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## A SHORT SURVEY ON AGING EVALUATION OF POWER TRANSFORMER INSULATION OIL

Harkamal Deep Singh and Dr. Jashandeep Singh

<sup>1</sup>Research Scholar, IKG Punjab Technical University, Kapurthala, India<sup>2</sup>Bhai Gurdas Institute of Engineering and Technology, Main Patiala Road, Sangrur, Punjab**ABSTRACT**

*The reliability of power transformers is restricted by the system quality of electric insulation that also operate as a heat transferring media. Conversely, cellulose insulation gets decomposed owing to overheat of transformers leads to diminution in their life span. Therefore, it is much significant for checking the oil insulation and insulation levels for improving the transformer quality. This survey makes a significant analysis on about 30 papers regarding aging assessment of power transformer (PT). More particularly, varied performance measures that are contributed in diverse articles are analyzed. In addition, a comprehensive study is made regarding the maximal performances attained in each works. Moreover, chronological analysis is done that shows the count of works deployed in the respective years.*

*Keywords- Power transformers; Insulation; Aging Evaluation; Moisture content; Performances.*

**Nomenclature**

Acronyms	Descriptions
BDV	Breakdown Voltage
DP	Degree Of Polymerization
GTL	Gas-To-Liquid
2-FAL	2-Furfural
FCM	Fuzzy C-Means
FDDS	Frequency Domain Dielectric Spectroscopy
FDS	Frequency Domain Spectroscopy
LEDT	Low Energy Degradation Triangle
LR	Linear Regression
FDS	Frequency Domain Spectroscopy
PDC	Polarization And Depolarization Currents
PT	Power Transformer
XRD	X-Ray Diffraction
NFS	Neuro-Fuzzy Scheme
MLSR	Multiple Linear Stepwise Regression
WC	water content

**1. INTRODUCTION**

Aging of power transformers is a rising focus nowadays owing to the utilization of power systems and thereby, the demand and lifetime of power systems along with power quality turn out to be important. Oil cellulose transformers insulations may irretrievably ages, and cellulose insulations could not be transformed [14] [25]. The aging of oil- cellulose insulation and the related reduction of motorized strengths were significant factors, which limits the life expectation of transformer [1].

Certain schemes such as LR model and a MLSR scheme were tested and suggested for the BDV of the transformers, thereby, increasing the life span of oils. The forecasted values of these schemes have proven a superior concurrence with computed values [24] [31]. Numerous analyses were performed on aged oil monitoring, preventive and testing repairs. When cellulose insulation gets decomposed owing to overheat, the chemical compounds gets suspended and released in oil. These compounds are said to be furans [10] [4].

Furans are by-products of an aged transformer paper, which liquefy in transformer oil. A furanic element 2 - FAL was developed at 1980's [12] [31] for indicating the aging of winding insulations. In addition, this derivative was most often found in high concentrations amongst the 5 furanic elements. A stronger semi-logarithm linear association among DP of paper insulation and 2-FAL in oil were noticed and measured constantly in numerous labs throughout accelerated thermal aging experimentations. Nevertheless, deploying 2-FAL for indicating the insulation age of an functional transformer is not better [1].

The major contributions are as follows.



1. Carries out a review on Aging evaluation of PT by analysing 30 research papers.
2. Presents a comprehensive review on various methodologies adopted in each reviewed articles.
3. Makes evaluation on performance metrics in each of the reviewed articles
4. Reviews the maximal performances in each works along with chronological analysis.

Here, Section II illustrates the related works on Aging evaluation of PT. The extensive review on implemented schemes is preferred in section III. The review on performance metrics is represented in Section IV. Furthermore, Section V organized the challenges and the conclusion is portrayed in Section VI.

## 2. LITERATURE REVIEW

### 2.1 Related works

In 2021, Carmela *et al.* [1] reported investigational data on mechanical and tensile compressive property of 2 kinds of paper, crepe and plain Kraft papers. These papers were characteristically deployed in power transformers for insulation, under diverse aged states. These data were reprocessed for numerous purposes. They improved the present knowledge on degradation process and mechanical reaction of cellulosic insulation and gave various values for reference, which were evaluated over others in the factory by producers. In 2019, Weidong *et al.* [2] have presented an enhanced technique for hot-spot insulation evaluation depending upon concentration of 2-FAL in oil. The 2-FAL production in cellulose series scission was initially examined hypothetically, and a novel linear association among 2-FAL and total generation was attained. In addition, the 2-FAL partition among mineral oil and insulation paper impacted by aging status, moisture, and temperature was considered. Then, an equation was established among the 2-FAL and insulation for the thermal aging. At last, for verifying the presented scheme, analysis was done with temperature grades.

In 2016, Matharage *et al.* [3] have concerned on applying paper aging gauge in transformer oil via a step up lab aging experimentation. The analysis was done at 120 °C and with that, conservative mineral oil was examined as reference. The quantity of methanol presented in oil was much higher; as a result, use of methanol as an earlier paper aging marker was validated. 2-FAL was suitable for GTL oil with no any alterations. Furthermore, the oil aging analysis revealed that the oil generated methanol that was not important. In 2019, Dein and Gouda [4] deployed a new model for forecasting the aged paper insulation. The experimentation was done and the oil was monitored in the review phase till 10years. Finally, the result has established the 1st-quality consistency by oil feature.

In 2019, Yang *et al.* [5] have recommended a novel method that exploited FDS for calculating the aging condition of oil-paper insulations. FDS curves were utilized for estimating the moisture and oil sample was exploited for measuring the moisture in oil. Also, the proportion amongst the moisture of paper and oil were regarded as aging feature for calculating the aging of oil-paper insulations. In 2017, Singhe *et al.* [6] discovered a relationship among dielectric property, and the aging state of transformer samples. It was deployed for considering the aging state by computing dielectrics at the prominent frequencies. Experimentations were done on dry and wet pressboard samples and at last, the resultants were distinguished with field aged samples. It was determined that the values of permittivity had a superior relationship with specific tensile values than wet and dry samples.

In 2019, Liu *et al.* [7] examined the aging state of insulation by means of “average activation energy” process. Here, Arrhenius equation was steadily analysed for evaluating the DP value of transformer. In the end, the test outcome exposed that the typical activation energy was proficient. In 2016, Gao *et al.* [8] construed the power transformer condition via dielectric response scheme. FDS, and PDC, were measures of dielectric reaction that were accomplished at atypical temperatures. By deploying the master curve technique, the impact of the temperature on FDS was removed efficiently. At the intervening time, dielectric constraints were composed to form a fingerprint database for signifying the dissimilar states of the oil. At end, FDS measures were done to validate the effectiveness of proposed technique for estimating the paper insulation of transformer oil.

In 2013, Malik *et al.* [9] tended to scrutinize the effectiveness of NFS, to identify the failing of the WIP in an oil-immersed power transformer, and to compute its performances over extant schemes. The deployed scheme provided a successful perceptive and accordingly, testing was made on 25 transformer models that exhibited the potency for larger conversion during interruptions. In 2019, Serrano *et al.* [10] analyzed the absorption of diffusivity of mineral oil aging up to 2300h under controlled situation. Subsequently, it was noted that, thermal diffusivity does not demonstrated foremost distinctions up to specific time period. Consequently, the relevant optical constraints were constructively deployed for analytical tasks.

In 2019, Lin *et al.* [11] investigated the impact on furfural partitioning and generation on the aging evaluation of oil-paper insulation of power apparatus. Moreover, oil-paper sample with a variety of furfural substances were arranged by means of thermal aging experimentation.. In 2019, Li *et al.* [12] proposed a self-learning technique for estimating the DP value of insulation paper depending upon numerous oil aging transformer constraints. The adopted technique comprised linear regression, FCM and data processing. Resultants revealed that computing the DP values depending upon several aging constraints was more precise than computing via a single constraint. The adopted technique also promoted the development of more precise life evaluation schemes for power transformers depending upon these oil aging constraints.

In 2016, Yang *et al.* [13] conducted 2-FAL research at diverse temperatures for constructing a 2-furfural partition illustration. Resultants have shown that the adopted scheme was affected by temperature. At higher temperature, furfural migrates to oil from paper. At the end, the 2-furfural adjustment factor was confirmed by investigational data. In 2017, Moodley and Gaunt [14] formulated LEDT technique for identifying earlier state changes. The technique was deployed to records of DGA to larger industrial units and transformers. A degradation constraint extracted from the LEDT offered early forecast of the malfunction. It also illustrated the relationship in certain transformers among geomagnetic and degradation disturbances.

In 2017, Mishra *et al.* [15] has deployed charge de-trapping model to split the current element from depolarization current. On considering the current element as de-trapping current, its association with another constraint of transformer insulation was examined. The introduced method was deployed on numerous realistic transformers. It was noticed that the period of de-trapping current was interrelated with dissipation factor, oil conductivity, and paper conductivity and insulation age. In 2021, Zhang *et al.* [16] have proposed a non-destructive system depending upon multivariate chemical indicator for evaluating the residual existence of cellulosic paper insulation. The elected chemical indicator closely associated with the aging of the insulating paper was analyzed. In addition, by deploying the objective and subjective weighting technique, the assessment information of every indicator were fully derived to attain wide-ranging estimation weights.

In 2021, Khan *et al.* [17] have performed comparative analysis with mineral oil using vegetable oils that were subjected to multi-aging. Furthermore, the thermal and dielectric property of vegetable oils were analysed after and before aging. In the end, a relative analysis of mineral oil with vegetable oil was offered to establish the effectiveness of the developed vegetable oils. In 2019, Mingze *et al.* [18] have proposed a quantitative assessment technique of insulation aging depending upon Davidson-Cole scheme. Here, the constraints of Davidson-Cole approach were derived by fitting model. The investigational resultants have shown that the adopted constraints were directly associated with aging period.

In 2015, Jiefeng *et al.* [19] have reported a non-destructive assessment method depending upon dielectric characteristics of time-frequency domain. Initially, the depolarization / polarization current were computed in reserved lab conditions. Subsequently, the time-domain dielectric features that could characterize oil-paper insulation aging were derived from depolarization / polarization current curves. In 2020, Liu *et al.* [20] have precisely evaluated the transformer service life and ensured the steady function in power system for predicting the life span of oil immersed press board at diverse moisture and temperatures. This technique was chiefly realized by transformation factor and kinetic equation. Initially, the consequence of moisture and temperature content on frequency dielectric reaction was analyzed using FDDS technique. The resultants have shown that dielectric losses increase with the raise of temperature and moisture contents.

In 2019, Yuandi *et al.* [21] investigated the association of furfural partition and moisture proportion. The moisture absorption test and thermal aging test were done for preparing oil-paper samples with diverse moisture and furfural concentration. For samples with diverse humidity concentration, the furfural partition ratio among paper and oil were distinguished. Resultants have shown that samples with higher humidity revealed a higher furfural mass proportion in oil. In 2016, Ruijin *et al.* [22] have investigated the impact of aged paper and oil on damp equilibrium chart for determining “which of the two primarily causes the inaccuracy in moisture estimation of aged transformers.” At thermal age experimentation was done at 5 aging degrees and 4 types of insulations were created.

In 2019, Thabet *et al.* [23] have investigated the impact of nanoparticles on conductivity of transformer oils. In addition, it was analysed on the major effectual factors of efficient electrical conductivity for nanofluids of transformer oil. An analysis was carried out by means of multiple and individual nanoparticles depending upon electrophoretic and static conductivities. An investigational work was done for confirming the significance of deploying numerous nanoparticles for regulating the conductivity of nanofluids. In 2019, Maharana *et al.* [24] have carried out open beaker oxidative aging analysis at 115 °C for NF and VO at 3 different aging intervals

like 500, 300, and 100 h. Modification in aged NF and VO were examined via the different physicochemical and spectroscopic analysis like color, fluorescence, flash point, acid count and so on. A relative study of the electrical property for aged and fresh samples of NF and VO was also carried out in this work.

In 2020, Fan *et al.* [25] have deployed a new scheme that aided in standardizing the FDS curve depending upon the theory of fitting analysis and power series. The resultants revealed that the investigated technique was competent of forecasting the dielectric losses with minimal error values. In 2020, Jacob *et al.* [26] have presented an analysis on wavelet textures of microscopic images obtained from aged samples of winding insulation paper in power transformer. Here, Kraft paper samples were used for investigational analysis and the accelerated aged test preparation was deployed for producing a group of paper samples with altering levels of insulation corrosion. Microscopy images of paper surfaces were attained by means of benchmark optical microscopes.

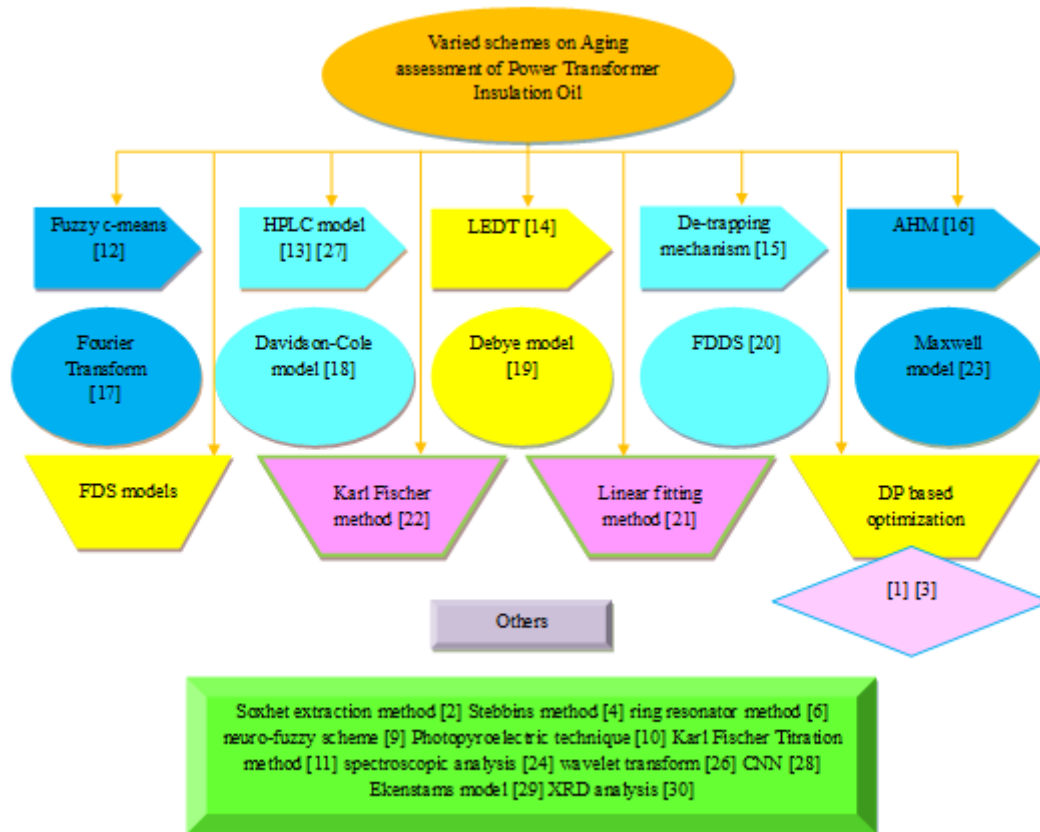
In 2021, Liu *et al.* [27] have examined the aging evaluation scheme depending upon furfural marker for transformer insulation under diverse pressboard / oil ratios. Initially, pressboard / oil insulation system with diverse pressboard / oil mass proportion were done for entire changes in oil. Subsequently, the customized furfural-DP scheme was expanded to diverse pressboard / oil mass proportion under varied oil changes. The developed scheme has promoted the accurateness of the aging evaluation under diverse oil change condition and pressboard / oil mass ratios. In 2021, Song *et al.* [28] have deployed a transformation technique for transforming the 1-D data into 2-D data. By exploiting CNN on the basis of dimensionality expanding technique, analysis of paper – oil insulation with diverse aging condition depending upon Raman spectroscopy was recognized. The resultant has shown the CNN was proficient to classify the differentiations of transformer oil samples at every age phase using Raman spectral image.

