remaining loyal to his leader and steadfast in his faith. Not a single Sikh lost his religion for fear of death. The historical significance of this letter is immense. This is the letter presenting the testimony of the occasion. This letter is published in a book named European accounts of Sikhs by Prof. Ganda Singh.

At the beginning of the nineteenth century, the British had a direct connection with Punjab. The British had reached Delhi in form of British East India Company and the reign of Maharaja Ranjit Singh was considered as the most emerging period in Punjab. 1805 CE, Lord Lake reached the Beas River in pursuit of Jaswant Rao Holkar. Along with Lord Lake there was John Malcolm. John Malcolm obtained information about the Sikhs from various sources during his travels with the British Army at this time, which he published in

1812 under the title Sketch of the Sikhs. Along with this there is also a little mention about Banda Singh Bahadur.

It was written in English by an Indian Muslim author from a purely sectarian and political point of view. This work is Syed Mohammad Latif's *History of Punjab*. It was completed in 1891 CE., and was written in English and one the full chapter is written about Banda Singh Bahadur. Latif has portrayed Banda Singh as a murderer of Muslims, a rebel of the Mughal Empire, a destroyer of mosques, and a man who digs up graves of Muslims and burns their bodies. These statements are exaggerated and non-historical but this text being in English has had a great impact on readers and scholars, because the English were the masters in that period and the incidents mentioned in their works find worth in the society.

Gurmukhi Script

Kesar Singh Chibber's *Bansavalinama Dasan Patshahian Ka* is one of the first to be found in Punjabi to give details of Banda Singh Bahadur. It was written in 1769 CE. In other words, it can be said that the Gurmukhi writings about Banda Singh Bahadur were written in 1769 CE.

Mahima Prakash (Poetry) is the second Gurmukhi (Punjabi) text giving information about Banda Singh Bahadur. As for the period of composition, it was created in 1776 CE. In this way it was written 60 years after Banda Singh Bahadur's death. The first inscription before this work, as has been written before, was the genealogy of Kesar Singh Chibber. The difference between these two writings was only 7 to 8 years and both the writers Kesar Singh Chibber and Sarup Das Bhalla were contemporaries.

The third writing in Gurmukhi (Punjabi) giving information about Banda Singh Bahadur according to the time of creation is Ratan Singh Bhangu's *Sri Gur Panth Prakash*. It is also known as *Prachin Panth Prakash*. Bhangu wrote this in 1841 CE. Accordingly, it was written 125 years after the martyrdom of Banda Singh Bahadur.

According to the chronology, the fourth writing in Punjabi (Gurmukhi) giving information about Banda Singh Bahadur is Bhai Santokh Singh's *Sri Gur Pratap Suraj Granth*. It was written in 1843 CE. As is clear from the name, the inscription is about the glory of Guru Sahibs (from Guru Nanak Dev Ji to Guru Gobind Singh Ji), so it mainly deals with the ten Gurus. In this great work, along with the ten Gurus, there is also a brief account of Banda Singh Bahadur.

According to the chronology, Giani Gian Singh is the fifth in the Gurmukhi writings. He is the author of two books, Sri Gur Panth Prakash (*Panth Prakash*) and *Twarikh Shamsher Khalsa,* gives a detailed account of Banda Singh Bahadur. Giani Gian Singh wrote these writings in 1889 and 1892 CE. Some mentions of Banda Singh Bahadur's is given in that. It is clear that the author dates back to the time of Banda Singh Bahadur. Therefore, the author cannot be considered as a close contemporary or a contemporary of Banda Singh Bahadur, but the author has given a full detailed account of Banda Singh Bahadur.

Conclusions

Banda Bahadur occupies an important and significant place in the history of Sikhism. He was not only a staunch believer in the Khalsa and dedicated student of Guru Gobind Singh, but he was also a great freedom fighter who fought the fall and farmed against the tyranny. Many of us know that Baba Banda Singh Bahadur was Great Sikh warrior. Banda Singh Bahadur fought the Mughals until his last breath. He is one of the most important names in Indian history. Though there is so much of work done on the history of the Sikh Sovereign, the origin of the Khalsa Panth, the life and struggles of Banda Singh Bahadur at all. Only some specific work is available related to Banda Singh Bahadur. The available sources like Persian, Urdu and English, were little partial towards one community or they did not cover the whole scenario related to Baba Banda Singh Bahadur.

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REMEDIATION STUDY ANALYSIS OF SOIL WASHING AND IMMOBILIZATION ON INDUSTRIAL HEAVY METAL-CONTAMINATED SOIL

Sukhdeep Singh[1] and Gunjan Bhalla[2]
Department of Civil Engineering, CT University, Ludhiana, Punjab (India)

ABSTRACT

Long-Term effluent irrigation or solid waste disposal has resulted in significant metal contamination I each soil as well as groundwater due to the industrial activity nearby Buddha Nullah Area. The remediation of heavy metal-contaminated soils is difficult for worldwide ecological sciences and engineering. To control the biological dangers of heavy metal-tainted soil all the more viably, the current study focused on the blend of soil washing (with FeCl3) and in situ immobilization (with hydrated lime, biochar, and fly ash). The outcomes showed that the expulsion pace of Chromium (Cr), Cadmium (Cd), Mercury (Hg), Lead (Pb) and Zinc (Zn) was 64.35, 65.4%,41%, 55.6%, 31.7%, and 18.4%, individually, when washed wit with Ferric Chloride (FeCl3). After the consolidated remediation (immobilization with 1% (w/w) hydrated lime), the soils which are contaminated showed a 39.4%, 37.3%, 51%, 70.4%, 71.5%, and 51.7% decrease in the bioavailability of Cr, Cd, Hg, Pb and Zn (extracted with 0.11 M acidic corrosive), separately, than those of the soil washed with Ferric chloride as it were. Nonetheless, the immobilization with 1% (w/w) biochar or 1% (w/w) fly ash subsequent to washing showed low consequences for balancing out the metals. The distinctions in impacts between the immobilization with hydrated lime(Ca(OH)2), biochar, and fly ash showed that the soil pH had a critical influence on the liability of various heavy metals within the joined remediation process. The movement of the soil enzymes & chemicals showed that the expansion of the multitude of materials, including hydrated lime, biochar, and fly ash displayed constructive outcomes on microbial remediation after soil washing. Moreover Hydrated lime was the best material, demonstrating that low soil pH and high corrosive solvent metal focuses may control the movement of soil catalysts. The discoveries during the study recommend that the mix of soil washing and in situ immobilization is a powerful strategy to revise the soil debased with different heavy metals.