In 2018, Matharage *et al.* [29] have investigated the applicability of deploying methanol and 2-FAL via lab aging experimentation at temperature of 120, 100 and 80°C. As the artificial ester was more polar, it attracts additional methanol, thus resulting in a higher methanol concentration. Moreover, a diminution in methanol was noticed at 120 °C. This was owing to a variation in partition among paper and oil, or an esterification effect that consumed methanol. In 2019, Rao *et al.* [30] have described the appliance of XRD and dilatometry study as direct techniques for characterizing the deprivation of transformer insulation. Investigational aging on paper / oil insulation was done in lab situation at high temperature. The comprehensive process and understanding of signatures were discussed explicitly.

### 3. EXTENSIVE REVIEW ON IMPLEMENTED SCHEMES

#### 3.1 Review on various schemes

The performance metrics measured in diverse contributions concerning the Aging evaluation of PT. The review on adopted techniques in each work is discussed, and the illustration is exposed in Fig. 1 Here, it was noticed that DP based scheme was used in [1] [3] and Soxhlet extraction method was adopted in [2]. In addition, Stebbins method was adopted in [4] and FDS based schemes were used in [5] [7] [8] [25]. Furthermore, ring resonator method and neuro-fuzzy scheme were used in [6] and [9] and Photopyroelectric technique was exploited in [10]. Moreover, Karl Fischer Titration method and fuzzy c-means was adopted in [11] and [12]. In addition, HPLC based models were deployed in [13] [17] and LEDT model was deployed in [14]. De-trapping mechanism was adopted in [15] and AHM model was adopted in [16]. Moreover, Fourier Transform model was adopted in [17] and Davidson-Cole model was deployed in [18] and Debye model was used in [19] other methods such as FDDS approach, Linear fitting method, Karl Fischer method, Maxwell model, spectroscopic analysis, and wavelet transform scheme were deployed in [20] [21] [22] [23] [24] and [26]. In addition, CNN, Ekenstams model and XRD analysis were deployed in [28] [29] and [30] correspondingly.



**Figure 1.** Pictorial representation of various techniques adopted for Aging evaluation of PT

#### 4. COMPREHENSIVE REVIEW ON VARIED PERFORMANCE METRICS

##### 4.1 Analysis on Performance Measures

The performance metrics measured in diverse contributions concerning Aging evaluation of PT is depicted in Table I. From Table I, it is noticed that the analysis on stress have been done by [1] and 5 works have made analysis on error. 11 papers have made a performance study under temperature and 10 papers analysed moisture content, which have offered about 36.67% and 33.33% of the reviewed works. Similarly, the DP, Accuracy, Time and Tensile index have contributed about 43.33% (13 paper), 10% (3 paper), 33.33% (10 paper), 6.67% (2 papers). Further, activation energy, methanol in oil and water content have been adopted in 6.67% (2 papers each).

**Table 1.** Review on different performance metrics for Aging evaluation of PT schemes

Citations	Stress	Error	Temperature	Moisture content	DP	Accuracy	Time	Tensile index	Activation energy	Methanol in oil	Water content	Others
[1]	✓											
[2]		✓	✓									
[3]										✓		
[4]							✓					✓
[5]		✓		✓								
[6]			✓		✓			✓				
[7]			✓	✓	✓				✓			
[8]					✓				✓		✓	
[9]		✓				✓	✓					
[10]			✓									
[11]			✓	✓	✓							
[12]		✓	✓		✓	✓						
[13]			✓							✓		
[14]					✓							✓

[15]							✓					
[16]					✓		✓					
[17]											✓	✓
[18]				✓	✓		✓					
[19]			✓				✓					
[20]			✓	✓								✓
[21]				✓	✓		✓					
[22]				✓	✓		✓					
[23]												✓
[24]				✓			✓					
[25]		✓		✓								
[26]			✓	✓	✓		✓					
[27]												✓
[28]					✓	✓						
[29]			✓		✓			✓				
[30]												✓

#### 4.2 Analysis on Maximal Performances

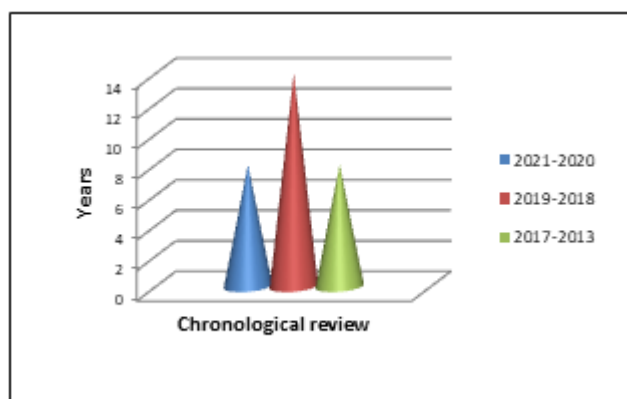
The maximal performances attained in the reviewed works are shown in Table II. Here, stress examined in [1] has attained a minimal value of 4.5mpa and error analyzed in [9] has obtained a value of 0.3469. The temperature analyzed in [11] has obtained a value of 100 °C and moisture content examined in [7] has obtained value of 1.17%. Likewise, DP, accuracy, time, tensile index, and activation energy has attained the values of 415, 95%, 70%, 92Nmg<sup>-1</sup> and 0.95eV and it has been examined in [8] [29] [4] [6] and [8] correspondingly. The measures such as methanol in oil, water content and permittivity have attained optimal values of 0.28ppm, 1.2% and 2.2 and they have been analysed in [3] [8] and [23] respectively. Also, conductivity and recovery rate were exploited in [23] and [27], and they have attained optimum values of 12.6pS/m and 0.49 k correspondingly.

**Table 2.** Maximum performances obtained in considered works

Sl. no	Performance measures	High achievements	Citations
1	Stress	4.5mpa	[1]
2	Error	0.3469	[9]
3	Temperature	100 °C	[11]
4	Moisture content	1.17%	[7]
5	DP	415	[8]
6	Accuracy	95%	[29]
7	Time	70%	[4]
8	Tensile index	92Nmg <sup>-1</sup>	[6]
9	Activation energy	0.95eV	[8]
10	Methanol in oil	0.28ppm	[3]
11	Water content	1.2%	[8]
12	Permittivity	2.2	[23]
13	Conductivity	12.6pS/m	[23]
14	Recovery rate	0.49k	[27]

#### 4.3 Analysis on Chronological review

The analysis regarding chronological review is depicted in Fig. 2. From Fig. 2, it is noticed that 8 papers (i.e. 26.67%) has been deployed between the years 2021-2020 and 14 works (i.e. 46.67%) has been deployed between the years 2019-2018, and around 26.67% of the exploited works were published between 2017-2013.



**Figure 2.** Bar graph representation showing the chronological analysis

## 5. CONCLUSION

This work has presented a wide-ranging review on Aging evaluation of PT models. Diverse works were reviewed and their performances were portrayed. Moreover, this survey analyzes the varied performances related to aging assessment of power transformer systems. In conclusion,

- This work has reviewed around 30 research papers and explained the noteworthy analysis on Aging evaluation of PT.
- The review has analysed different techniques and varied performance measures exploited in each works.
- Further, the maximal performances accomplished in each works were analysed and the chronological review was also represented in brief.

## REFERENCES

- Carmela OriaIsidro CarrascalAlfredo Ortiz, "Experimental dataset on the tensile and compressive mechanical properties of plain Kraft and crepe papers used as insulation in power transformers after ageing in mineral oil", Data in Brief, Volume 36 (Cover date: June 2021), Article 107031, 2 April 2021.
- Weidong SunLijun YangZhidong Cheng, "Improved method for aging assessment of winding hot-spot insulation of transformer based on the 2-FAL concentration in oil", International Journal of Electrical Power & Energy Systems, Volume 112 (Cover date: November 2019), Pages 191-198, 3 May 2019.
- S. Y. Matharage, Q. Liu, and Z. D. Wang, "Aging assessment of kraft paper insulation through methanol in oil measurement," Transactions on Dielectrics and Electrical Insulation, vol. 23, no. 3, pp. 1589-1596, June 2016.
- Osama E. Gouda, and Adel Z. El Dein, "Prediction of Aged Transformer Oil and Paper Insulation", Journal Electric Power Components and Systems, vol.47, no.4-5, 2019.
- L. Yang, T. Zou, B. Deng, H. Zhang, Y. Mo, and P. Peng, "Assessment of Oil-Paper Insulation Aging Using Frequency Domain Spectroscopy and Moisture Equilibrium Curves", in IEEE Access, vol. 7, pp. 45670-45678, 2019.
- W. M. S. C. Samarasinghe, J. R. S. S. Kumara, M. A. R. M. Fernando, and A. U. A. W. Gunawardena, "Aging assesment of transformer pressboard insulation by micro-strip ring resonator at GHz frequencies", Transactions on Dielectrics and Electrical Insulation, vol. 24, no. 3, pp. 1923-1930, June 2017.
- J. Liu, X. Fan, H. Zheng, Y. Zhang, C. Zhang, B. Lai, J. Wang, G. Ren, and E. Zhang, "Aging condition assessment of transformer oil-immersed cellulosic insulation based upon the average activation energy method", Cellulose, vol.26, no.6, pp.3891–3908, 02 March 2019.
- J. Gao, L. Yang, Y. Wang, X. Liu, Y. Lv, and H. Zheng, "Condition diagnosis of transformer oil-paper insulation using dielectric response fingerprint characteristics", Transactions on Dielectrics and Electrical Insulation, vol. 23, no. 2, pp. 1207-1218, April 2016.
- HasmatMalik, Amit KumarYadav, SukumarMishra, and TarkeshwarMehto, "Application of neuro-fuzzy scheme to investigate the winding insulation paper deterioration in oil-immersed power transformer", International Journal of Electrical Power & Energy Systems, vol.53, pp.256-271, December 2013.

- A.Marín-Serrano, J.A.Balderas-López, P.A.Calva, and A.Aranda-Pérez, "Thermo-optical properties as complementary parameters for damage assessment of mineral oils aged under controlled conditions used in power transformers", *Thermochimica Acta*, vol.676, pp.33-38, June 2019.
- Y. Lin, C. Wei, F. Tao, and J. Li, "Aging Assessment of Oil-Paper Insulation of Power Equipment With Furfural Analysis Based on Furfural Generation and Partitioning," in *IEEE Transactions on Power Delivery*, vol. 34, no. 4, pp. 1626-1633, Aug. 2019.
- S. Li, Z. Ge, A. Abu-Siada, L. Yang, S. Li and K. Wakimoto, "A New Technique to Estimate the Degree of Polymerization of Insulation Paper Using Multiple Aging Parameters of Transformer Oil," in *IEEE Access*, vol. 7, pp. 157471-157479, 2019, doi: 10.1109/ACCESS.2019.2949580.
- L. Yang, Y. Lin, R. Liao, X. Zhao, W. Sun and Y. Zhang, "Effects of temperature and aging on furfural partitioning in the oil-paper system of power transformers," in *IEEE Transactions on Dielectrics and Electrical Insulation*, vol. 23, no. 3, pp. 1393-1401, June 2016, doi: 10.1109/TDEI.2015.005530.
- N. Moodley and C. T. Gaunt, "Low Energy Degradation Triangle for power transformer health assessment," in *IEEE Transactions on Dielectrics and Electrical Insulation*, vol. 24, no. 1, pp. 639-646, Feb. 2017, doi: 10.1109/TDEI.2016.006042.
- D. Mishra, N. Haque, A. Baral and S. Chakravorti, "Assessment of interfacial charge accumulation in oil-paper interface in transformer insulation from polarization-depolarization current measurements," in *IEEE Transactions on Dielectrics and Electrical Insulation*, vol. 24, no. 3, pp. 1665-1673, June 2017, doi: 10.1109/TDEI.2017.006525.
- Zhang, E., Zheng, H., Zhang, C. et al. Aging state assessment of transformer cellulosic paper insulation using multivariate chemical indicators. *Cellulose* 28, 2445–2460 (2021). <https://doi.org/10.1007/s10570-021-03683-3>.
- Khan, I., Abid, M.A., Ullah, K. et al. Multi-aging Effects on Vegetable Based Oils for Transformer Insulation in HV Systems. *J. Electr. Eng. Technol.* 16, 2709–2720 (2021). <https://doi.org/10.1007/s42835-021-00795-5>
- Mingze Zhang, Ji Liu, Menghan Yin, Haifeng Jia & Jialu Lv (2019) Assessment on Oil-Paper Insulation Aging of Transformer Based on Dielectric Response Model, *Electric Power Components and Systems*, 47:13, 1145-1155, DOI: 10.1080/15325008.2019.1663454
- Jiefeng Liu, Ruijin Liao, Yiyi Zhang, Chunyan Gong, Cong Wang & Jun Gao (2015) Condition Evaluation for Aging State of Transformer Oil-paper Insulation Based on Time-frequency Domain Dielectric Characteristics, *Electric Power Components and Systems*, 43:7, 759-769, DOI: 10.1080/15325008.2014.991462
- Ji Liu, Jialu Lv, Mingze Zhang, Haifeng Jia, Weitao Zhuang & Xin Chen (2020) Research on Life Prediction of Oil-Paper Insulation Based on Dielectric Response, *Electric Power Components and Systems*, 48:3, 281-290, DOI: 10.1080/15325008.2020.1758839
- Yuandi Lin, Ruijin Liao, Fengbo Tao & Chao Wei (2019) Effects of Moisture on Furfural Partitioning in Oil-Paper Insulation System and Aging Assessment of Power Transformers, *Electric Power Components and Systems*, 47:1-2, 192-199, DOI: 10.1080/15325008.2019.1565135
- Ruijin Liao, Yuandi Lin, Yiyi Zhang & Huanhuan Xia (2016) Independent Effects of Aged Oil and Aged Paper on Moisture Evaluation of Power Transformers, *Electric Power Components and Systems*, 44:5, 556-564, DOI: 10.1080/15325008.2015.1122104.
- Thabet, M. Allam & S. A. Shaaban (2019) Assessment of Individual and Multiple Nanoparticles on Electrical Insulation of Power Transformers Nanofluids, *Electric Power Components and Systems*, 47:4-5, 420-430, DOI: 10.1080/15325008.2019.1609624.
- M. Maharana, N. Baruah, S. K. Nayak, N. Meher and P. K. Iyer, "Condition Assessment of Aged Ester-Based Nanofluid Through Physicochemical and Spectroscopic Measurement," in *IEEE Transactions on Instrumentation and Measurement*, vol. 68, no. 12, pp. 4853-4863, Dec. 2019, doi: 10.1109/TIM.2019.2900883.

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- X. Fan, S. Yang, L. Benhui, J. Liu, Y. Zhang and Z. Wang, "Normalization for FDS of Transformer Insulation Considering the Synergistic Effect Generated by Temperature and Moisture," in IEEE Access, vol. 8, pp. 202013-202021, 2020, doi: 10.1109/ACCESS.2020.3036418.
  - N. D. Jacob, B. Kordi and S. S. Sherif, "Assessment of Power Transformer Paper Ageing Using Wavelet Texture Analysis of Microscopy Images," in IEEE Transactions on Dielectrics and Electrical Insulation, vol. 27, no. 6, pp. 1898-1905, December 2020, doi: 10.1109/TDEI.2020.009086.
  - J. Liu, H. Zhang, C. Geng, X. Fan and Y. Zhang, "Aging Assessment Model of Transformer Insulation Based on Furfural Indicator under Different Oil/Pressboard Ratios and Oil Change," in IEEE Transactions on Dielectrics and Electrical Insulation, vol. 28, no. 3, pp. 1061-1069, June 2021, doi: 10.1109/TDEI.2021.009530.
  - R. Song, W. Chen, D. Yang, H. Shi, R. Zhang and Z. Wang, "Aging Assessment of Oil–Paper Insulation Based on Visional Recognition of the Dimensional Expanded Raman Spectra," in IEEE Transactions on Instrumentation and Measurement, vol. 70, pp. 1-10, 2021, Art no. 6007110, doi: 10.1109/TIM.2021.3075525.
  - S. Y. Matharage, Q. Liu, Z. D. Wang, G. Wilson and C. Krause, "Aging assessment of synthetic ester impregnated thermally non-upgraded kraft paper through chemical markers in oil," in IEEE Transactions on Dielectrics and Electrical Insulation, vol. 25, no. 2, pp. 507-515, April 2018, doi: 10.1109/TDEI.2018.006833.
  - Rao, U.Mohan & Jarial, R.. (2019). Measurement of Transformer Solid Insulation Degradation Using Dilatometry and X-ray Diffraction Analysis. Measurement. 131. 701-705. 10.1016/j.measurement.2018.09.024.



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**A STUDY OF STRESS LEVEL OF STUDENTS IN GOVERNMENT UNIVERSITY: A SYSTEMATIC REVIEW LITERATURE**

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*Stress is physical, mental, and emotional tension on a person. Stress is a part of life but in students, there are many causes behind their stress level. The transition from school education to university education, new teaching methods, an environment of the university, language barrier, educational loan. University education is a very important turning point in an individual's life; this education plays a very crucial role in their career. To work out the key issues and gaps within the current academic research, this paper conducted a scientific review of educational research papers available theoretical, applied, and empirical to supply a summary of stress level of students, academic stress level, the stress level of male and female students and causes of stress among university students. The result expresses that the present literature reports four key groups of topics: stress level of students, the academic stress level of students, the relation between stress level and gender also, and causes of stress. Still, during a promising phase of research, the issues covered in literature means a level of stress among students is increasing day by day due to some causes or factor and its effect on students. The selection of research strategies is moreover restricted to range and intensity. This look contributes to expertise the to be had studies stress level among university students and finding research gaps for future study.*

**KEYWORDS:** *Stress, Stress level, academic stress level, causes of stress, Male and Female students.*

**INTRODUCTION**

Every Human's life is full of stress so that the present century is called the stress era (Amir, Esfandiar, Maryam, 2015). Stress is one of the most important factors that affect the well-being of the individual and also affect their health. Stress means pressure; stress can be physical, emotional, and psychological (Bruce & Robert, 2006).

In 19<sup>th</sup>-century psychologist, J.C. Colman wrote in his book – “19<sup>th</sup> century was the era of progress while the 20<sup>th</sup> and 21<sup>st</sup> century is the era of anxiety”. Several incidents in a person's life lead to negative emotions like anger, frustration, and nervousness that further develop stress in an individual. It can lead to severe health conditions. Academic stress is mental distress concerning some frustration associated with academic failure (Gupta and Khan, 1987). Academic stress is a very serious issue among university students parental pressure for better academic performance is the most responsible factor (Anoushka Thakkar, 2019). Academic stress is a mental-emotional pressure that comes due to the demands of college life. It may come from new teaching methods, language barrier, vat syllabus, assignment, etc. (B. Razia, 2016). In India, the education structure is workbook oriented which require long hour studying and no scope for extra activity (Yashwant Kumar Nagle and Usha Sharma, 2018). Student's stress is unavoidable which is often seen in their lives. Postgraduate students were easily targeted by stress than the graduate students (Mazumdar, Gogoi, Buragohain and Haloi, 2012). Graduate students are more stressed than undergraduate students (Darcy A. Keady, 1999).

Post-graduate studies are very stressful that may affect the academic performance, physical and mental wellbeing of students (Abriham, Andualem, Alemu, and Yohannes, 2018). In terms of academic achievements, stress was higher in female students than male students (Asaduzzaman, Mohiuddin, Ahmned and Bhyiyan, 2019). Girls have higher stress levels than male students (Kakoli Ghosal, Abhiram Behera, 2018).

**Stress, Stress level among students, academic stress level, causes of stress, male and female students stress level among university students.**

Various numbers of previous studies have been done on to stress level of students, academic stress level, male and female students stress level, causes of stress among university students. A maximum number of researchers have come across different surveys and models to recognize the status of stress among students.

**Stress: An overview**

Stress is the disparity between situational demand and the individual ability to meet those needs (Kakoli Ghosal and Abhiram Behera, 2018). Today's era is a stress era because stress is every human's life, all people experienced stress throughout their life. It is one of the special characteristics of life and its presence in literature in all eras. The reason for the presence of stress is the complexity of human social, personal, and simultaneous interaction of humans with surrounding issues (Amir, Esfandiar, and Maryam, 2015). Stress

means pressure; stress can be physical, emotional, and psychological (Bruce & Robert, 2006). 6.23% of Indian students are committing suicide every day due to stress and this reinforced by parents and teacher because every parent need their child became brilliant in academic performance as well as extra curriculum activity also (Yashwant Kumar Nagle and Usha Sharma, 2018). Kendall & Hammen "stress can occur in individuals when their demand is increasing and they cannot meet these situational demands. Stress means a physical and emotional factor that causes body and mental disorders and also generates disease in the body (Archana Kumari and Jagrati Jani, 2014).

**Academic stress level: An overview**

Academic stress among students has increased rapidly due to high parental expectations for a good grade and a competitive environment. Its effect on the individual, parents, and society also. The majority of students are not able to cope because of the heavy syllabus, the parental expectation among students leading them to mental health issues like depression, anxiety, and suicide. (Yashwant Kumar Nagle and Usha Sharma, 2018). (K. Jayasankara Reddy, Karishma Rajan Menon and Anjana Thattil, 2020) in their study, they reported that Academic stress among students is different gender-wise as well as stream-wise. (Fatima Al Rasheed, Atta Abbas Naqvi, and Niyaz Ahmad, 2020) in their research, they suggested that the majority of students have stress because of stress and most students perceive a moderate level of stress. Stress is rise among medical students because of academic pressure (Madiha Ali, Sidra Masud Qureshi, 2015). Academic-related stress among students because of higher learning of education, adopt new educational and social environments (Malarvili and Saroja, 2018). Academic stress is a common phenomenon that students experience during their professional's studies. And nowadays stress is an issue across the world because of exam burden, tests, different educational systems, demanding courses, and thinking about their future and worry (Nur Hamizah, Alavi Masoumeh, Seyed Abolghasem, and Ahmadi Atefeh, 2018). Academic stress is connected with two elements demands and constraints. Demand means something you desired but somehow you lose something and constraints prevent students from what they desire (Lovely Joseph Pullokarar, 2018). Medical students were in high mental distress and it's related to academic pressure (Syeda Rubaba Azim and Mukhtiar Baig, 2019).

**Stress level among students: An overview**

Students' stress levels rise with the high level of education (Shiny George, Biju Baby Joseph, 2018). High-stress levels and unhealthy behavior are correlated with each other; unhealthy behavior i.e. decreased quantity of sleep and diet (Britz Jacqueline and Pappas Eric, 2021). According to Priyadarshini and rubeena, 2016, their study they found that first-year engineering students have more stress than last year's engineering students because final year students can manage their stress and anxiety in a better way rather than first-year students. Medical students have higher stress levels compare to other populations and between males and females, because of high stress among medical students intake alcohol, and mental health problems (Jenny Firth, 1986).

**The stress level of male and female students: An overview**

(B.Razia, 2016) in their study about the Academic stress of adolescents in government and private schools, they suggested that females have high-stress levels than male students.

In an academic career, stress is more effective for female students (Rabbani and Pourrajab, 2014). According to Sulaiman, 2009, their study they reported that stress among female students is higher than male students because of their emotional character in the environment. Financial problem and academic stress there are two major stressors among female students (Mazumdar, 2012). According to Garrett, 2001, Female students are more stressed than male students there is some reason behind i.e. financial problems, fear of failing in examination, examination pressure, break up in their relation. Male and female students' stress levels are different (Amr, El Gilany, and El-Hawary, 2008).

**Causes of stress: An overview**

Stress is an unavoidable phenomenon in every student's life due to several reasons such as tests, assignments, fear of failure, financial problems, projects, and fear of the future (Mazumdar, Gogoi, Buragohain and Haloi, 2012). Self-efficacy, faculty and administration, workload, performance pressure, social stressors, lack of confidence, language barrier, amount of assigned classwork, lack of time for relaxation, vast syllabus, examination, financial responsibilities, lack of home atmosphere (Zeyad, Abdulmohsen, Mohammed, Saleh, 2013). Academic workload and time management are major causes of stress among students. Fear of failing, Lack of confidence, rules and regulation of school, amount of classwork, the difficulty of classwork, lack of communication, examination, and grade, working while studying, lack of time for relaxation. There are very stressful factors of stress. It should be characterized as homogenous in terms of different –different backgrounds of education ethnicity and sociocultural parameters (Argy Polychronopoulou and Kimon Divaris, 2005). At the university level, there may be stressors like course/syllabus load, financial problems, relationships with

classmates, overcrowded lecture halls, semester system, anxiety; employment requirements affect the academic performance (Spielberger, 1983; Barker, 1987; Ongori, 2007; Fair Brother and Warn, 2003).

Some of the causes of stress among youth like Finance, academics, relationship, career, time management, lack of job security (Dr. Deepti Bhargava and Hemant Trivedi, 2018). Relationship factors, personal factors, academic factors, and environmental factors are some factors that cause stress among students (George and Patrick, 2017). Peer pressure, family problem, extracurricular, cost of living, classroom environment, inadequate support, hostel facility, financial standing, result, final exam, campus rules these are some causes of stress among pharmacy students (Peter, Abdul, Ramadan, 2017). College students experience high stress because of various causes i.e. Lack of preparation, lack of needed information, and their study style (Archana Kumari and Jagrati Jani, 2014). College students have stress due to academic pressure and transition from school education to university education they cannot adjust new social environment (Sadananda Reddy, Prasad Reddy, and Dharma Reddy, 2014). Social related stress living away from home, lack of time for relaxation, personal physical health, difficulty in making friends. Financial-related stress financial responsibility- living expenses, transportation, and current debt loan. Clinically related stress transition from pre-clinical to clinical studies, confidence in own clinical decision making. Academic-related stress lots of work, communication with teachers, rules, and regulation of college (Alyssa Hayes, Jay N. Hoover, Chandima P. Karunanayake, and Gerald S. Uswak, 2017).

## CONCLUSION

Now a day's stress is the most complex and important topic around the world and it's also a threat to our bodies and health. The reason for this stress is academic pressure like an exam, vast syllabus, university environment, language barrier, and transition from school education to university education; communication with the teacher, higher learning of education. Social stress like, change in living status, getting married, loss of job, living away from home, lack of time for relaxation, personal physical health, difficulty in making friends. Financial stress like heavy fees of university, financial responsibility, living expenses, transportation, current debt loan. Stress is considered daily in the 21<sup>st</sup> century. Stress is continuous and increasing day by day but a high level of stress affects the body. The current study systematically reviewed the literature on stress, stress level of students, stress level among male and female students, academic stress level among students, and causes of stress were discussed. The study reviews suggested that stress is a part of daily human life but in students, there are several factors responsible for stress i.e. academic social, environmental factors. Stress is different in male and female students because they have different characters. Stress is increasing in higher education.

## REFERENCE

- Al Rasheed, F., Naqvi, A. A., Ahmad, R., & Ahmad, N. (2017). "Academic stress and prevalence of stress-related self-medication among undergraduate female students of health and non-health cluster colleges of a public sector university in Dammam, Saudi Arabia". *Journal of pharmacy & bioallied sciences*, 9(4), 251.
- Al-Sowygh, Z. H., Alfadley, A. A., Al-Saif, M. I., & Al-Wadei, S. H. (2013). "Perceived causes of stress among Saudi dental students". *King Saud University Journal of Dental Sciences*, 4(1), 7-15.
- Ali, M., Asim, H., Edhi, A. I., Hashmi, M. D., Khan, M. S., Naz, F., & Jehan, I. (2015). "Does academic assessment system type affect levels of academic stress in medical students? A cross-sectional study from Pakistan". *Medical education online*, 20(1), 27706.
- Bhargava, D., & Trivedi, H. (2018). "A study of causes of stress and stress management among youth". *IRA-International Journal of Management & Social Sciences*, 11(03), 108-117
- Britz, J., & Pappas, E. (2010). "Sources and outlets of stress among university students: Correlations between stress and unhealthy habits". *Undergraduate Research Journal for the Human Sciences*, 9(1).
- Firth, J. (1986). "Levels and sources of stress in medical students". *Br Med J (Clin Res Ed)*, 292(6529), 1177-1180.
- George, S., & Joseph, B. B. (2018). "Level of stress and its causes among 1st-year dental students-A cross-sectional study". *National Journal of Physiology, Pharmacy and Pharmacology*, 8(11), 1518-1521.
- Ghosal, K., & Behera, A. (2018). "Study on prevalence of stress in medical students". *J Res Med Dent Sci*, 6(5), 182-18.

- Hasan, A. N., Islam, M. A. U., Rahman, S., Nishi, Z. M., Hossain, M. J., Gorapi, M. Z. H., & Bhuiyan, M. A. (2019). "Level of Stress, Predisposing Factors and Status of Mental Health among Pharmacy Students of a Private University of Dhaka, Bangladesh: A Cross Sectional Study". *Health*, 11(02), 222.
- Hayes, A., Hoover, J. N., Karunanayake, C. P., & Uswak, G. S. (2017). "Perceived causes of stress among a group of western Canadian dental students". *BMC research notes*, 10(1), 1-9.
- James, P., Jamshed, S., Elkalmi, R., AlShami, A., Nor, A., Kabir, F., & Shamsudin, S. (2018). "Causes of stress and management approaches among undergraduate pharmacy students: Findings from a Malaysian public university". *Archives of Pharmacy Practice*.
- Keady, D. A. (1999). "Student Stress: An Analysis of Stress Levels Associated with Higher Education in the Social Sciences".
- Kumari, A., & Jain, J. (2014). "Examination stress and anxiety: A study of college students". *Global journal of multidisciplinary studies*, 4(1), 31-40.
- Mazumdar, H., Gogoi, D., Buragohain, L., & Haloi, N. (2012). "A comparative study on stress and its contributing factors among the graduate and post-graduate students". *Advances in Applied Science Research*, 3(1), 399-406.
- Nagle, Y. K., & Sharma, U. (2018). "Academic stress and coping mechanism among students: An Indian perspective". *Journal of Child Adolescence Psychology*, 2(1), 6-8.
- Owusu, P., & Essel, G. (2017). "Causes of students stress, its effects on their academic success, and stress management by students".
- Polychronopoulou, A., & Divaris, K. (2005). "Perceived sources of stress among Greek dental students". *Journal of dental education*, 69(6), 687-692.
- POURRAJAB, M., RABBANI, M., & KASMAIENEZHADFARD, S. (2014). "Different Effects of Stress on Male and Female Students". *Online Journal of Counseling & Education*, 3(3).
- Pullokarar, L. J. (2018). "Academic stress among college students in Kerala, India". *International Journal of Scientific and Research Publications*, 8(11), 299-330.
- Ramachandiran, M., & Dhanapal, S. (2018). "Academic Stress Among University Students: A Quantitative Study of Generation Y and Z's Perception". *Pertanika Journal of Social Sciences & Humanities*, 26(3).
- Razia, B. (2016). "Academic stress of adolescents in government and private schools". *International Journal of Scientific Research*, 5.
- Reddy, K. J., Menon, K. R., & Thattil, A. (2018). "Academic stress and its sources among university students". *Biomedical and Pharmacology Journal*, 11(1), 531-537.
- Shahsavarani, A. M., Azad Marz Abadi, E., & Hakimi Kalkhoran, M. (2015). "Stress: Facts and theories through literature review". *International Journal of Medical Reviews*, 2(2), 230-241.
- Sharma, B. (2018). "A Study of Stress of M. Ed. Students about Dissertation in M. Ed."
- Yasarturk, F., Akyüz, H., Karatas, I., & Turkmen, M. (2018). "The relationship between free time satisfaction and stress levels of elite-level student-wrestlers". *Education Sciences*, 8(3), 133.
- Zegeye, A., Mossie, A., Gebrie, A., & Markos, Y. (2018). "Stress among Postgraduate Students and Its Association with Substance Use". *Journal of Psychiatry*, 21(3).