Keywords: *Soil Washing, In-situ immobilization, contaminated soil and groundwater, soil catalyst*

1. Introduction

Soil is a significant element for crop development. With the quick increment of industrial activity, numerous heavy metals went into soils through different ways like industrial activities, car emissions causing genuine heavy metal contamination in soil [1-4]. HMs in the soil can harm the ecosystem, pose poisonous impacts on plants and reduce farming efficiency. Besides, they can undermine human health through accumulation in the food chain. Internationally, heavy metal defilement of soil has threatened a significant number of nations, including Europe, Brazil, Japan, and the USA [5]. It is of extraordinary importance to find a steady soil alteration that can not only provide nutrients for crop growth as well as cure contaminated heavy metal soil. Two fundamental techniques namely Mobilization and immobilization are utilized these days to remediate soil HM contamination [6]. These incorporate phytoextraction [7,8], soil washing [9,11], and in situ immobilization [13,14]. Phytoextraction refers to the evacuation of heavy metals involving plants as accumulators, which normally requires quite a while and isn't appropriate for restricted farmland regions. The HMs immobilization, which changes HMs into less bioavailable structures, was considered as quite possibly the best method for remediating the HMs debased soils. The immobilization of HMs tainted soils utilizing different soil corrections changes metals into less bioavailable structures and is considered as quite possibly the best method for remediating debased soils [15-17]. Fly ash is the proper material for lingering water treatment; a few investigations have called attention to their proficiency in the expulsion of heavy metal ions from the aqueous phase [18 - 21]. Biochar is a substance well off in carbon and can be gotten from various feedstocks under warm conditions in a limited stock of oxygen called pyrolysis development. Biochar ended up being more carbonaceous as the temperature was extended, and the carbon content went from 55 to 64% at the temperature extent of 310 to 750 °C. The use of biochar in soil has been considered as having the capacity to improve long haul carbon sequestration in light of the fact that most carbon in biochar has an aromatic

structure and is extremely obstinate in the environment [22]. Hydrated lime (Ca(OH)2) is the most seasoned and most generally utilized as a soil PTMs immobilizing specialist [23]. Since, the expansion of hydrated lime to PTMs contaminated soils is a strategic system to expand soil pH, trigger precipitation of metal carbonates, oxides, or hydroxides, and decline metals solvency [24]. Nonetheless, last few years numbers of scientific papers are published on lime alone applied as a soil amendment [25-27] or combined with other inorganic additives e.g., limestone + sepiolite, for soil remediation. Moreover, researchers have applied lime, slag, and Bagasse alone or joined as alterations for remediation of Cd-paddy contaminated soil, yet exceptional, no endeavor has been made to concentrate on the effectiveness of hydrated lime joined with Ca bentonite (CB), biochar, Fly Ash on the immobilization and its fundamental system for phytoavailability.

Soil washing is to move pollutants from the soil strong stage to the aqueous stage by dissolving or suspending them with some chelating specialists or corrosive solutions, or packing them into a little volume of soil by means of isolating them from sand parts. Soil washing can eliminate a specific measure of metals from soils by dissolving heavy metals in the eluant [10]. The soil after appropriate washing can be reused, which can have both social and financial advantages [28-29]. In any case, an enormous number of heavy metals and a part of leachate stay in soils after washing. Ferric chloride (FeCl3) can eliminate metals in more ways than one: the opposition for adsorption destinations through H+ and Fe3+ particles and the arrangement of soluble complexes by Cl− particle. It has better cadmium (Cd) evacuation execution than certain acids, like HCl, HNO3, and H2SO4 [31]. Moreover, similar to Fe and Cl− are significant constituents of soils, the impact of ferric chloride on soil may be moderately low. Studies have shown that 7%-22% of HMs in the soil can be taken out through FeCl3 washing during field tests; in any case, acid/corrosive downpours can influence the bioavailability of the remaining metals [30]. Dissimilar to soil washing, the principle objective of in situ immobilization is to diminish the portability and bio-accessibility of heavy metals; in any case, the aggregate sum of these metals in soil isn't decreased. Htdrated Lime, Fly Ash [13,27] and biochar are the normal materials that have been tried viably to balance out heavy metals. In situ field tests have shown that both hydrated lime and biochar can bring down the uptake of heavy metals by plants and further develop their biomass to some extent [32]. Studies have additionally revealed that lime can be utilized to remediate soils contaminated with metals [33], while the use of biochar has been restricted to fields [34]. With the bigger explicit surface regions and more utilitarian gatherings than biochar, fly ash as a sorbent can likewise be utilized to alter soilied soils [35]. The blend of soil washing and in situ immobilization is gainful as it takes advantage of their benefits and makes up for their respective deficiencies. In this paper, we researched the consolidated impact of soil washing (with FeCl3) and in situ immobilization (with hydrated lime, biochar, and fly ash) to remediate the soil sullied with multi-metals. It helps to broke down the progressions in heavy metal substances, soil properties, and soil enzymes activities after the consolidated impact. Our aim was to control the danger of heavy metal tainting and foster a compelling remediation procedure through this technique.