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**A STUDY ON CUSTOMER PREFERENCE TOWARD RETAIL SHOPS IN MADURAI**

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**Dr. N. Dharani**Assistant Professor, St. Antony's College of Arts and Sciences for Women, Dindigul, Tamil Nadu,  
India**ABSTRACT**

*Customer may buy goods from Retail Shops. Retail is one of the fastest growing fields today in India. Customer have to buy their products easily and conveniently through retail shop. It is confined to factors influencing the customer behaviour, their level of satisfaction, level of problem of the respondents to analyze the significant relationship between socio-economic factors and level of satisfaction and level of problem faced by the customer while purchase their products. The area of study is extended to Madurai only. Data have been collected from 75 retail customers in Madurai. Customer describe that they layout of the department stores should be improved. Packing must be in improved.*

*"Retail" originates from the French word retailer, which means 'to cut the piece off' or to break bulk. Retailer is someone who cuts off or sheds a small piece from something. Retailing is the set activities that market the products or services to final consumers for their personal or household use. It does this by organizing their availability on a relatively large scale and supplying them to customers on a relatively small scale. Retailer is a person or Agent or Agency or Company or Organization who is instrumental in reaching the goods or services to the End User or Merchandise or Services to the End User or Ultimate consumer.*

*Retailing is one of the oldest businesses of mankind and almost close to settled agriculture, as its origins can be traced back to the time when exchange of goods started taking place. Any exchange (even barter) as in prehistoric times represent retailing as there was a direct interaction with the consumer. As the development of human civilization took place and business as an entity took birth, the direct producer to the consumer interaction gave way to a business – to consumer interaction. Any business to consumer interaction in the present context can be interaction in the present context can be termed as retailing therefore encompasses all formats of direct marketing too, in its broader sense.<sup>1</sup>*

*As retailing is a consumer interfacing activity and acts as a last link in the supply chain, it is where data generated about the consumer about products and services could be of immense help for members across the supply chain. As product be and service categories as well as proliferate, the data*

*That could be collected increase by leaps and bounds, if the number of consumers that retailers interact with increases in order to make meaningful inferences from the same. Traditional retailing became a professional and widespread enterprise, personal memory started to fail and therefore, a need for technology to record data for analysis emerged. Information technology, therefore, is one of the greatest enables of efficient and effective retailing.<sup>2</sup>*

*Retail store is a large departmental retail establishment offering a relatively broad and complete stock of dry groceries, fresh meat, perishable products and dairy products supplemented by a variety of convenience, non-food merchandise and operated primarily on a self-service basis.*

*Retails are the sale of goods and services from individuals or business to the end-user. Retailers are part of an integrated system called the supply chain. In simple term retailer purchases goods or products in large quantities from manufactures directly or through wholesaler, and then sell smaller quantities to the consumer for profit. Retail is an emerging sector in India so the marketers are influencing the customer by offering them in a variety of product in different ways, at various locations, in various forms resulting in emergence of different retail formats. Customers are highly influenced by image of the retail outlet, its attributes, product range, variety, services, employee's behaviour, decor, music and marketing strategies. Retailing can be done in either fixed location like stores or markets, door-to-door or by delivery. There are two different types of retail outlets operate in the market first one is organized retail which refers to the sectors undertaken by licensed retailers, that is, those who are registered for sales tax, income tax, etc. This includes the corporate retail formats of the exclusive brand outlets, hypermarkets, supermarkets, departmental stores and shopping malls. Another is unorganized retail which is traditional formats of low-cost retailing for example, hand cart and pavement vendors, mobile vendors, local kirana shops, general stores, convenience stores, hardware shop, small retail business in apparel, electronics, food etc. new retail formats are growing at a rapid pace in India. The retail sector is controlled by traditional and modern retail formats. These formats have emerged and developed with the growth of population in India. Organized retailing formats. There remains a need among*

India business to understand the changing behaviour of customers towards shopping in organized retail outlets. The remains a need among Indian business to understand the changing behaviour of customers towards shopping in organized retail outlets. The remains a need among Indian businesses to understand the activities, interest, satisfactions', motives and lifestyles have contributed immensely to the growth of organized retail outlet catering to varied needs of the customers. The purchasing pattern of the customer has changed recent days. Customer's buying behaviour is influenced by social factors, such as group to which the customers along and social status. In a group, several persons may interact to influence the purchase decision. Change in consumption pattern is due to Lifestyle, income of middle angel population in big cities is rising rapidly and easier access to credit. Drastic change in the behaviour of the consumer, in view of growing economy, earning capacity, less time and fast track life, have to face emerging challenge for the organized in India. Among the different type of retail outlets available, a customer can choose any outlet confidently different this aspect, the researcher mode a study on customer preference toward retail shops.<sup>3</sup>

**Key Words:**

### RETAIL PRICING:

The pricing technique used by most retailers is cost – plus pricing. This involves adding a mark up amount (or percentage) to the retailer's cost. Another common technique is suggested retail pricing. This simply involves charging the amount suggested the manufacturer and usually printed on the product by the manufacturer.

### Customer service:

Customer service is the “sum of acts and elements that allow consumers to receive what they need or desire from your retail establishment. “ It is important for a sales associate to greet then a cu customer and make himself available to help the customer find whatever he needs. When a customer feel welcomed, important, and make sure he leaves the store satisfied.

### Objectives of the Study

- To identify the level of satisfaction of customers of retail shops in Madurai.
- To review the problem faced by the customers regarding retail shops and to offer suitable suggestions to overcome them.

### Scope of the Study

The present study is limited to study the level of satisfaction of consumer in Madurai. The problem of these consumers are assessed on the basis of availability of the goods, assured quality of the goods, good customer service, good shopping experience and communicating opportunities. The problem mainly focused from the purchasing side. The findings of the study many help to overcome from these problems.

### Sampling Design

By adopting convenient sampling the researcher has selected 75 samples from the study area. As the sample is a non-random sampling, universal application of the results of the study is not possible.

### Hypotheses of the Study

- There is no significant relationship between socio-economic factors and the level of satisfaction.
- There is no significant relationship between socio-economic factors and the level of problem.

### Age

Age is the one of the phases in the life time measured in terms of years. When the age increases, the experience of the individual also increases. The increased experience enables an individual to be more selective in his choice. Hence, age plays an important role in talking a wise decision.

**Table – 1: Age – wise classification of the Respondents**

S.No	Age	No. of Respondents	Percentage
1	Upto 20 years	31	41
2	20 to 40	34	46
3	40 to 60	7	9
4	Above 60	3	4
	Total	75	100

The above Table - 1 shows that out of 75 respondents, 34 (46 percentage) of the respondents belong to 20 to 40 years of age group, whereas 31 (41 percentage) customer belong to 20 years of age group, 7 ( 9 percentage) belong to 40-60 categories and 3 (4percentage) of the respondents belongs to the age group of above 60 years.

### Gender

The self-image and life style may vary among gender. Gender has a physical identity. Gender means either of two main group like male and female. The following Table shows gender – wise classification of retail shops in the Madurai District.

**Table – 2: Gender – wise Classification of the Respondent**

S.No	Gender	No. of Respondents	Percentage
1	Male	37	49
2	Female	38	51
	Total	75	100

The above Table - 2 shows exhibits that out 75 respondents, 38 (51 percentage) sample respondents are Females category and 37 (49 percentage) respondents to Males category. It may concluded that male and female respondents are equal and both of them are equally visiting retail shops.

### Educational Qualifications

Today education qualification is a must for every person take basic knowledge about the society where they live in and also to create better communication with others. Keeping this point in view the responds were categorized into five categories on the basis of education like Illiterate, School, Graduate, and Post graduate and Professional. The following Table -3 shows that educational of the customers in Madurai.

**Table – 3: Education – wise classification of the Respondents**

S.No	Education	No. of Respondents	Percentage
1	Illiterate	20	26
2	School	19	25
3	Graduate	27	36
4	Post-Gradate	5	7
5	Professional	4	6
	Total	75	100

The above Table - 3 that out of 75 respondents, 27 (36 percentage) respondents have education upto graduate level, 20 ( 26 percentage) respondents are Illiterate, 19 (25 percentage) respondents have education are educated upto school level and only less number of respondents (13 percentage) have higher education qualification.

It may be concluded that majority the respondents (36 percentage) who come to the retail shops have education only upto UG level.

### Monthly Income

Income is one of the major determinants of one's socio-economic in the society. The following Table -4 exhibits the annual income of the respondents.

**Table – 4: Monthly Income – wise classification of the Respondents**

S.No	Income	No. of Respondents	Percentage
1	Less than Rs. 20,000	31	41
2	Rs. 20,000 to Rs. 40,000	21	28
3	Rs. 40,000 to Rs. 60,000	11	15
4	Above Rs. 60,000	12	16
	Total	75	100

The above - 4 table shows that out of 75 respondents, 31 (41 percentage) respondents Annual Income is less than Rs. 20,000, 21 (28 percentage ) of the respondents annual income is between Rs. 20,000 – Rs. 40,000 and 12 ( 16 percentage) respondents annual income is Rs. 60,000.

Most of the respondents prefer the customers (41 percentage) have their income between the less than Rs. 20,000 per annum.

### Opinion and Level of Satisfaction

**Table – 5: Level of Satisfaction**

Factors	Particulars	Low Level	Medium Level	High Level	df	Table value (0.05)	Chi – Square value	Result
Age	Below 40 years	31	62	23	2	5.99	0.058	Significant
	Above 40 years	3	19	2				
Gender	Male	15	45	12	2	5.99	0.988	Significant
	Female	19	46	13				
Education Qualification	Below Graduate	6	24	4	8	0.05	0.049	Significant
	Graduate	7	15	7				
	Above Graduate	4	6	2				
Monthly Income	Below Rs. 40,000	12	30	9	8	0.05	0.434	Insignificant
	Above Rs. 40,000	5	15	4				

From the above Table – 5 defines level of satisfaction and socio economic factors of respondents. The analysis of respondents based on Age, Gender, Education Qualification and Monthly Income of the respondent. From the above Table - 5 there is significant relationship between Age, Gender, Education Qualification and level of satisfaction. There is insignificant relationship between Monthly Income and level of satisfaction.

**Table – 6: Opinion and Level of Problem**

Factors	Particulars	Low Level	Medium Level	High Level	df	Table value	Anova Value	Result
Age	Below 40 years	31	72	23	6	0.05	0.058	Insignificant
	Above 40 years	3	19	2				
Gender	Male	15	45	12	2	0.05	0.988	Insignificant
	Female	19	46	13				
Education Qualification	Below Graduate	6	25	4	8	0.05	0.049	Significant
	Graduate	7	15	6				
	Above Graduate	4	6	2				
Monthly Income	Below Rs. 40,000	12	30	9	8	0.05	0.434	Insignificant
	Above Rs. 40,000	5	15	4				

From the above Table – 6 defines level of problem and socio economic factors of respondents. The analysis of respondents based on Age, Gender Education Qualification and Monthly Income of the respondent. From the above table there is significant relationship between Age, Gender, Education Qualification and level of problem. There is insignificant relationship between Monthly Income and level of problem.

### SUGGESTIONS

- The products should be sold at reasonable price.
- Place of the payment for the purchases should get in a single particular place to avoid the high consumption of time.



- 
- They layout of the departmental stores should also be improved.
  - The parking facility for the vehicles should be improved.
  - The quality of packing material is must to avoid leakage of products.
  - The facility of the door delivery should be improved to avoid more faulted products.
  - The quality of the products should be increased to avoid the duplicate trade mark.
  - The services rendered to the consumers should be enhanced.

**CONCLUSION**

The present study has been made with an attempt to study customer preference towards retail shops in Madurai. This study will be helpful for the future researchers for doing their research work relating to retail shops in different angles. The findings of the study and suggestions given in the study will be useful to the retailers of household items in retail shops. It is concluded that in the present day competitive world retailers must take necessary steps to attract more number of customers to their shops. They should improve their service to enhance the number customers.

**REFERENCE:**

1. Kumar Siva. A. Retail Marketing, A-45, Naraina, Phase I, New Delhi – 110 028, 2007 1- 5 pp: 1-3.
2. Nageshkumar.M “Success of Retail Marketing in India” National Level Seminar p.no: 13-15
3. Sunil Atulkar. Mr. “A Review of customer preference towards organized retail stores” – ISSN: 2320-8236 Volume:2, Issue:3 July – September 2014.

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**A STUDY ON CUSTOMER SATISFACTION AND PREFERENCE TOWARDS OTT MEDIA PLATFORM WITH REFERENCE TO SALEM TOWN**

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**Ms. Umayya Salma Shajahan****INTRODUCTION**

Customer satisfaction refers to the extent to which customers are happy with the products and services provided by a business. Customer satisfaction levels can be measured using survey techniques and questionnaires. Gaining high levels of customer satisfaction is very important to a business because satisfied customers are most likely to be loyal and to make repeat orders and to use a wide range of services offered by a business.

**Customer focused**

Studies carried out by companies like Argos and Cadburys have found very high levels of customer satisfaction. It is not surprising because these companies emphasise market research and marketing as the tools to find out what customers want. Knowing what your customer wants then makes it possible to tailor everything you do to pleasing the customers e.g. providing the goods that customers want, in the packaging that they want, in retail outlets which are convenient to use and well placed.

There are many factors which lead to high levels of customer satisfaction including:

- Products and services which are customer focused and thence provide high levels of value for money.
- Customer service giving personal attention to the needs of individual customers.
- After sales service - following up the original purchase with after sales support such as maintenance and updating (for example in the updating of computer packages).

What is clear about customer satisfaction is that customers are most likely to appreciate the goods and services that they buy if they are made to feel special. This occurs when they feel that the goods and services that they buy have been specially produced for them or for people like them. This relates to a wide range of products such as razors that are designed for ease of use and good quality finish, petrol products that are environmentally friendly and customised to meet the needs of particular types of engines, etc.

**Defining customer satisfaction**

Because the concept of customer satisfaction is new to many companies, it's important to be clear on exactly what's meant by the term. Customer satisfaction is the state of mind that customers have about a company when their expectations have been met or exceeded over the lifetime of the product or service. The achievement of customer satisfaction leads to company loyalty and product repurchase. There are some important implications of this definition:

- Because customer satisfaction is a subjective, non-quantitative state, measurement won't be exact and will require sampling and statistical analysis.
- Customer satisfaction measurement must be undertaken with an understanding of the gap between customer expectations and attribute performance perceptions.
- There should be some connection between customer satisfaction measurement and bottom-line results. "Satisfaction" itself can refer to a number of different facts of the relationship with a customer. For example, it can refer to any or all of the following:
  - Satisfaction with the quality of a particular product or service
  - Satisfaction with an on-going business relationship
  - Satisfaction with the price-performance ratio of a product or service
  - Satisfaction because a product/service met or exceeded the customer's expectations

**Importance of Customer Satisfaction**

- A totally satisfied customer contributes 26 times as much revenue to a company as a somewhat satisfied customer.
- A totally satisfied customer contributes 17 times as much revenue as a somewhat dissatisfied customer.
- A totally dissatisfied customer decreases revenue at a rate equal to 18 times what a totally satisfied customer contributes to a company.

### Functions of Customer Satisfaction

- As business owners, we'd all like to think of ourselves as providers of great customer service. As small business owners in particular, it's quite possibly your biggest differentiator. After all, how often is it that you walk into a national chain restaurant and are greeted by name, handed your favourite drink and made to feel like part of the family?
- But delivering great customer service is also about knowing how to handle problems, respond to and resolve issues — something at which agile small businesses can often excel.
- If customer satisfaction is your goal, then great customer service will get you there. Here are three simple things you can do to embed customer service into your business philosophy and day-to-day operations:
- Listen and learn. Listening is key to effective customer service and it can also help boost your profitability. Here are two ways to prove to your customers that you're listening — and tip on how to make it count.

### IMPORTANCE OF THE STUDY

The Role of improvement in usable bandwidth provided by ISP and CSPs today, coupled with the enhanced visual capabilities of mobile devices, are contributing to the humungous growth in the consumption of video-on-demand or OTT (over the top) content. OTT refers to the practice of delivering media over the internet, bypassing traditional telecom infrastructures such as cable, broadband, and satellite platforms to provide services to the end-user. Customers are especially sensitive to prices.