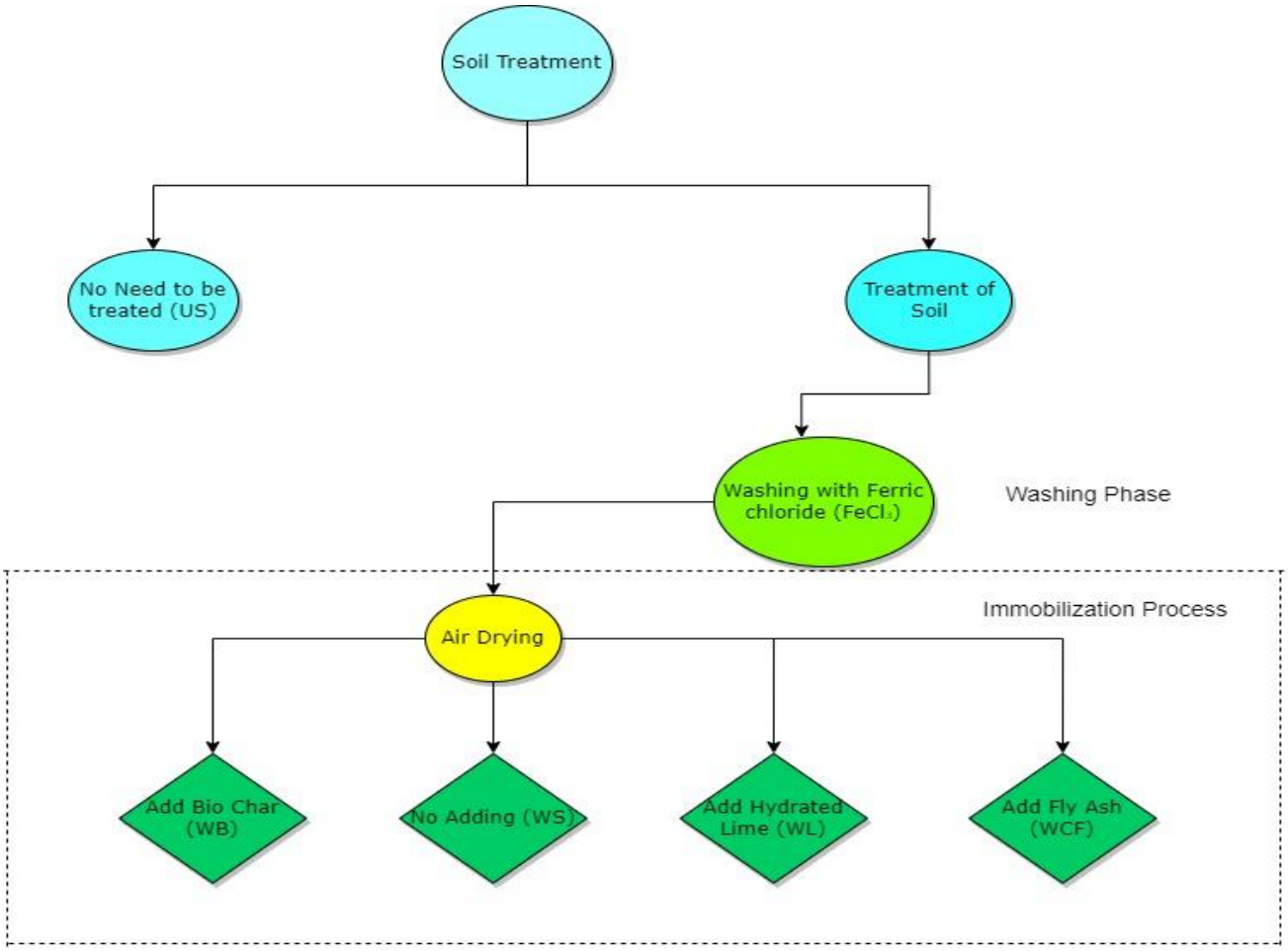

Figure 1: Immobilization Process Stage Wise

2. Materials and methods

2.1 Materials

In this study, hydrated lime as ($Ca(OH)_2$), was bought from market of Ambala, Haryana. Biochar material was accessible from neighbourhood market and was inferred utilizing rice straw, which was pyrolyzed for 1 h at 450 °C with nitrogen. Fly Ash (FA) was from Aggarwal Traders, Ludhiana, Punjab and went through 90µm-mesh. It usually contains a large specific surface area and less ash.

2.2 Soil sampling and Characterization

Samples of soils were taken from February 1, 2020, to April 30, 2021. The soil utilized in this study was gathered from the rural fields adjoining the Buddha Nullah, Ludhiana, India. All the samples of soil where were gathered from the surface layer (0-20 cm depth), from selected locations near Buddha Nullah in 10 locations then stored in polyethylene bags and all sub-samples were bulked together in the laboratory to obtain an "average" sample. A few Locations tests have caused extreme soil contamination with mercury (Hg), zinc (Zn), lead (Pb), Cd, copper (Cu), and arsenic (As). Among these, Pb, Zn, Cd, and Cu are the primary pollutants as their fixations are altogether higher than the environmental quality norm. Subsequent to testing, the soil was air-dried at room temperature (25 ± 2 °C) and went through a 2-mm sieve analysis, and investigated for their essential physicochemical properties as indicated [36]. Subsequently, sieved tests were put away at 4 °C before use and investigated physicochemical qualities of concentrated on soils were. The soil pH was estimated utilizing the pH meter with a soil/water proportion of 1:2.5 [37]; soil organic matter (SOM) not entirely set in stone by the potassium dichromate (K2Cr2O7) assimilation technique [38]; broke down organic matter (DOC) content was resolved utilizing the all out natural carbon analyzer (Shimadzu, Japan); cation exchange capacity (CEC) was estimated by the barium chloride

(BaCl2) removal strategy (Wang et al., 2015). The soil texture was analyzed according to Ball (1964). Total Pb, Cu, Zn, and Cd contents in soil were determined by inductively coupled plasma-optical emission spectrometry (ICP-OES) after mixed acid (HNO3-HClO4-HF) digestion [39]. Taking into account that most soils close by Buddha Nullah are acidic, and to further develop the soil pH to decrease the action of PTMs, one sort of soluble material viz. desulfurized fly ash (FA) was chosen. The values of chosen substance of FA were as per the following: pH 12.77; cation exchange capacity (CEC) 50.72 cmol+/kg; electrical conductivity 373 μS/cm; and total content of Cd 0.50 mg/kg. FA test was screened through a 2-mm sieve for preparation. The major Physicochemical qualities of the soil are introduced in Table 1.

2.3 Soil washing treatment

For best results, 3 g of soil which is contaminated was blended in with various Ferric Chloride (FeCl3) concentrations (0-1 M) and washing fluid/soil proportions (1.2-10), the combinations were vibrated at room temperature (25 ± 2 °C) for 1 h. The substance of heavy metals (Cd, Cu, Zn, and Pb) disintegrated in the supernatant was estimated by inductively coupled plasma - optical emission spectrometry subsequent to centrifuging at 4000 rpm for 10 min. All trials were acted in sets of three.

Table 1: The major Physicochemical attributes of the soil before and after washing.

Variables/Properties and units	Before	After
pH	5.10 ± 0.05	3.71 ± 0.04
Silt (%)	41.58 ± 3.67	42.72 ± 1.91
Clay (%)	35.71 ± 0.06	36.42 ± 0.29
Sand (%)	25.15 ± 3.94	16.20 ± 1.71
Soil organic matter (%)	31.97 ± 0.87	41.78 ± 0.79
CEC(cmol/kg)	27.10 ± 1.72	18.41 ± 0.85
Lead (mg/kg)	449.77 ± 2.76	227.49 ± 2.59
Zinc (mg/kg)	1097.63 ± 1.19	807.74 ± 3.72
Cadmium (mg/kg)	19.83 ± 0.67	6.7 ± 0.08
Copper (mg/kg)	181.89 ± 2.39	151.73 ± 0.79

2.4 Pot trial

In this method Untreated soil (US), FeCl3-washed soil (WS), washed soil with the expansion of 1% (w/w) Hydrated lime (WL), washed soil with the expansion of 1% (w/w) biochar (WB) and washed soil with the expansion of 1% (w/w) Fly Ash (WCA). The contaminated soil (5 kg) tests were washed by the strategy depicted [40] at a liquid/soil proportion of 2:1 for 1 h. After air-drying at room temperature, the WS (5 kg) was gone through a 5-mm sieves and 1 kg of US was gone through a 5 mm sieve as control. Further, 300 g of WS was blended in with 1% (w/w) hydrated lime, biochar, or fly ash, individually in each pot. The soils were incubated at 25 °C in dark for a week at about 50% water holding capacity (WHC) to activate the soil microbes. Subsequently, all the pots were covered with plastic films (with some holes in them) to prevent moisture loss and incubated at 25 and 20 °C during the day and at night, respectively. The incubation lasted for 108 days. The water content was maintained at about 50% WHC and no fertilizer was added during the incubation period.

2.5 Heavy metals Extraction

The extraction systems are as per the following: i) the acid-soluble fraction: extracted with 0.11 M acidic corrosive (pH 2); ii) the reducible portion: extracted using 0.5 M hydroxyl ammonium chloride by changing the pH to 2; iii) the oxidizable division: extracted with 30% hydrogen peroxide and afterward removed with 1 M ammonium acetic acid derivation (pH 2); iv) the residual fraction: by embracing blended corrosive assimilation (HNO3-HClO4-HF) and disintegrated with 5% HNO3. Every extraction was gone through a 0.45-mm channel layer and the filtrate was investigated for Cd, Cu, Pb, and Zn

substance by ICP-OES. All trials were acted in sets of three.

2.6 Soil enzyme activity

The movement of soil enzymes is a decent mark of soil organic properties [42]. The action of urease was estimated in view of urea imagined by phenol sodium hypochlorite, and furthermore by the spectrophotometric assurance of ammonium at 578 nm (Hu et al., 2014). The action of sucrose was known by the dinitrosalicylic acid (DNS) strategy at 508 nm. The action of catalase was known by KMnO4 titration [44]. All analyses were taken in sets of three.

3. Results and discussion

3.1 Ideal condition for Ferric Chloride washing

The expulsion efficiency of Cd, Pb, Cu and Zn by washing with Ferric Chloride at various concentrations and fluid/soil proportions are displayed in Fig. 1. The heavy metal-evacuation productivity changed essentially when the convergence of FeCl3 fluctuated from 0.01 to 0.1 M. The qualities then, at that point, stayed consistent with the expansion in concentration from 0.1 to 1 M. The evacuation process can be clarified as follows: I) Fe3+ can replace metal particles that are joined with the soil adsorption destinations; ii) FeCl3 can advance the disintegration of soil natural matters, prompting the arrival of metal particles bound to the organic matter; iii) metal particles can frame solvent metal-Cl edifices with chloride, which is favorable for more metal particles to break down into the arrangement [46]. Nonetheless, high grouping of FeCl3 can make the arrangement tacky, and accordingly it is difficult for the trace metal particles to spread in the arrangement, which can influence the extraction proficiency. The washing fluid/soil proportion additionally influenced the expulsion productivity. In the current study, the ideal L/S proportion was 2:1. At the point when the L/S proportion was under 2:1, the soil may neglect to get full admittance to the washing, in this manner it would be hard for the soil and FeCl3 to blend totally. The soil may totally blend in with the leachate when the L/S proportion is 2:1. Along these lines, the extraction rate was the maximum when the grouping of FeCl3 was 0.1 M and the L/S proportion was 2:1.

3.2 Evacuation efficiency of Heavy Metals by FeCl3 washing

The extraction paces of Cd (61.4%), Pb (53.6%), Cu (18.2%), and Zn (28.5%) after soil washing in the pot demonstration are displayed in Fig. 2. The outcome is like that of [47]. In the current study, the absolute soil Cd focus was 18.52 mg/kg, which is multiple times higher than the Class II level of the Soil Environmental Quality Standards (0.3 mg/kg). The backdrop use of Cd in the soil of Budhha Nullah area is 0.126 mg/kg. The high grouping of Cd in the current review may be the fundamental justification behind its high expulsion productivity. It has been accounted for that Cd has dynamic synthetic property, it was the most pitifully adsorbed in soil when contrasted and that of different metals, like Pb, Cu and Zn [43]. Subsequent to entering the soil, the majority of the Cd2+ can stay in dynamic state. Moreover, Cd2+ can frame Cd-Cl complex, which can be effectively taken out during washing. The consequences of the study showcased that soil pH significantly influences the adsorption of Cd2+, the Cd2+ adsorption capacity of soil expanded with the increment in soil pH. In the current research, the pH of untreated soil and washed soil tests was 5.24 and 3.69, separately (displayed in Table 1). The diminishing in soil Ph can likewise advance Cd evacuation [48]. The convergence of Pb was 461.37 mg/kg, which is 1.8 folds higher than the Class II (250 mg/kg) level of the Soil Environmental Quality Standards. Lead for the most part is truly steady in soil [49]. In any case, the evacuation pace of Pb was 52.1% by FeCl3 washing. The potential reasons incorporate the accompanying was about the competition for adsorption destination points among various trace metals (Pb, Cd, Cu and Zn); Secondly, the soil pH essentially impacts the desorption of Pb. [51] observed that the desorption pace of Pb in red soil was N80% when the pH of soil was b2, and the rate diminished to around half when the pH was

somewhere in the range of 2.9 and 3.4. As FeCl3 is a solid corrosive and frail base salt, it can deliver countless hydrogen particles in the arrangement, which in turn can diminish the pH of soil:

$Fe^{3+} + H_20 \rightarrow FeOH^{2+} + H^+$
$FeOH^{2+} + H_20 \rightarrow Fe(OH)_{+_2} + H+$
$Fe(OH)_{+_2} + H_20 \rightarrow Fe(OH)_3 + H+$

Besides, under low pH condition, most trace metal particles are in the cationic state. The H+ particles can seek the adsorption location with the heavy metal ions, consequently advancing the desorption of heavy metal ions in soil. Hence, a few trace metal ions, especially Pb2+, will be left in the solution mixture. The grouping of Cu and Zn was 181.91 and 1174.22 mg/kg, separately, which are 3.9 and 5.7 which is higher than the Class II level of the Soil Environmental Quality Standards, individually. However, the extraction pace of Zn was just 30.0%, which is in opposition to the discoveries of [49], who showed that Zn is an effectively extractable metal. As Zn and Cd are synthetically comparative, Zn can seek the adsorption destinations with Cd. Moreover, Cd can influence the conduct of Zn during soil washing. The extraction pace of Cu was 16.7%, which may be because of its generally low focus in soil (the foundation worth of Cu is 27.3 mg/kg).

3.3 Influence of different treatments on soil properties and soil enzymes

A few properties of soil after various methods are introduced in Table 2. After soil washing, the soil pH diminished from 5.81 to 3.43 and the soil CEC diminished by 29.1%. Be that as it may, the SOM content of the WS test expanded to 41.34 mg/kg (the SOM content of the US test was 36.45 mg/kg). This is in opposition to the outcomes detailed by [40]. This may be a direct result of the presence of reductive substances in the WS test. As soil pH can influence the soil redox processes, more Fe(II) is produced in the WS test during the brooding time frame. As we decided the soil SOM content by K2Cr2O7 oxidation strategy, Fe(II) in the WS test influenced the outcome, prompting high soil SOM focus in the WS test. The SOM content of the WL test (33.29 mg/kg) was lower than that of the US test, which likewise demonstrates the explanation talked about above. The DOC content of the WS test expanded by 87.2% contrasted and that of the untreated soil test, which may be because of the corruption of SOM. Hence, in the wake of washing the soil with FeCl3, the soil was more acidic, and the Fe(II) content expanded.