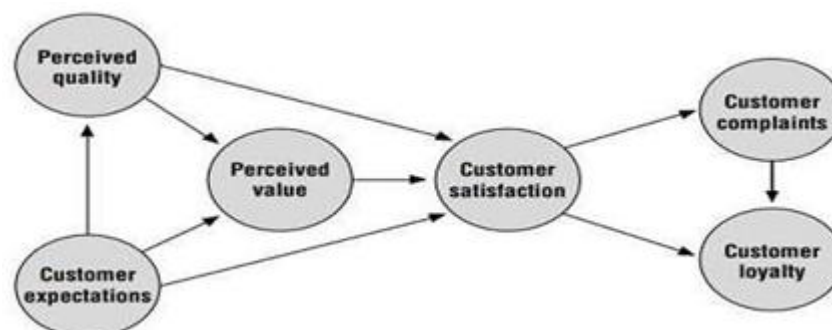
Of all potential considerations, lower monthly rates have the greatest effect on the consumer's decision to subscribe (or not) to a service and too high a cost is primarily responsible for cancelling a subscription. As competing offerings continue to flourish on the market, pricing will increasingly be critical to consumer retention, turnover, product longevity, and success. But do not confuse this with a race to the bottom. Establish a value proposition by pricing the distinction with an entry point that does not turn away interested customers.

### NEEDS OF THE STUDY

It is the study lies in the fact that this study is a sociological analysis of the various ramifications of the impact of Online Streaming services as an important medium of mass communication. The scope of the study enables the consumers to choose the online video streaming services and also to identify the Satisfaction and Preference towards the change in the way of delivery of mass media. It also analyses their preferences on various genres and various streaming applications. The study finds how it effects the climate change and also gives suggestions on how to enhance energy consumption practices

### CONCEPT AND REVIEW

Customer satisfaction is defined as a measurement that determines how happy customers are with a company's products, services, and capabilities. Customer satisfaction information, including surveys and ratings, can help a company determine how to best improve or changes its products and services. An organization's main focus must be to satisfy its customers. This applies to industrial firms, retail and wholesale businesses, government bodies, service companies, nonprofit organizations, and every subgroup within an organization



### CUSTOMER SATISFACTION RESOURCES

R. L. Polk & Co.: Making Every Issue the Only Issue (PDF) Annual customer surveys for R. L. Polk & Co. identified opportunities for improvement in customer contact and issue resolution. By following the same steps for every issue and performing full root cause analysis for 100% of issues, Polk increased operational excellence and improved customer satisfaction. Move from Product to Customer Centric (Quality Progress) "Customer centricity" is about listening to your customers, with a focus on collecting, understanding, and acting on customer feedback and providing tools for easy access to this information.

- Determine your levels of customer satisfaction
- Understand how unsatisfied customers are affecting your bottom line
- Define customer preferences that will improve satisfaction
- Identify ways to increase customer loyalty
- Understand satisfaction levels among your competitors' customers

### RELATED

While individual consumers may not give much thought to why they prefer one product over another, for businesses and marketers who make a living based on consumer demand, it is pretty much a science. In addition to a product's price and its availability, knowing consumer preferences can predict how likely a product is to sell and how much it can be sold for. Preferences vary from one product to another and the components of those products can each affect preference.

### Consumer Preference Introduction

Consumer preference is defined as the subjective tastes of individual consumers, measured by their satisfaction with those items after they've purchased them. This satisfaction is often referred to as utility. Consumer value can be determined by how consumer utility compares between different items. Consumer preferences can be measured by their satisfaction with a specific item, compared to the opportunity cost of that item since whenever you buy one item, you forfeit the opportunity to buy a competing item.

### REVIEW OF LITERATURE

**Sodergard (2013)** executed an experiment to examine the audience's view behaviour on TV and tablets and found that participants tended to watch short videos on mobile devices, but they did not really watch them all the way through; sometimes they just listened to them in lieu of watching. Moreover, findings reveal that they had preferential places for viewing. For example, participants watched videos via tablets at bus stops during their waiting time.

**Repo, Hyvonen, Pantzar and Timonen (2014)** proposed that what participants are concerned the most about in mobile phones for video viewing is the context. In other words, when watching videos on phones, they constantly think about whether their behaviour is pertinent in the social or environmental context (i.e. whether people in the same context felt annoyed or offended). Moreover, they pointed out that the mobile phone audience tends to create the chance of bonding with people through their phone usage, in addition to the purpose of killing time.

**O'Hara, Mitchell, and Vorbau (2014)** paid attention to what role mobile devices play in the family and concluded that their role is highly associated with the foremost goal to facilitate social relationships when users actually long for solitude. They simplified the video viewing process by making it easier for users to save, pause, and resume what they were watching, and this feature allowed users to multitask; they could pull out of their solitude from their mobile device use and quickly get ready to interact with people around them. This feature is vital in family interaction; it enables family members to have some personal space while still keeping each other company.

**Banerjee et al. (2013) and Müller et al. (2015)**, portability and screen size are the two core concerns of users. Among mobile devices, PCs are not as portable as tablets, because they are heavier, bigger, and have a smaller battery. Moreover, phones can barely compete with tablets due to their smaller screen size. Online streaming platforms also often target tablet users and roll out customized applications for them. As a result, all in all, these studies believed that tablets will become the greatest rival of TVs and the dominant device for future audiences.

**Tang, Venolia, and Inkpen (2015) and Banerjee et al. (2009)**, connectivity and high portability are the most striking features where smartphones stand out. While PCs and tablets still demand exterior assistance such as Ethernet or Wi-Fi to connect to the Internet, smartphones can easily connect to it through any fairly accessible 3G or 4G network. On top of that, research has shown that audiences who visited online streaming platforms care about related information (e.g. Facebook's most viewed or YouTube's most rated, comments, critics, etc.) more than the video content itself; consequently, the role of smartphones among mobile devices is in fact more for information gathering than for long-hour video viewing (Tang et al., 2016). Based on the literature discussed above, we pose our first research question as follows.

**Kayana and Yelsma (2016)** noted that the symmetricalist perspective is closer to a zerosum situation; in other words, one medium's emergence would for sure either replace or be replaced by an existing one in terms of

time spent (2000). For example, when TV was introduced into a Canadian town it was found (Schramm, 1961) that kids in the town cut down on the time they had previously used for listening to the radio, and instead they spent more time watching TV. After the VCR came onto the market, a similar phenomenon took place whereby people shifted a certain proportion of time that would have been spent on TV to the VCR (Henke and Donohue, 1989). When MP3 devices became popular, people scale back even more on listening to the radio (Ferguson et al., 2007).

**Newell et al. put it (2016)**, people might alternate between two or several media; they pick one medium over another on the condition that they believe it is more likely to satisfy some specific need(s) of theirs than the another one does, yet people have multifarious needs. As a result, the fact that they use a variety of media simultaneously out of manifold concerns should not be neglected.

**Rubin (2017)** methodically categorized human needs into a few dimensions of gratifications: emotional release, reality exploration, information acquisition, value reinforcement, and companionship; and the results point out that companionship matters to TV viewers more than the other factors.

**Ferguson and Perse (2017)** added social interaction, relaxation, entertainment, and so on to the existing dimension categories that are utilized by our research as well. With the literature review above, we present our second research question.

**Dimmick et al. (2018)** foresaw the chance of the Internet replacing conventional media. In developing the niche theory, they decided to evaluate users' time spent on online news and conventional media news (e.g. radio, TV, and newspapers), and they concluded three possible outcomes. One is exclusion; either emerging media or old media disappear from the market, because their function is no longer needed. Another one is replacement; there are still needs in the market for the function, but one's functions expand and replace all its rivals in the market. The other is partial replacement; neither one can entirely displace the other; as a result, they both co-exist with their own particular segments of users developed.

**Hoplamazian (2018)** investigated the competitive dynamics between mobile devices and conventional media, arguing that developing niches are not merely about differentiated services, but also the abilities to satisfy specific needs users have on the time-space location. Previous studies largely focused on users' gratification and the sum of time spent alone, yet their research took into account "location" and the special traits of each medium (e.g. portability). The research categorized variables into "news types" and "time-space" (e.g. during commutation, at home, and at work) for niche analyses, and they concluded that mobile devices and conventional media each possess their own niches "under particular circumstances." Findings demonstrate that TV news is competitive and popular when it comes to weather forecasts and general news, whereas online news is competitive for sport news.

**Wright, 2017, p. 488; FCC, 2019)** This drastic shift was labelled as compelling and inefficient for the growth of the industry. This was viewed as indicative of the future internet regulation, largely owing to the fact that the FCC is treated as a single authority with the power to legally regulate existing internet networks, and hence, greatly capable of influencing the development of the global Internet industry (i.e., the minimum price set by FCC turns out to be the new market equilibrium price) (Prüfer and Jahn, 2007).

**Schiff (2019)** considers so called open two-sided market mechanism, because there is always a possibility that one market side is accessible for other players. According to Schiff (2003) an open duopoly is well acceptable over a monopoly, because the positive network effects from a joint customer basis will result in an increase in consumers' surplus. On the other hand, in some cases consumers may choose monopoly over a closed duopoly, because the internalization of externalities in monopoly is far better outcome than the increase in price. But there is a chance of experiencing weakened completion in an open platform, which might lead them to merge. Potential merger initiative should be strictly observed because there is always a significant possibility of decrease in consumers' surplus as well as total welfare.

**Gaskins and Jerit (2020)** also proposed that new media might not be the most crucial factor eroding old media's chance of survival. Their study demonstrated that those who claimed they had ditched newspapers and TV news expressed very stiff political preferences and often complained that those old media were under the sway of parties they were against; it was not the Internet, but their political beliefs that pushed them to reject old media.

**Ha and Fang (2020)** agreed with that argument that a complete replacement would not take place soon, in spite of the surging influence of the Internet, because users will find it difficult to change their long-term habits and

preferences within a short period of time. Grounded on the literature discussed above, our third research question follows.

### RESEARCH GAP ANALYSIS

Gap analysis is defined as a method of assessing the differences between the actual performance and expected performance in an organization or a business. The term “gap” refers to the space between “where we are” (the present state) and where “we want to be” (the target state). A gap analysis can also be referred to as need analysis, need assessment or need gap analysis. Research gap is a research question or problem which has not been answered appropriately or at all in a given field of study.

### OBJECTIVES OF THE STUDY

- To study the preference of OTT media platform among the customer
- To study the customers' preference towards OTT platforms
- To study shift of viewers from Traditional Television channels to OTT Video Platforms
- To study the factors affecting viewers to shift from Traditional Television channels to OTT video platforms
- To study the viewers' behaviour over traditional television channels and over OTT Video platforms
- To study the relationship between demographic factors and consumer preferences toward OTT platforms
- To study the Major Shift towards the consumption of old entertainment to new entertainment.

### SCOPE OF THE STUDY

- This research currently only covers the consumer's point of view in terms of the consumption of video on the OTT platforms, thus not taking in to picture at all the channel and the platforms point of view.
- Further research must be conducted with different customers or target audiences and experts in order to understand and integrate the brand's point of view to gain a more consistency and integrated view on OTT platforms.

### DATA ANALYSIS AND INFERENCE

#### DATA ANALYSIS

The term Data analysis refers to the computation of certain measures along with searching for patterns or relationship that exist among data groups. After collection of data has to be processed and analyzed in accordance with the outline laid down for the purpose at the time.

**TABLE NO: 1 RANK THE FOLLOWING APPLICATIONS**

Factors/ Agree level	Highly Satisfied		Satisfied		Dissatisfied		Highly Dissatisfied	
	Res	Per	Res	Per	Res	Per	Res	Per
Netflix	57	38.0%	48	32.0%	20	13.3%	25	16.7%
Prime	66	44.0%	37	24.7%	23	15.3%	24	16.0%
Hotstar	47	31.3%	55	36.7%	27	18.0%	21	14.0%
Voot	45	30.0%	52	34.7%	21	14.0%	32	21.3%
Zee 5	45	30.0%	54	36.0%	24	16.0%	27	18.0%

#### Inference

The above table shows that rank the following applications, 44.0% of the respondents are given first rank to Prime, 38.0% of the respondents are given second rank to Netflix, 36.7% of the respondents are given third rank to Hotstar, 36.0% of the respondents are given fourth rank to Zee 5 and remaining 34.7% of the respondents are given fifth rank to Voot. Majority 44.0% of the respondents are given first rank to Prime

CHART 1: Rank of the Following Network

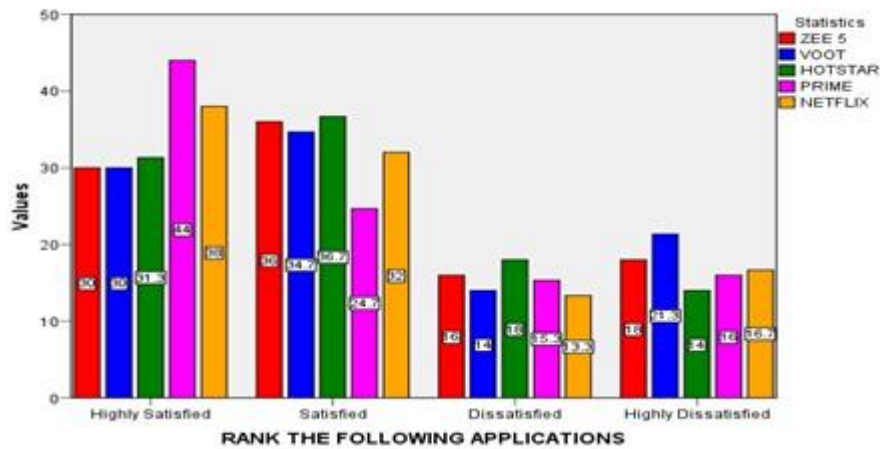


TABLE NO: 2 FACTORS INFLUENCING THE VIEWERS AGREE LEVEL IN OTT PLATFORM

Factors/ Agree level	Strongly Agree		Agree		Disagree		Strongly Disagree	
	Res	Per	Res	Per	Res	Per	Res	Per
It relaxes me	48	32.0%	54	36.0%	28	18.7%	20	13.3%
Feeling of control	45	30.0%	38	25.3%	40	26.7%	27	18.0%
It entertains me	48	32.0%	39	26.0%	33	22.0%	30	20.0%
It passes the time	47	31.3%	52	34.7%	30	20.0%	21	14.0%
To watch when alone	51	34.0%	43	28.7%	35	23.3%	21	14.0%

### Inference

The above table shows that factors influencing the viewer's agree level in OTT platform, 36.0% of the respondents are Agree for it relaxes me, 30.0% of the respondents are Strongly Agree for Feeling of control, 32.0% of the respondents are Strongly Agree for It entertains me, 34.7% of the respondents are Agree for It passes the time and remaining 34.0% of the respondents are Strongly Agree for To watch when alone.

The majority 36.0% of the respondents are Agree for it relaxes me.

CHART NO: 2

FACTORS INFLUENCING THE VIEWERS AGREE LEVEL IN OTT PLATFORM

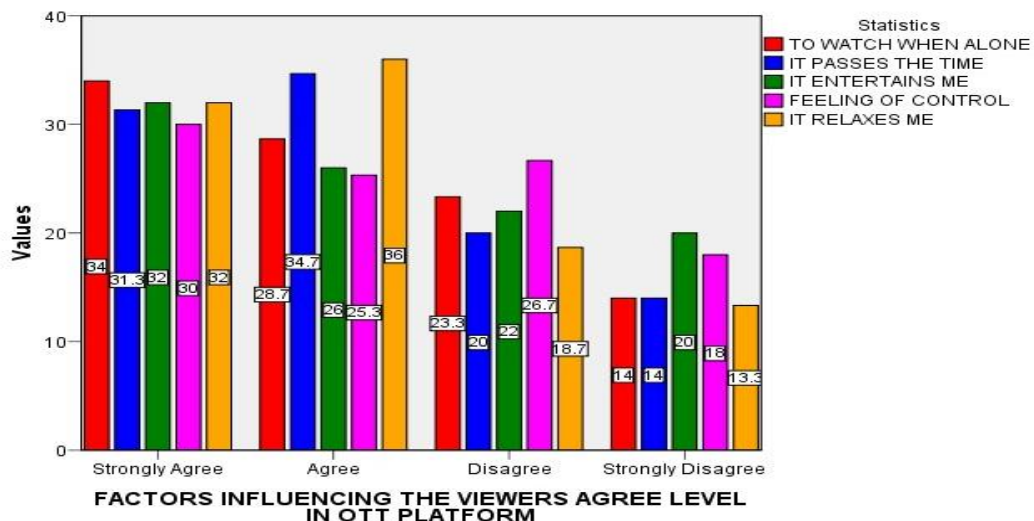


TABLE NO - 3CHI-SQUARE ANALYSIS NULL HYPOTHESIS

**H<sub>0</sub>:** There is no significance relationship between age of the respondents and agree with Indian OTT platform can be an alternative to cinema halls in the future.