The low pH and expanded reductive substances can initiate dangerous consequences for the soil environment. For example, overabundance ferrous ion can induce plants to produce oxygen radicals, which is connected with primary changes in the cells. In the present work, the pH of the WS test was 3.43, which influences the metabolic exercises in plants and microorganisms. After the joined remediation (immobilization with hydrated lime), the soil pH expanded to 7.9. Besides, the soil CEC and DOC content expanded by 75% and 100% contrasted and those of the washed soil, demonstrating that high soil pH may lean toward SOM corruption. The expansion of biochar and fly ash displayed generally irrelevant impact on soil pH, CEC and DOC content. While, the expansion in the SOM concentration by 29% and 41%, individually, showed that most natural material in biochar and fly ash can scarcely be utilized by the microorganisms. As displayed in Fig. 3, there were huge contrasts in the urease, sucrase and catalase exercises of the US, WS, WL, WB and WCF tests after hatching. After soil washing, the action of urease, sucrase and catalase of the WS test diminished by half, 72% and 29%, individually, contrasted and those of the US soil. As most low atomic weight natural acids in soil are eliminated during soil washing, the remainder DOC can't be very much used by soil organisms. The absence of fuel source can debilitate the movement of compounds. As indicated [52], adequate energy is important to keep up with the dynamic microbial populaces, if not the action of microbial catalysts will be impacted to different degrees.

The consolidated remediation (immobilization with hydrated lime, biochar, and Fly Ash) may advance the action of soil

catalysts (urease, sucrase and catalase) contrasted and those of the washed soil test. Moreover, the expansion of hydrated lime was the best treatment. The connection coefficients of the protein soil properties connections after the consolidated remediation are displayed in Table 3. The action of urease, sucrase and catalase displayed critical relationship with one another, showing that the movement of these compounds has specific importance during their natural practices. The soil enzymes likewise showed huge positive relationship with the soil pH, DOC content and CEC; and negative connection with the corrosive solvent metals. The outcome shows that the pH of soil assumes a significant part in microbial bio-remediation. The conceivable purpose incorporate the accompanying: I) the soil pH can influence the bacterial layer penetrability, microbial ingestion, and use of supplements; ii) high soil pH can lighten the harmful impacts of corrosive solvent trace metals. The positive relationships between these compounds and soil pH, DOC content, and CEC show that pH and nourishment are the significant contemplation's for microbial remediation after soil washing. The negative relationship between these chemical and corrosive dis-solvable metals recommends that the corrosive solvent heavy metals have noxious affect on the action of soil enzymes application.

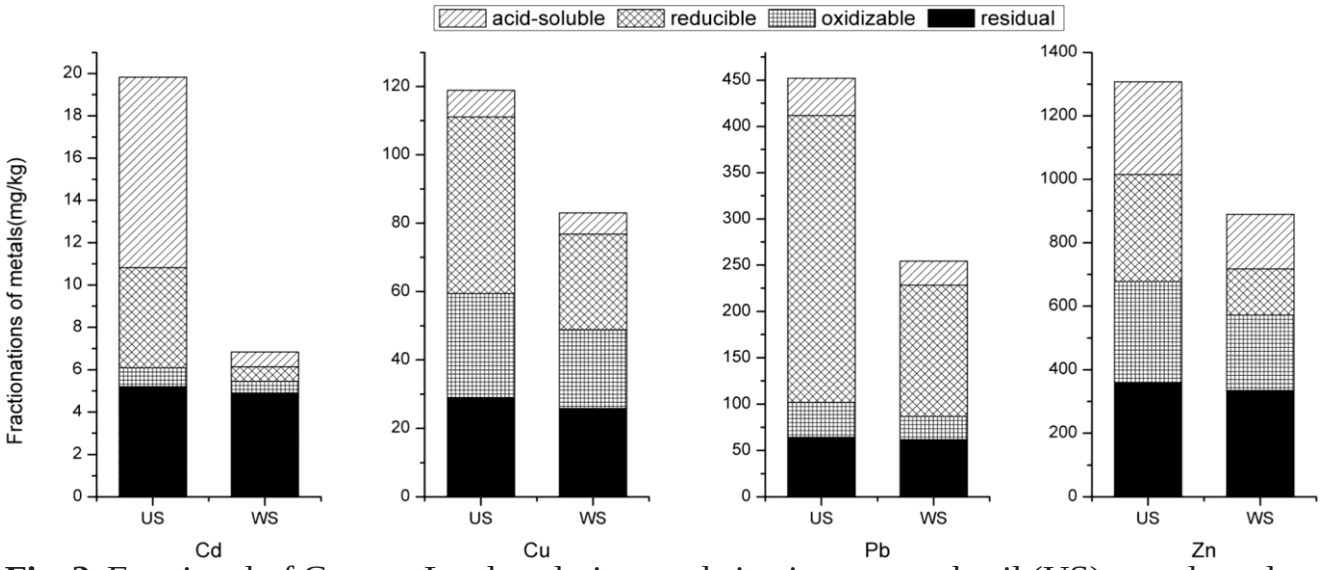

Fig. 2. Fractional of Copper, Lead, cadmium and zinc in untreated soil (US) sample and ferric chloride ($FeCl_3$)-washed soil (WS) sample.

Table 2: Influence on some properties of soil after different treatments.

Variables	DOC(mg/kg)	SOM(mg/kg)	pH	CEC(cmol/kg)
Untreated soil	0.15 ± 0.07	37.13 ± 0.95	6.04 ± 0.19	22.62 ± 1.00
$FeCl_3$-washed soil	0.41 ± 0.16	43.91 ± 0.59	3.82 ± 0.01	14.98 ± 0.63
Addition of Hydrated Lime to Washed soil	0.79 ± 0.19	35.48 ± 2.39	7.89 ± 0.19	25.87 ± 1.81
Addition of Bio-char to Washed soil	0.41 ± 0.12	53.94 ± 0.55	4.01 ± 0.14	17.14 ± 0.76
Addition of Fly Ash to Washed soil	0.33 ± 0.83	55.35 ± 0.61	3.99 ± 0.11	18.00 ± 0.38

3.4 Influence on heavy metals

The convergence of 0.11 M acidic corrosive extractable metals (Cd, Pb, Cu and Zn) in the wake of consolidating soil washing and in situ immobilization (materials were biochar, hydrated lime and fly ash) is displayed in Table 4. The expansion of 1% biochar and fly ash displayed insignificant impact in

diminishing the convergence of corrosive dis-solvable Cu, Pb and Zn. Besides, it imperceptibly expanded the centralization of corrosive solvent Cd. Unexpectedly, the expansion of hydrated lime showed critical decrease impact on the grouping of corrosive extractable Cd, Cu, Pb and Zn after joined remediation. The grouping of Cd, Cu, Pb and Zn in corrosive solvent structure diminished by 36.5%, 73.6%, 70.9% and 53.4%, separately, contrasted and those in the soil examples treated with just soil washing. The corrosive dissolvable part is the most accessible piece of metal in soil for plant take-up, and it is the most unsafe portion for living organic entities. The reducible and oxidizable trace metals are expected bioavailable divisions. The expansion of hydrated lime can expand the centralization of the relating reducible, oxidizable and remaining metals by diminishing the convergence of corrosive solvent metals. The corrosive solvent Cd, Pb, Cu and Zn showed huge negative connection with the soil pH, CEC, DOC content and absolute Pb focus (P b 0.01). The negative relationship of the soil pH with the bioavailability of trace metals is steady with the discoveries of a past report (Huang et al., 2017; Shaheen et al., 2013). Soil CEC is related with the negative charge in soil colloid, which can influence the bioavailability of heavy metals through soil pH. The expansion of hydrated lime essentially expanded the soil pH to 7.52, though the washed soil pH was 3.69. The maintenance of metal particles in soils can be improved with the expansion in soil pH. At the point when the soil pH increments, less H+ particles go after the adsorption destinations with the metal particles, particularly Pb2+, accordingly the soil sorption of metal particles increments.

Besides, more metal particles can be in the hydrolysis state because of the expanded soil pH, and they can absorb to soil all the more effectively. Hydroxides of trace metals are adsorbed all the more effectively to the soil surfaces, because of the diminished electrostatic shock between them. Heavy metal particles in the arrangement can accelerate by joining with OH−, shaping metal hydroxide, which can settle down when the soil pH is adequately high. As it is notable that the DOC content associates emphatically with the bioavailability of heavy metals, the expansion of DOM (dissolved organic matter) can build the centralization of corrosive solvent metals. In any case, we tracked down a contrary outcome in the current study. This may be on the grounds that most low atomic weight natural acids in soil were eliminated during soil washing, which can advance the disintegration of heavy metals. While the expanded DOC focus after soil washing demonstrated that some SOC can change into DOC. The recently framed DOC may include macromolecular natural matters, with complex constructions and low bioavailability. For example, humic like substances are a kind of DOM that can diminish the bioavailability of heavy metals. Plus, corrosive solvent Cd and Zn fixations additionally gave perceptible positive relationship SOM and negative connection with absolute Cu focus (P b 0.01). This may be on the grounds that Cd and Zn can frame solid bonds with SOM, and Cu can rival Cd and Zn for adsorption sites area.

Table 3: The concentration of acid-extractable heavy metals (Cd, Pb, Cu and Zn) after different treatments.

Variables	Cadmium (mg/kg)	Copper (mg/kg)	Zinc (mg/kg)	Lead (mg/kg)
Untreated soil	9.19 ± 0.04	7.50 ± 0.02	288.73 ± 1.49	41.23 ± 0.45
$FeCl_3$-washed soil	0.69 ± 0.12	6.62 ± 0.16	174.81 ± 4.54	28.83 ± 0.44
Addition of Hydrated Lime to Washed soil	0.52 ± 0.14	1.81 ± 0.19	81.63 ± 1.39	7.91 ± 0.65
Addition of Bio-char to Washed soil	0.78 ± 0.14	5.81 ± 0.73	196.22 ± 14.74	22.56 ± 0.59
Addition of Fly Ash to Washed soil	0.94 ± 0.04	6.91 ± 0.17	194.19 ± 8.73	25.89 ± 0.34

4. Conclusions

Soil washing is a viable strategy to eliminate heavy metals from soil. But, it doesn't display high evacuation rates for a wide range of metals in the soil tainted with numerous heavy metals. In the current study work, soil washing with FeCl3 introduced great expulsion proficiency for Cd and Pb; be that as it may, it showed moderately low evacuation productivity for Cu and Zn in contaminated paddy soil. Subsequent to washing, the soil pH displayed a solid influence on the bioavailability of remaining metals. The joined remediation (immobilization with binder materials) can altogether lessen the bioavailability of the remaining metals. Likewise, the immobilization materials (lime, biochar, and fly Ash) can viably shape the structure of the soil microbial local area and further develop the soil environment contrasted to those of washed soil. In outline, the mix of soil washing (with FeCl3) and in situ immobilization (with hydrated lime, biochar, and fly ash) showed beneficial outcomes in reducing soil polluting by heavy metals. Moreover, the mix of soil washing and in situ immobilization was more helpful for recuperating the soil microbial local area than that just soil washing. Accordingly, the mix of soil washing and in situ immobilization can be considered while changing soil contaminated with different heavy metals.

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COMPARATIVE STUDY AND ANALYSIS OF NOISE EFFECT WITH RESPECT TO DIFFERENT TRADE FAIRS

Tufail ur Rehman[1] and Gulzar Ahmad Bhat[2]
Department of environmental science, Jiwaji University, Gwalior-474011(India)
[1]tufailurrehman421@gmail.com [2]bhatgulzar17@gmail.com

ABSTRACT

The research experiment was carried out and the effects of noise are both direct and indirect they affect the health and make our living environment miserable. The noise at the specified location is noted for duration of fifteen minutes. In the specified locations sound level was taken either at the separator or on bank of the foot path. The sound pressure level at a specified location was noted 3 times during the day (i.e. morning, noon, and evening). Frequency type C is chosen in the sound level meter. The noise level also varies according to the number of visitors passing so the total persons were also recorded during the study. The readings were taken during early hours of the day (10:30 AM to 12:00 AM), noon and during evening rush hours (6.30 PM to 9.30 PM) and with those readings comparison of noise level are done. For averaging purpose the study is conducted repeatedly and the average value is taken for the results analysis. This study is done to identify the amount of noise generated at same time and same place during morning and evening hours so that we can know how much the city is affected by noise pollution. The noise level during evening time was more than morning and noon. This is because of huge crowd and traffic is experienced in the evening.

Introduction

The World Health Organization (WHO) aims to make all people attain the highest possible level of health. Health is defined in the WHO Constitution as "[a] state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". By this broad definition that includes well-being; noise impacts can be clubbed as 'health' issues. The word "noise" is derived from the Latin word "nausea," which means seasickness or a sensation of discomfort. Noise comprises those sounds occurring around us that are not part of the environment under consideration. It is also a type of pollution and impacts on our health and wellness and the ability to do productive work. Sources of noise pollution include industries, traffic and vehicles, construction and domestic appliances. The effects of noise are both direct and indirect; they affect the health and make our living environment wretched.

The readings were taken during early hours of the day (10:30 AM to 12:00 AM), noon and during evening rush hours (6.30 PM to 9.30 PM) and with those readings comparison of noise level are done. The comparison of noise data is plotted in the form of chart so that it makes convenient to differentiate the trade fair noise. In each area for each a minute readings were taken almost for 15 minutes.

The following parameters like

1. Total visitors volume per hour
2. Atmospheric temperature in degree Celsius
3. Relative humidity in percentage
4. Type of vehicles crossing the area during the study.
5. Noise level in that area was all recorded in order to have a brief study of trade fair noise in Gwalior city. Noise measurements were done at a distance of 3m from road side at an elevation of 130cm above the road surface. A and C sound level meter type SL-4001 with the capacity of measuring noise from 30 dB to 130 dB was used for measurements. Humidity in % and temperature in degree Celsius was measured by Thermo- hygrometer ATC-288 in each area. For averaging purpose the study is conducted repeatedly and the average value is taken for the results analysis. This study is done to identify the amount of noise generated at same time and same place during morning and evening hours so that we can know how much the city is affected by noise pollution.