### ALTERNATIVE HYPOTHESIS

**H<sub>1</sub>:** There is a significance relationship between age of the respondents and agree with Indian OTT platform can be an alternative to cinema halls in the future.

### Case Processing Summary

	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
AGE OF THE RESPONDENTS * AGREE WITH INDIAN OTT PLATFORM CAN BE AN ALTERNATIVE TO CINEMA HALLS IN THE FUTURE	150	100.0%	0	.0%	150	100.0%

### AGE OF THE RESPONDENTS \* AGREE WITH INDIAN OTT PLATFORM CAN BE AN ALTERNATIVE TO CINEMA HALLS IN THE FUTURE Cross tabulation

Count		AGREE WITH INDIAN OTT PLATFORM CAN BE AN ALTERNATIVE TO CINEMA HALLS IN THE FUTURE				Total
		Strongly agree	Agree	Disagree	Strongly Disagree	
AGE OF THE RESPONDENTS	Below 20 years	42	7	0	0	49
	21-30 years	0	38	15	0	53
	31-40 years	0	0	19	10	29
	Above 40 years	0	0	0	19	19
Total		42	45	34	29	150

### Chi-Square Tests

	Value	df		Asymp. Sig. (2-sided)
Pearson Chi-Square	2.625E2 <sup>a</sup>		9	.000
Likelihood Ratio	270.824		9	.000
Linear-by-Linear Association	127.611 150		1	.000
N of Valid Cases				

a. 2 cells (12.5%) have expected count less than 5. The minimum expected count is 3.67.

### Symmetric Measures

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Ordinal by Ordinal	Gamma	1.000	.000	43.068	.000
Measure of Agreement	Kappa	.709	.045	14.815	.000
N of Valid Cases		150			



- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

### RESULT

Hence the value is less than 0.05, we accept null hypothesis and reject alternate hypothesis. So there is no significant difference between age of the respondents and agree with Indian OTT platform can be an alternative to cinema halls in the future.

**TABLE NO- 4 CORRELATION**

The table shows that the relationships between educational qualification of the respondents and think about OTT advertising.

### Correlations

		EDUCATIONAL QUALIFICATION OF THE RESPONDENTS	THINK ABOUT OTT ADVERTISING
EDUCATIONAL QUALIFICATION OF THE RESPONDENTS	Pearson Correlation	1	.938**
	Sig. (2-tailed)		.000
	N	150	150
THINK ABOUT OTT ADVERTISING	Pearson Correlation	.938**	1
	Sig. (2-tailed)	.000	
	N	150	150

\*\*, Correlation is significant at the 0.01 level (2-tailed).

### NONPARAMETRIC CORRELATIONS

### Correlations

		EDUCATIONAL QUALIFICATION OF THE RESPONDENTS	THINK ABOUT OTT ADVERTISING
Kendall's tau_b EDUCATIONAL QUALIFICATION OF THE RESPONDENTS	Correlation Coefficient	1.000	.911**
	Sig. (2-tailed)	.	.000
	N	150	150
THINK ABOUT OTT ADVERTISING	Correlation Coefficient	.911**	1.000
	Sig. (2-tailed)	.000	.
	N	150	150
Spearman's rho EDUCATIONAL QUALIFICATION OF THE RESPONDENTS	Correlation Coefficient	1.000	.938** .000 150
	Sig. (2-tailed)	.	
	N	150	
THINK ABOUT OTT ADVERTISING	Correlation Coefficient	.938**	1.000
	Sig. (2-tailed)	.000	. 150
	N	150	

\*\*, Correlation is significant at the 0.01 level (2-tailed).

**RESULT**

This is a positive correlation. There are relationships educational qualification of the respondents and think about OTT advertising.

H<sub>0</sub>: There is no significance relationship occupation of the respondents and hours do you spend on OTT platform per month.

**ALTERNATIVE HYPOTHESIS**

H<sub>1</sub>: There is a significance relationship between occupations of the respondents and hours do you spend on OTT platform per month.

**TABLE NO: 5 ANOVA NULL HYPOTHESIS****Descriptive**

OCCUPATION OF THE RESPONDENTS	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
					Lower Bound	Upper Bound			
Daily	48	1.00	.000	.000	1.00	1.00	1	1	
Weekly once	33	1.85	.364	.063	1.72	1.98	1	2	
Weekly twice	39	2.56	.502	.080	2.40	2.73	2	3	
Monthly once	30	3.50	.509	.093	3.31	3.69	3	4	
Total	150	2.09	.999	.082	1.93	2.25	1	4	
Model	Fixed Effects		.382	.031	2.03	2.16			
	Random Effects			.544	.36	3.82			1.141

**Test of Homogeneity of Variances****OCCUPATION OF THE RESPONDENTS**

Levene Statistic	df1		df2		Sig.	
153.094		3		146		.000

**ANOVA**

OCCUPATION OF THE RESPONDENTS	Sum of Squares	df	Mean Square	F	Sig.
Between Groups (Combined)	127.361	3	42.454	290.559	.000
Linear Term Unweighted Weighted Deviation	124.201	1	124.201	850.048	.000
	127.067	1	127.067	869.660	.000
	.295	2	.147	1.008	.368
Within Groups	21.332	146	.146		
Total	148.693	149			

**Robust Tests of Equality of Means<sup>b</sup>****OCCUPATION OF THE RESPONDENTS**

	Statistic <sup>a</sup>	df1	df2		Sig.	
Welch				.		.

- a. Asymptotically F distributed.
- b. Robust tests of equality of means cannot be performed for OCCUPATION OF THE RESPONDENTS because at least one group has 0 variance.

**POST HOC****Multiple Comparisons**

Dependent Variable: OCCUPATION OF THE  
RESPONDENTS

(I) HOURS DO YOU SPEND ON OTT PLATFORM PER MONTH (J) HOURS DO YOU SPEND ON OTT PLATFORM PER MONTH	Mean Difference (IJ)	Std. Error	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Tukey HSD Daily Weekly Weekly twice Monthly once	-.848*	.086	.000	-1.07	-.62
	-1.564*	.082	.000	-1.78	-1.35
	-2.500*	.089	.000	-2.73	-2.27
Weekly once Daily Weekly twice Monthly once	.848*	.086	.000	.62	1.07
	-.716*	.090	.000	-.95	-.48
	-1.652*	.096	.000	-1.90	-1.40

	Weekly twice	Daily	1.564*	.082	.000	1.35	1.78
		Weekly once	.716*	.090	.000	.48	.95
		Monthly once	-.936*	.093	.000	-1.18	-.69
	Monthly once	Daily	2.500*	.089	.000	2.27	2.73
		Weekly once	1.652*	.096	.000	1.40	1.90
		Weekly twice	.936*	.093	.000	.69	1.18
LSD	Daily	Weekly once	-.848*	.086	.000	-1.02	-.68
		Weekly twice	-1.564*	.082	.000	-1.73	-1.40
		Monthly once	-2.500*	.089	.000	-2.68	-2.32
	Weekly once Daily		.848*	.086	.000	.68	1.02
		Weekly twice	-.716*	.090	.000	-.89	-.54
		Monthly once	-1.652*	.096	.000	-1.84	-1.46
	Weekly twice	Daily	1.564*	.082	.000	1.40	1.73
		Weekly once	.716*	.090	.000	.54	.89
		Monthly once	-.936*	.093	.000	-1.12	-.75
	Monthly once	Daily	2.500*	.089	.000	2.32	2.68
		Weekly once	1.652*	.096	.000	1.46	1.84
		Weekly twice	.936*	.093	.000	.75	1.12
Tamhane	Daily	Weekly once	-.848*	.063	.000	-1.03	-.67
		Weekly twice	-1.564*	.080	.000	-1.79	-1.34
		Monthly once	-2.500*	.093	.000	-2.76	-2.24

	Weekly once Daily		.848*	.063	.000	.67	1.03
		Weekly twice	-.716*	.102	.000	-.99	-.44
		Monthly once	-1.652*	.112	.000	-1.96	-1.34
	Weekly twice	Daily	1.564*	.080	.000	1.34	1.79
		Weekly once	.716*	.102	.000	.44	.99
		Monthly once	-.936*	.123	.000	-1.27	-.60
	Monthly	Daily	2.500*	.093	.000	2.24	2.76
once		Weekly once	1.652*	.112	.000	1.34	1.96
		Weekly twice	.936*	.123	.000	.60	1.27
Dunnett T3 Daily		Weekly once	-.848*	.063	.000	-1.03	-.67
		Weekly twice	-1.564*	.080	.000	-1.79	-1.34
		Monthly once	-2.500*	.093	.000	-2.76	-2.24
Weekly once Daily			.848*	.063	.000	.67	1.03
		Weekly twice	-.716*	.102	.000	-.99	-.44
		Monthly once	-1.652*	.112	.000	-1.96	-1.34
Weekly twice		Daily	1.564*	.080	.000	1.34	1.79
		Weekly once	.716*	.102	.000	.44	.99
		Monthly once	-.936*	.123	.000	-1.27	-.60
Monthly once		Daily	2.500*	.093	.000	2.24	2.76
		Weekly once	1.652*	.112	.000	1.34	1.96
		Weekly twice	.936*	.123	.000	.60	1.27

\*. The mean difference is significant at the 0.05 level.

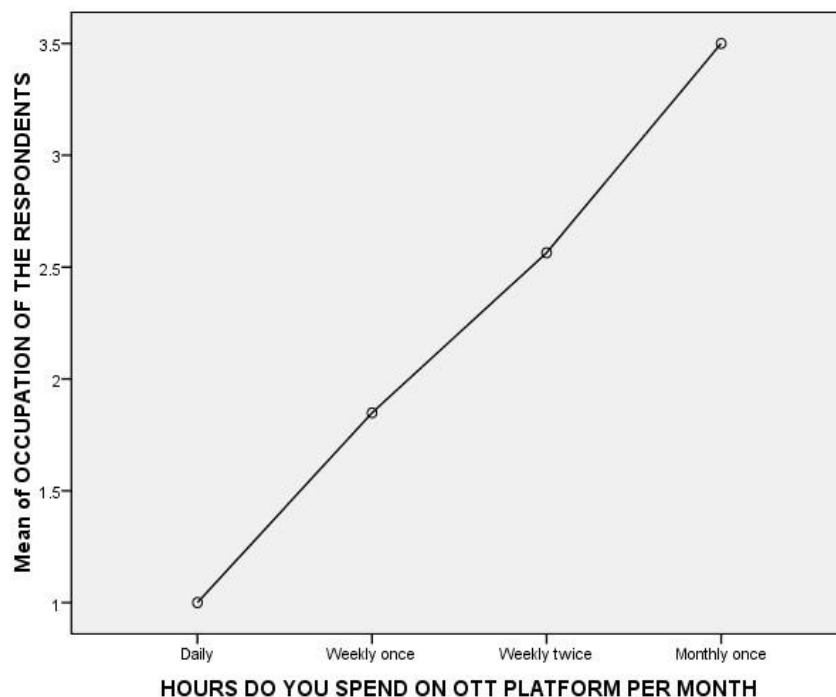
## HOMOGENEOUS

### OCCUPATION OF THE RESPONDENTS

	HOURS DO YOU SPEND ON OTT PLATFORM PER MONTH	N	Subset for alpha = 0.05			
			1	2	3	4
Student-Newman-Keuls <sup>a</sup>	Daily	48	1.00	1.85		
	Weekly once	33				
	Weekly twice	39		1.000	2.56	
	Monthly once	30				3.50
	Sig.		1.000		1.000	1.000
Tukey HSD <sup>a</sup>	Daily	48	1.00	1.85		
	Weekly once	33				
	Weekly twice	39		1.000	2.56	
	Monthly once	30				3.50
	Sig.		1.000		1.000	1.000

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 36.327.

**MEANS****RESULT:**

Since the calculated value is less than the table value. So we accept the null hypothesis. There is no significance relationship between occupations of the respondents and hours do you spend on OTT platform per month.

**FINDINGS**

1. Majority 64.7 % of the respondent are male
2. Majority 35.3% of the respondent are 21-30 years of age group
3. Majority 40.0% of the respondent are qualified in Graduate
4. Majority 32.0% of the respondent are size of the family 5-6 members
5. Majority of 55.3% of the respondents are Unmarried person
6. Majority 36.7% of the respondent are income based on Rs 5,001 to Rs 10,000
7. Majority 35.3% of the respondents are Employee
8. Majority 35.3% of the respondents are mostly use OTT
9. Majority 32.0% of the respondents are known about OTT through Friends recommendations.
10. Majority 32.0% of the respondents are mostly use Mobile phone.
11. Majority 30.0% of the respondents are said Sometimes experience in OTT.
12. Majority 28.7% of the respondents are said Sometimes experience in OTT.
13. Majority 28.7% of the respondents are view Amazon Prime Video.
14. Majority 30.0% of the respondents are agreeing about Indian OTT platform can be an alternative to cinema halls in the future.
15. Majority 30.0% of the respondents select High Quality for amazon prime video.
16. Majority 28.0% of the respondents are said Video completion rate for OTT advertising price.
17. Majority 32.0% of the respondents are spend time on OTT platform per month Daily.
18. Majority 28.0% of the respondents are said 24 x 7 for live streaming events provided per month.

19. Majority 30.0% of the respondents are mostly watch Movies.
20. Majority 24.7% of the respondents are said Non-monetary value.
21. Majority 31.3% of the respondents said OTT advertising is excellent.
22. Majority 24.7% of the respondents are said rebuffing rate for improvement of OTT platform.
23. Majority 36.0% of the respondents said Excellent for waiting for a movie to release on OTT.
24. Majority 42.0% of the respondents are satisfied about television compare with OTT Media.
25. Majority 42.0% of the respondents are Good about social media influencing your online media streaming purchase.
26. Majority 36.7% of the respondents are said strongly agree with the online streaming subscription.
27. Majority 44.0% of the respondents are given first rank to Prime
28. Majority 36.0% of the respondents are Agree for it relaxes me.

### **SUGGESTIONS**

Recently there will be a massive change in media and entertainment industry with major players shifting to OTT platforms. Among all the available video-on demand players Netflix and Hotstar were the widely accepted platforms with Amazon prime a distinct third.

India is a potential market for the growth of OTT platform across the globe. The emergence of JIO is the driving force for the growth of OTT platforms in India. It provided cheap data and since then India became the second country on the basis of data usage. The acceptance of the platforms was remarkable signifying a greater change over in the near future.

The Hotstar had a better reach among all the sections and the acceptance rate is greater compared to other competitors. The homemakers preferred Hotstar among other digital players. Live streaming of sports and Hindi local TV serials were the driving forces which favoured Hotstar.

In this age of digital transformation, it is necessary to constantly upgrade your content and availability with cost effectiveness to reach a wider audience and stay in the hunt. In order to compete with Hotstar, mostly Netflix OTT platform need to invest in more local content in Hindi language to garner a wider audience base.

The media and entertainment industry is going to shift to video-on-demand and this opportunity must be grabbed well by channel providers. This opportunity must be used to revive the sports industry and give it the due respect and importance. The live streaming of all sports tournaments and championships will help the sports garner a good viewership and following. There must be censorship in OTT platforms as well so that nudity and offensive scenes are censored and the mindset of audience is not adversely affected.

### **CONCLUSION**

This study was a novel attempt to analyse the acceptance of the new emerging digital super power media among the masses of Tamil Nadu. This new media platform is a growing rapidly and is gaining momentum as the day passes.

The new generation has moved on from the traditional broadcasting system to the mobile gadgets. The emergence of Reliance JIO and cheaper data with uninterrupted 4G services has helped the OTT platforms grow immensely. The media & entertainment industry has now found a new home.