Measuring Instrument

Sound level meter NL-42:

Noise measurements were performed using an integrated Average Sound Level Meter NL-42 which is designed for sound level measurements according to the IEC standard. It support diffuse sound field measurements and also meets standard requirements when the supplied windscreen is mounted.

Table 1: Data collected after sampling.

S.No.	Location	Sound level meter reading(in dB)		
		MORNING	NOON	EVENING
1.	Gate-1	63.6±2.01	64.66±4.26	80.48±5.9
2.	Gate-2	64.1±1.54	77.66±4.38	80.48±5.59
3.	VIP gate	65.48±6.19	76.36±2.73	79.01±1.97
4.	Kashmiri gate	56.1±5.63	75.81±2.58	77.81±2.59
5.	Chatrri-1	67.51±5.25	76.85±2.88	78.58±2.46
6.	Chatrri-2	65.61±6.25	76.11±4.2	79.65±1.4
7.	Chatrri-3	66.4±5.42	76.08±2.49	78.7±1.96
8.	Chatrri-4	66.01±5.67	76.31±1.15	78.55±0.89
9.	Chatrri-5	66.71±5.22	75.38±2.34	77.53±2.72
10.	Chatrri-6	65.98±5.68	78.16±1.11	77.46±1.98
11.	Chatrri-7	67.73±4.88	76.9±1.97	77.78±2.15
12.	Chatrri-8	65.45±6.27	75.98±2.13	77.43±2.89
13.	Chatrri-9	65.38±6.53	75.28±3.63	78.66±3.88
14.	Chatrri-10	67.11±5.05	75.95±1.35	77.65±2.58
15.	Chatrri-11	66.01±5.55	75.55±2.14	78.61±1.97
16.	Chatrri-12	65.48±2.03	74.91±1.72	77.81±1.46
17.	Chatrri-13	65.23±2.16	76.46±1.8	78.48±2.22
18.	Chatrri-14	65.08±3.24	75.6±3.24	78.75±1.36
19.	Chatrri-15	64.01±1.88	76.58±2.06	78.83±1.67
20.	Chatrri-16	64.55±2.85	76.5±2.23	79.86±1.11
21.	Chatrri-17	64.36±3.4	76.23±3.13	78.28±2.17
22.	Chatrri-18	64.21±3.54	77.05±2.19	79.18±1.59
23.	Chatrri-19	64.01±2.99	77.21±0.81	79.11±0.83
24.	Chatrri-20	64.45±2.16	76.61±2.17	78.76±2.07
25.	Chatrri-21	66.08±2.59	66.08±2.59	81.28±7.3
26.	Chatrri-22	65.28±2.96	81.38±7.7	84.33±9.22
27.	Chatrri-23)	65.7±3.3	81.65±9.6	84.6±10.22
28.	Chatrri-24	64.01±1.35	76.11±4.26	79.01±2.58
29.	Chatrri-25 (jhula sector)	63±0.44	79.98±4.38	86.75±2.5
30.	Chatrri-26 (jhula sector)	64.06±2.93	78.9±2.73	87.78±2.35

Variation of the noise levels (dB) with time at different locations in the Gwalior trade fair.

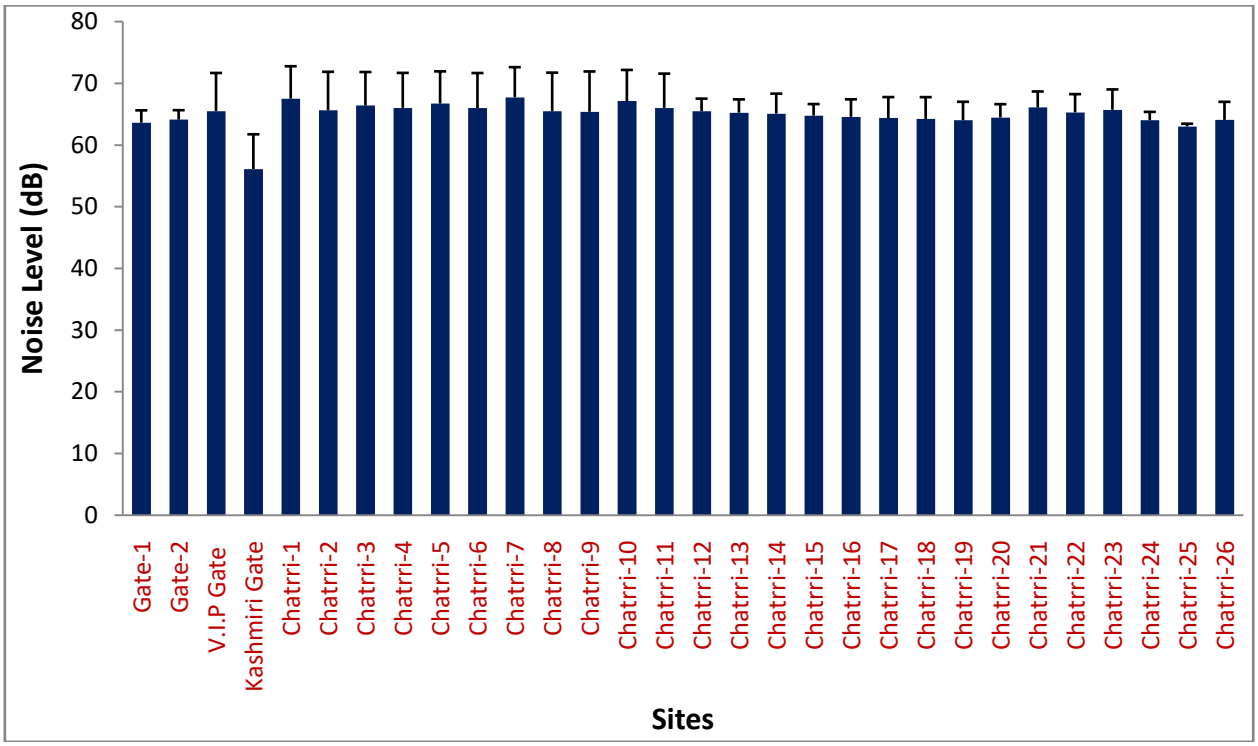

Figure: 1. Noise Levels in the Morning at 30 locations.