The survey was conducted among the masses of Salem and the data gathered was segregated, refined and then classified and tabulated for analysis.

The Data which was collected through questionnaires via digital media was analysed in MS Excel.

All the respondents in my study were aware of the OTT platforms and using it as an alternative to cable broadcast and DTH. The acceptance of the platforms was remarkable signifying a greater change over in the near future. Among the people of selected area.

### **ANEXURE**

1. Dasgupta, S., & Grover, P. (2019). Understanding Adoption Factors Of Over-TheTop Video Services Among Millennial Consumers. International Journal Of Computer Engineering & Technology, 10(1). doi:10.34218/ijcet.10.1.2019.008

- 
2. Mann, G., Venturini, F., Murdoch, R., Mishra, B., Moorby, G., & Carlier, B. (2015). Digital Video and the Connected Consumer. Accenture, Retrieved July 30, 2020, from <https://www.accenture.com/us/en/~media/accenture/conversionassets/microsites/documents17/accenture-digital-video-connected-consumer.pdf>
  3. Bhattacharyya, A. (2017, November 27). Video OTT vs DTH players: How Netflix, Amazon Prime, Hotstar cornered Indian market. Financial Express, Retrieved July 30, 2020, from <https://www.financialexpress.com/industry/video-ott-vs-dth-playershownetflix-amazon-prime-hotstar-cornered-indian-market/948816/>.
  4. E&Y. (2016). EY Report 2016: Future of Digital content consumption in India. Retrieved July 30, 2020, from <https://www.exchange4media.com/digitalnews/eyreport-2016-future-of-digital-content-consumption-in-india-63168.html>
  5. Sabharwal, Karan. (2018). Amazon Vs Netflix: Who will win Indian battleground?. Early Years an International Journal of Research and Development. 5. Kochhar & Co. (2016) "India: Changing Trends in Media and Entertainment Industry in India".

## DIGITAL TRANSFORMATION IN TOURISM

**Dr. M. S. Kamalaveni<sup>1</sup>, A Suriya<sup>2</sup>, PS Sakthivel<sup>3</sup> and S. Vignesh<sup>4</sup>**<sup>1</sup>Assistant Professor, Department of Management Studies, Sona College of Technology, Salem<sup>2,3,4</sup>MBA, Sona School of Management, Sona College of Technology, Salem**ABSTRACT**

*The aim of the research is to examine the impact of technology upon tourism. For the purpose of this research a mixed approach was used. Digital innovation is transforming the way we live, work and run businesses it has global impact on economies, sectors and industries. The commencement of the Digital India programme in 2014 led the country into the League of nations that is revamping their economies and governance with the power of technology. Since then, Digital India has affected almost all aspects of our lives, ranging from work, travel, communication to shopping, education and healthcare. It is expected that the tourism sector, and especially the hospitality industry, will rely heavily upon technology in the following years. India has been ranked 51<sup>st</sup> out of 63 countries in the 2017 IMD World Digital Competitiveness ranking. Technology today plays a vital role in shaping the travel industry. With the increase in internet penetration and availability of smart phones India's Travel sector has expanded in the recent years. Among the service sectors in India, the tourism has emerged as one of the major drivers of growth. The rich and cultural and historical inheritance variety in flora and fauna and places of natural beauty spread across the country has enriched tourism in India. The role of new technologies and automation in streamlining the business processes across the value chain thereby canvassing picture of digital travel revolution unfolding.*

*Key words: Tourism, travel industry, digital transformation, technology and tourism etc.,*

**INTRODUCTION**

Travel and Tourism is among the largest service provider industry all over the world. The tourism sector can be categorized into five areas: accommodation, dining, entertainment, transport, and travel services. All of these areas offer services to tourists. This sector aims to develop and promote tourism, retain the image of India as a tourist centric destination and expanding the present tourism products. Tourism all over the world is a great employment generator in different areas like accommodations, transportation, attraction sites, information offices photography etc. It is a significant source of foreign exchange especially in India. Overall, the tourism and travel sector is the one with the largest number of employees worldwide. More specifically, this sector employs over 100 million people and supports 1 in 11 jobs worldwide. Over the next decade, it is expected that this sector will provide 74 million new jobs. The continued growth of this sector worldwide depends on the availability of individuals to meet the demands for additional human capital in terms of knowledge and skills (World Travel and Tourism Council). Tourism is one among the top 10 sectors to attract the highest Foreign Direct Investment (FDI). On 2000 April – 2017 December Tourism sector alone attracted around US\$ 10.90 billion of FDI.

**REVIEWS OF LITERATURE:**

Nayyar A .et all (2018) have reviewed the successes, failures and challenges for the development and use of VR/AR applications to improve existing marketing funnel designs, improving client conversion rates and thus providing the required added value and ROI.

Dolan, R. et all (2019) have examined and identified three unique social practices of complaining on social media – namely, solution seeking, support seeking and social engagement seeking.

Auriga. (2016) has examined that all of the digital transformation predictions have one thing in common: change. Digitalization is creating more opportunities than ever before, but at the same time, it requires a new mind-set and readiness to embrace change.

Lee, K. (2018) has examined the development of IT usage in the tourism industry for the past few years to understand the latest research findings and some of the best managerial applications of IT in the field.

Buhalis, D et all (2008) have related the development of internet changed dramatically the market conditions for tourism organisation to support the interactivity between tourism enterprises for the process of developing, managing and marketing tourism products and destinations.

**OBJECTIVES OF THE STUDY:**

1. To investigate the impact of digital revolution on tourism and travel.



2. To research digital travel tools and technologies
3. To comprehend the tourist industry's economic contribution.
4. To determine the essential characteristics of digital transformation, as well as how they influence new and changing business models.

#### DEFINING THE ECONOMIC CONTRIBUTION OF TRAVEL AND TOURISM:

One of the most important economic activities in most countries around the world is Travel and Tourism. The industry has significant direct economic as well as indirect and induced impact. The following diagram shows the economic contribution of travel and tourism.

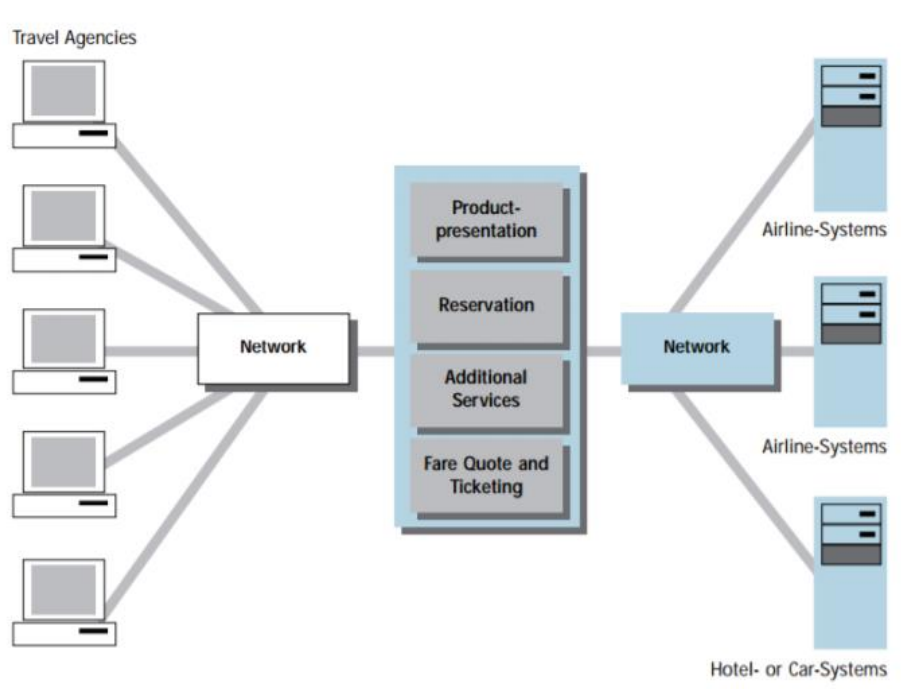


(Source: [www.googleimages.com](http://www.googleimages.com))

#### RESERVATION SYSTEM:

Computerized booking systems have grown rapidly since the 1980s, influencing many aspects of the tourism industry. They first appeared in the early 1960s as a way to provide an effective stock management tool. The tourist industry's tremendous expansion in demand and supply over the last few decades has demonstrated that it can be managed by a single sophisticated computer system. Because they replaced handwritten reservation methods with computerised databases, airlines were the first to implement this technology. International hotel chains and travel operators quickly recognised the advantages of these systems and followed suit. The phrase "reservation systems" is commonly used in a broad sense. Overall, booking system can provide important strategic tools for tourist businesses and destinations, and allow for the creation of autonomous business strategies.

Reservation system are used by the tourism industry as a whole. Their use and continuous development in the system improves the quality and quantity of the services offered to the customers, while at the same time offers measurable advantages to the tourism sector. According the Schulz (1996), computerized reservation systems are for pure logistical functions, namely information exchange. In additions, these systems also perform additional tasks related to the distribution of services, while supporting the transport of goods by eliminating the physical distance between the producer and the intermediaries. Therefore, computerized reservation systems can be described as a distribution support process, as it can be seen from the following figure, which illustrates the architecture of such system.



Architecture of a reservation system (Source: Schulz, 1996, p. 18)

#### GLOBAL DISTRIBUTIONS SYSTEM & BENEFITS

The Global Distribution System was created as a result of the further development of CRS (GDS). The operation of GDS in the tourist industry is depicted in the diagram below. GDSs are a connection that connects the major tourism players with the goal of recognising tourist requirements and providing them with up-to-date information to build an integrated tourist offering. In this way, they contribute to the achievement of a shared objective, which is not only the enjoyment of tourists, but also the long-term prosperity of all tourism Management and distribution of tourism products and services without the use of intermediaries and Suppliers, wholesalers, service providers, and travel brokers are all managed as Keeping track of sales and supply from a financial standpoint to the Information file management and customer information management that Improved financial management and control, as well as higher sales.



Operations of GDS in Tourism Sector (Source: Radulović, 2013, p. 32)

#### TRANSFORMATION OF TOURISM SECTOR DUE TO SOCIAL MEDIA:

In terms of engagement, communication, and customer interactions, some experts suggest that social media is a significant marketing tool for tourism companies. Initially designed for amusement, social networking sites have changed the way people connect with one another, particularly in the hotel and tourist industries, thanks to growing usage of communication technology such as the internet and information. For example, social networking sites like Facebook let registered users to engage internationally and freely with others who share their interests by publishing photos, sharing ideas, interacting with the organisation itself, and communicating with other customers, among other things.

**DIRECT CONTRIBUTION TO GDP:**

Directly dealing with visitor sectors, such as hotels, travel agencies, airline and other passenger transportation services, as well as lodging, food and beverage services, retail commerce, and cultural sports and recreational activities create GDP. It is calculated by subtracting total internal Travel & Tourism spending from purchases made by those businesses within a country (including Imports).

**INDIRECT AND INDUCED IMPACTS:****Indirect Contribution**

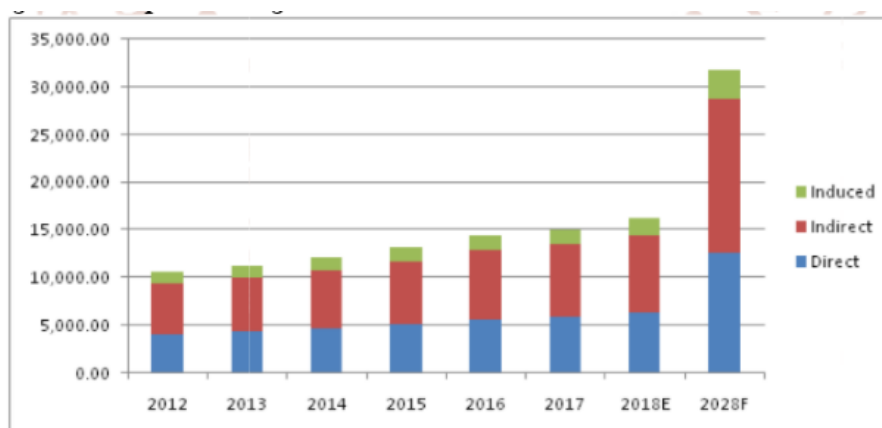
The following three factors are contributors to GDP and jobs:

- **Capital Investment:** It comprises of capital investment by all industries involved in Travel & Tourism. This also constitutes investment expenditure by other industries on particular tourism resources such as new visitor accommodation and passenger transport equipment, as well as restaurants and leisure facilities for explicit tourism use.
- **Government collective spending:** It is Government expenditure for general tourism activity. This comprises of national as well as regional and local government spending. For example, it includes information of visitor, administration services, tourism promotion and other public services.
- **Supply chain effects:** It is the purchase of domestic good and services directly by different industries within Travel & Tourism as inputs to their final tourism output.

**Induced contribution-** The expenditure by those who are directly or indirectly employed by Travel & Tourism.

The following table and graph present the total contribution of travel & tourism to GDP

INDIA(INR, real 2017 prices)	2012	2013	2014	2015	2016	2017	2018E	2018F
Direct	4,149.8	4,413.1	4,736.9	5,181.2	5,676.6	5,943.3	6,392.7	12,678
Indirect	5,255.7	5,589.1	5,999.2	6,561.9	7,189.3	7,517.2	8,096.3	16,057
Induced	1,207.6	1,276.3	1,381.1	1,465.7	1,573.3	1,619.3	1,771.8	3,092.1



(Source: Travel & Tourism Economic Impact 2018)

The above table and graph show the direct, indirect and induced contribution of travel & tourism to GDP from 2012 to 2017, 2018E to 2018F. The graph shows a continuous rising trend including a bright prospect for the industry.

**DIGITAL TRANSFORMATION IN TOURISM:**

The tourist industry is rapidly evolving, with a growing adoption of numerous tools, technologies, and digital platforms, mostly to improve customer experience, establish strong loyalty, and manage businesses more effectively. Mobile apps, social media, Big Data Analytics, artificial intelligence (AI) and machine learning, virtual reality (VR), and augmented reality (AR) are just a few examples (AR).

The findings of a global traveller survey of 13,000 individuals conducted by Travel Port, the leading Travel Commerce Platform, have been released, highlighting the usage of digital tools while planning, booking, and enjoying a journey.

The main results from the global reports are:

➤ **When planning a trip:**

- 81 percent use peer-to-peer reviews when planning a vacation
- 47 percent use voice search, such as Amazon Echo and Google Home, when planning a trip
- Nearly a quarter of those over 60 use a smartphone to plan a trip

➤ **When booking a trip:**

- More than 35% of travellers plan their vacation on their phones.
- 63% of people avoid staying in hotels that charge for Wi-Fi.

➤ **When on the trip:**

- 62% of travellers feel that a good digital experience is important when choosing an airline
- 75 percent of travellers say that digital boarding cards make travelling so much simpler
- At their destination, 47% of travellers rely on their smartphone.

➤ **When at the destination:**

- When travelling, travellers utilise an average of 18 different types of apps.
- On review sites, 78 percent of travellers provide feedback.

**TOOLS AND TECHNOLOGIES FOR DIGITAL TRAVEL:**

The introduction of technology is causing a shift in how firms connect with customers in the travel and tourism sector. As a result, according to a prominent data and analytics firm, travel businesses are using numerous technologies to increase operational efficiencies and fulfil consumer expectations.

Mobile applications, social media, Big data analytics, AI, machine learning, VR, and AR are some of the tools and technologies that are finding widespread use in the tourism industry.

**MOBILE APPLICATIONS:**

The mobile device is used for the majority of consumer contacts. From 2012 to 2017, the figures indicate the global number of mobile phone users. In 2016, there were around 830.4 million mobile phone users worldwide. The number of smart phone users in India is expected to exceed 350 million in the same year, and may reach almost 600 million by 2022.

## Market Share



(Source: [www.researchgate.net](http://www.researchgate.net))

**BIG DATA ANALYTICS:**

Big data has become one of the most important challenges in information management in the digital era, as well as a huge potential in the tourist sector for optimal use of maximum information. Tourism research can benefit from big data. Big data may be used to create intelligent travel experiences. Smart tourism is predicated on the ability of tourist firms to not only collect enormous amounts of data, but also to intelligently store, process, analyse, and apply that data to create tourism operations, services, and business innovation. It enables businesses in the travel and tourism sector to make quick decisions in response to changing client needs.