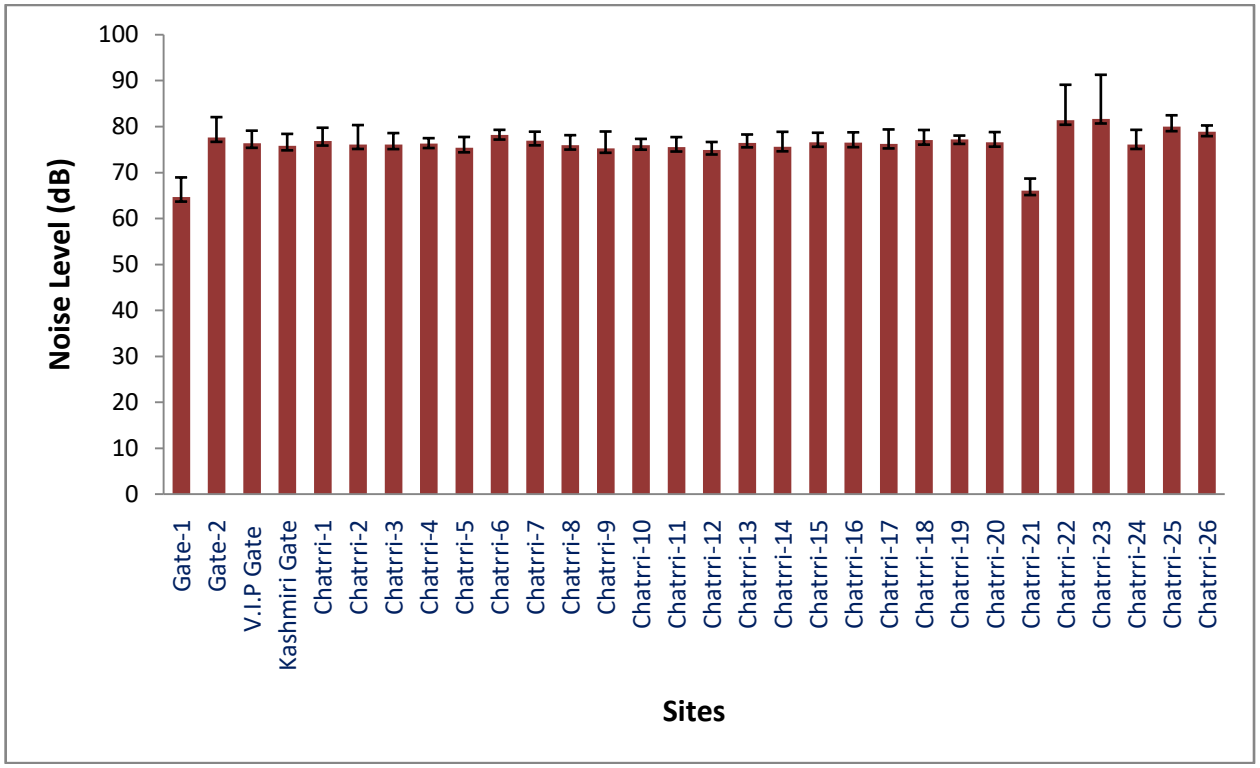

Figure2: Noise Levels in the Noon at 30 locations

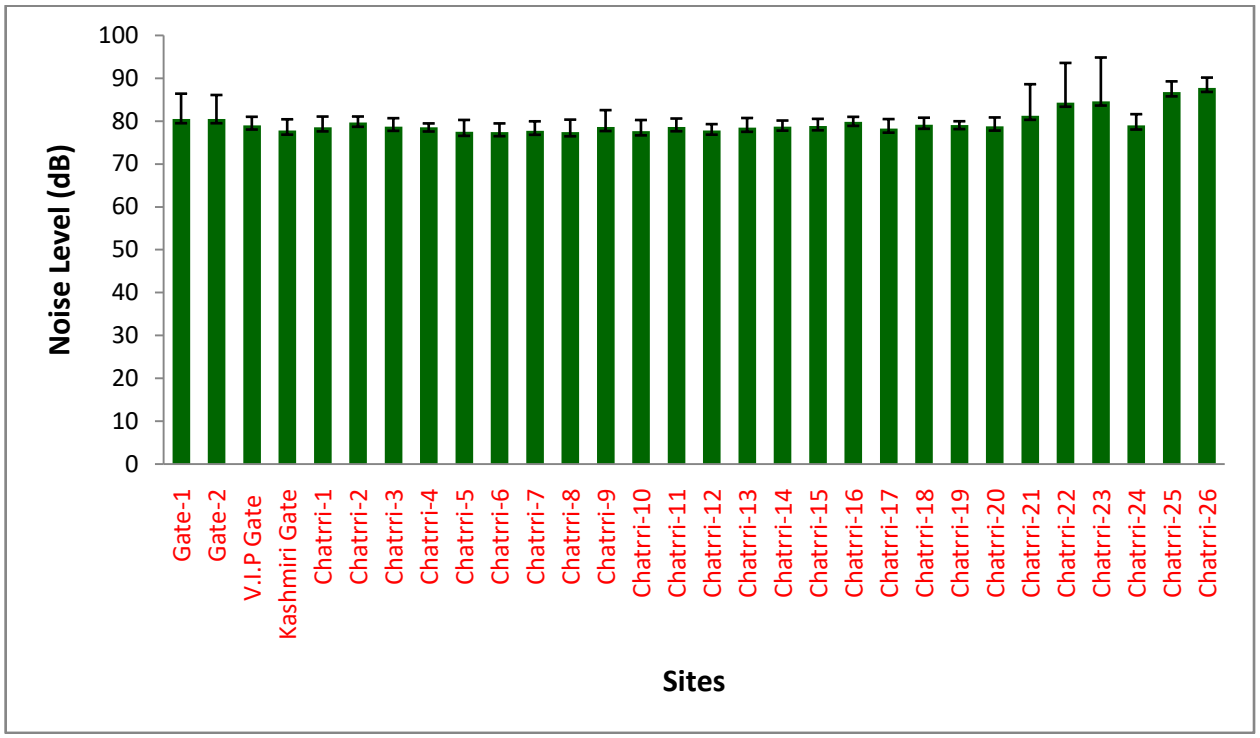

Figure 3: Noise Levels in the Evening time at 30 locations

Background

Gwalior Trade Fair is one of the oldest and largest trade fair in Madhya Pradesh, in Northern India. It was started in 1905 by the king of Gwalior: Maharaja Madhav Rao Scindia and with the history of 111 years, Gwalior Trade Fair is held at vast and modern fair complex spread over 104 acres. 5000 pavilions and shops, provided with ready-to use structures for showrooms and exhibitions. The fair complex has an independent power sub-station, water system, hospital, police station, banks and other modern facilities. The city boasts of its grand annual event, organized by Gwalior Trade Fair Authority: a nodal agency of govt. of Madhya Pradesh. The event which is a rare and captivating confluence of glorious tradition, culture, tourism and trade with a footfall of 10 million runs for over a month (December/January).

Figure 2. (a) chatrri-10 (b) jhula sector.

Present research was conducted to calculate the noise level and its effect on the surrounding in the Gwalior trade fair. We observe that the noise levels are quite high during the evening particularly on the holidays. Most of the sound pressure level at different site was within permissible limit. Near Chatrri- 25 and Chatrri-26 (Jhula sector), the measured sound pressure

level is around the permissible limit, so special provision should be taken for decrease of noise. The noise level during evening time was more than morning and noon. This is because of huge crowd and traffic is experienced in the evening.

Conclusion

Through the results obtained in the study, it is evident that the city is suffering from severe noise pollution due to trade fair. This is due to congested traffic, unplanned management for noise pollution, unplanned urban sprawl, no construction of silence zones in these areas.In this work periodic noise level meter was used and noise levels has been calculated manually. Accuracy of data may be improved by using continuous noise level meter.

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