**ARTIFICIAL INTELLIGENCE:**

In the tourism industry, there has been a dramatic transformation. People could first purchase flights through a travel agent, then through the internet, and finally through online travel agencies. Travelers can now complete their jobs using their smartphones. A chatbot can provide answers to their questions. Artificial Intelligence (AI) plays a vital role in developing personalized offers to consumers. Artificial Intelligence is significantly impacting the tourism industry as various smart systems and chatbots are used by the travel and tourism companies. The travel service providers can provide all the information efficiently through various apps and technology empowered by artificial intelligence.

**VIRTUAL REALITY:**

Virtual Reality (VR) has its origins in the gaming sector, but it has also had an impact on the tourism industry. Virtual reality (VR) is quickly becoming the most effective marketing tool for travel companies and promotional activities. Travel firms may give an intriguing experience for their consumers by allowing them to explore new places and also enjoy exotic adventures by staying at their own comfort place with this technology.

**CONCLUSION:**

The importance of digital transformation is based on the notion that digital technology allows individuals to find answers to their conventional problems and that they are more inclined to use digital solutions rather than traditional ones. The shift means that, rather than simply enhancing and supporting traditional techniques, digital usages typically enable new types of development, creativity, and innovation in a certain sector. The establishment of new digital business units can be part of a company's digital transformation, but the development of new business models can also lead to forays into new markets or sectors. In today's digital age, organisations need to form a new kind of innovations to get advantages of new opportunities.

**REFERENCES:**

1. Auriga. (2016). Digital transformation: History, present, and future trends. Retrieved September 1, 2018, from <https://auriga.com/blog/2016/digital-transformation-history-present-and-future-trends/>.
2. Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the internet—The state of tourism research. *Tourism Management*, 29(4), 609-623.
3. Dolan, R., Seo, Y., & Kemper, J. (2019). Complaining practices on social media in tourism: A value co-creation and co-destruction perspective. *Tourism Management*, 73, 35-45.
4. Lee, K. (2018). An investigation of the online travel agencies' usability. *Culinary Science & Hospitality Research*, 24(2), 44-50.
5. Nayyar, A., Mahapatra, B., Le, D., & Suseendran, G. (2018). Virtual reality (VR) & augmented reality (AR) technologies for tourism and hospitality industry. *International Journal of Engineering & Technology*, 7(2.21), 156-160.
6. Schulz (1996) [http://www.electronicmarkets.org/fileadmin/user\\_upload/doc/Issues/Volume\\_06/Issue\\_02/The\\_Role\\_of\\_Global\\_Computer\\_Reservation.pdf](http://www.electronicmarkets.org/fileadmin/user_upload/doc/Issues/Volume_06/Issue_02/The_Role_of_Global_Computer_Reservation.pdf)

**REFERENCE LINKS:**

1. [https://www.researchgate.net/publication/333712437\\_Digital\\_Transformation\\_of\\_Travel\\_and\\_Tourism\\_In\\_India](https://www.researchgate.net/publication/333712437_Digital_Transformation_of_Travel_and_Tourism_In_India)
2. [https://repository.ihu.edu.gr/xmlui/bitstream/handle/11544/29204/Dissertation\\_Chatzisavva\\_Panagiota.pdf?sequence=1](https://repository.ihu.edu.gr/xmlui/bitstream/handle/11544/29204/Dissertation_Chatzisavva_Panagiota.pdf?sequence=1)
3. [https://www.researchgate.net/profile/Shoaib-Imtiaz/publication/332889070\\_Digital\\_Transformation\\_Development\\_of\\_New\\_Business\\_Models\\_in\\_the\\_](https://www.researchgate.net/profile/Shoaib-Imtiaz/publication/332889070_Digital_Transformation_Development_of_New_Business_Models_in_the_)

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Tourism\_Industry/links/5f605db5a6fdcc1164132c26/Digital-Transformation-Development-of-New-Business-Models-in-the-Tourism-Industry.pdf

4. <http://www.bbc.com/storyworks/travel/the-new-tourism-trend/technology-redefine-tourism-industry#:~:text=According%20to%20the%20World%20Economic,from%20traditional%20players%20to%20new>

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**A STUDY ON THE INVESTMENT PATTERN OF NON-TEACHING STAFF WORKING IN EDUCATIONAL INSTITUTIONS WITH SPECIAL REFERENCE TO MADURAI CITY**

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Paravai, Madurai**ABSTRACT**

*Save and invest in one's fund to increase future income. The nature and financial markets have undergone tremendous changes. Investing funds has become a very complex task because of the large number of savings and investment companies and the products they provide, terms and conditions, and complex regulations. This research attempts to use Madurai City as the research object to study the investment model of non-faculty staff in colleges and universities, and select 100 sample interviewees as the research object. Most interviewees prefer to invest money in projects that they expect safety and future returns.*

**INTRODUCTION**

The research on investment management begins with the question of what investment is. The term investment has many explanations because it means different things to different people. For one person lending money to another, it may be a return investment. Similarly, if one person invests in order to appreciate him. Similarly, an insurance plan or pension plan is an investment in its purchaser. Investment is money invested to earn additional income. In other words, investment is considered to be the sacrifice of a certain amount of currency in order to obtain a return.

**REVIEW OF LITERATURE**

Dr.V.G.Jisha and V.Gomathy in their research article, "a study on the perception of investment pattern among urban working women with reference to Coimbatore city", have concluded that the success of every investment decision has become increasingly important in recent times, making sound investment decisions require both knowledge and skill. The working women investors have different expectations from the investment as their needs different such as savings, safety, and interest and capital appreciation. The research identified the relationship between the factors influencing the level of awareness of various investment and factors influencing the benefits. Investors describe safety of funds as their priority for choosing an investment. So, the government should provide more investor protection.

According to Mathivannan S. and Selvakumar M in their study titled, "Savings and Investment pattern of school teacher- a study with special reference to Sivakasi taluka, Tamil Nadu", have concluded that money is an inextricable part of our life. People toil to earn money to purchase a house, to marry off their children, to live and to eat. So, saving is necessary to survive. To Save means to put aside a portion of income, deferring its consumption until a future date. Saving means the total accumulated amount of income that is not spent on consumption. In economics, personal saving has been defined as personal disposable income minus personal consumption expenditure. Saving may take the form of increase in bank deposits, purchase of securities, or increased cash holdings.

The extent to which individuals save is affected by their preference for future over present consumption, their expectations of future income and to some extent, by the rate of interest. Saving plays a vital role in building up the household economy as well as the national economy. Savings provide the financial security to savers. Hence, attractive saving devices are very much necessary to increase and channel the savings in developing countries. India is taking much effort in inculcating the saving habit among the people. In order to mobilize savings, the Government of India is issuing saving certificates, government bonds and securities carrying high rates of interest.

**Statement of the problem**

The Indian economy has its own unique identity. The country's economy is supported by a huge population, a considerable area, a wide variety of natural resources, a variety of growing markets, and increasingly serious economic problems. In such economic development, a sound department can play an important role in the overall development of the country, and investment awareness provides investors with financial protection. To avoid idle funds and meet future needs, it is necessary for individuals to try. Therefore, it is necessary to study the investment model of non-faculty and staff in universities in Madurai.

**Objectives of the study**

The following are the objectives of the study

1. To review the previous related literature
2. To present the various avenues available to the investors
3. To analyze the investment pattern of the respondents
4. To offer suggestions

**Sampling design**

For the study purpose responses were collected from 150 respondents (non-teaching staff working in an educational institutions ) by applying convenient sampling method

**Methodology**

In his research study the secondary data were collected from journals, books, unpublished thesis and websites. primary data were collected through questionnaire. Framed hypotheses were tabulated and analyzed with the help of Chi-square test, fried man test and percentage method

**Investment pattern**

Recently, the success of every investment decision has become more and more important, and making wise investment decisions requires knowledge and skills. Attempt to investigate the investment model of non-faculty and staff at the University of Madurai. By considering the age, gender, income, and seniority of the respondent, construct hypotheses to test its significance. Table 1 shows the personal information of the respondents.

**Table 1 Personal details of the respondents**

Particulars	No. of respondents	percentage
<b>Age</b>		
< 30 years	15	10
30 - 40 years	23	16
40 – 50 years	79	53
> 50 years	31	21
Total	150	100
<b>Gender</b>		
Male	107	71.3
Female	43	28.7
Total	150	100
<b>Income</b>		
< Rs. 20,000	26	17.3
Rs. 20,000 – 30,000	37	24.7
> Rs. 30,000	87	58
Total	150	100
<b>Educational qualification</b>		
SSLC	22	14.7
HSC	49	32.7
UG	65	43.3
PG	14	9.3
Total	150	100

**Source:** primary data

Gold is considered as one of the best investment by the investors. Various forms of investment in gold are Jewelry, gold bullion bars, gold coins, gold certificates or deposit schemes, gold mutual funds, e-gold and the like.

$H_0$  : there is no significant difference between the gender and the investment in Gold

**Table 2 shows the gender and the investment in gold.**

**Table 2 Gender and the Investment in gold**

S.No.	Gender	aware	unaware	Total
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1.	Male	35	74	109
2	Female	16	25	41
	<b>Total</b>	51	99	150

. **Source:** primary data

Chi-square test is applied to test the null hypotheses

N=150, df=1, Table value=3.84 at 5% level of significance, Calculated value=3.

Since the calculated value is less than the table value, the Null hypothesis is accepted. Therefore, there is no significant difference between the gender and the investment in gold.

$H_0$  : there is no significant difference between the Income and the investment in Gold.

**Table 3 shows the Income and the investment in gold**

**Table 3 Income and the Investment in Gold**

Sl.No.	Income	aware	unaware	Total
1.	Less than Rs. 20,000	14	12	26
2	Rs.20,001 – Rs.30,000	24	13	37
3	More than Rs. 30,001	67	20	87
	<b>Total</b>	105	45	150

**Source:** primary data

Chi-square test is applied to test the null hypotheses

N=150, df=2, Table value=5.99 at 5% level of significance, Calculated value=10.11.

Since the calculated value is more than the table value, the Null hypothesis is rejected. Therefore, there is no significant difference between the Income and the investment in gold.

$H_0$  : there is a significant difference between the educational qualification and the preference of investment patten.

**Table 4 shows the educational qualification and the preference of investment patten.**

**Table 4 Educational qualification and the preference of Investment patten.**

**-Friedman test**

S. No.	Educational qualification	Gold		Real estate		Insurance		Total
		Response	Rank	Response	Rank	Response	Rank	
1	SSLC	11	3	6	2	5	1	22
2	HSC	29	3	14	2	6	1	49
3	UG	17	1	18	2	30	3	65
4	PG	7	3	3	1	4	2	14
	<b>Total</b>	64	10	41	7	45	7	150

**Source:** primary data

Friedman test is applied to test the significant relationship between the educational qualification and the preference of Investment pattern in Gold, Real Estate and Insurance.

N=125, df = 2 at 5 % level of significance, Table value =5.99, Calculated value =136.5

Since the calculated value is more than the table value, hence the null hypothesis is rejected. Therefore, there is a significant difference between the educational qualification and the preference of investment pattern.

## FINDINGS AND SUGGESTION

### Findings:

\*It is found by chi -square test, there is no significant difference between the gender and the investment in gold.

\*It is found by chi -square test, there is a significant difference between the Income and the investment in gold.

\*It is proved by Friedman test, there is a significant difference between the educational qualification and the preference of investment patternin Gold, Real Estate and Insurance.

**SUGGESTION:**

In order to raise awareness of various types of investments, banks and financial institutions should provide their customers with necessary information in terms of gold. The government must play an important role in building awareness in various investment fields through media and newspaper advertisements.

**CONCLUSION**

The ultimate goal of investors is to obtain a variety of investments that meet their preferences for risks and expected returns. They must choose securities that maximize their expected returns based on certain considerations. The demographics of the interviewees play an important role in the investment field.

**REFERENCES**

1. Deepak Sood and Dr. Navdeep Kaur, "A Study of saving and investment pattern of salaried class people with special reference to Chandigarh", International journal of Research in Engineering, IT and Social Sciences, vol 5, issue 2 , Feb 2015. P 9
2. Dr. Jisha V.G. and Gomathi V., "A study on the perception of investment pattern among urban working women with reference to Coimbatore City", International journal of Engineering Science and Computing, vol7, issue 2, Feb 2017, p 4306
3. Mathivannan S. and Selvakumar M., "Savings and Investment Pattern of School Teachers – A study with referenceto Sivakasi Taluka, Tamil Nadu", Indian Journal of Finance, vol 5, No.4, April 2011.
4. Raja MannarB. and Ramachandra Reddy B., "investor's perception and expectations towards mutual funds.", sixteenth AIMS International conference on management, ISBN:978-1-943295-11-1
5. Financial markets and services by Gordon-Natarajan, Himalaya publishing house, New Delhi.
6. Investment management – security analysis and portfolio management by Preeti Singh, Himalaya Publishing House, New Delhi.

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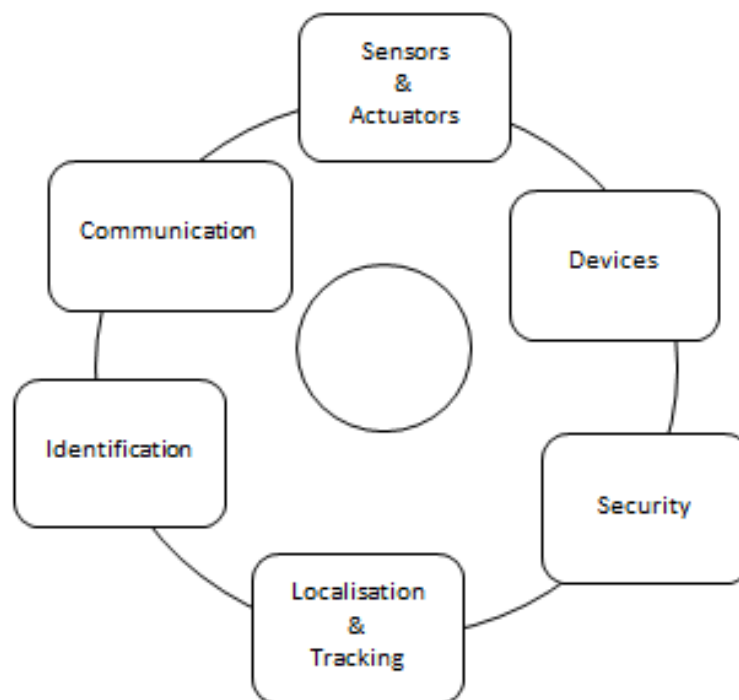
**A SURVEY ON SMART AGRICULTURE USING WIRELESS SENSOR NETWORK ON IOT WITH CLOUD COMPUTING**

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*IoT is one among the technology where the new developments are introducing day by day. The future computing and communication technology relies under integration of IoT and Cloud. This technology generally migrate with traditional agriculture methods to control the cost, maintenance and monitoring performance. Generally, precision agriculture sensors monitor to agriculture related temperature, humidity, Soil PH level, nutrition level, water level and so on. The development of geomatics in agriculture maintains economic viability with satellite and aerial imagery in farming enterprises. Advances in Wireless Sensor Networks (WSN) and image sensor identifies the landscape especially manageable as agriculture production zones effectively. This paper focused survey on typical applications of agricultural based IoT network with cloud support. This survey used to understand the different technologies to build and develop smart agriculture. This survey helps to create friendlier environments and efficient agricultural productions for the migration of people to the cities.*

*Keywords—Internet of Things (IoT), Cloud Computing, Smart Agriculture, precision agriculture, WSN*

**INTRODUCTION**

The precision agriculture is emerged in the mid of 1980's through grid based sampling of soil chemical properties with early developed variable-rate application equipment for fertilizers [1,2]. After farming the management practice, precision agricultural service provides,

1. Fight on the epidemic diseases through applying appropriate amount of organic fertilizers and pesticides at the needy time,
2. Efficient water consumption through watering the plants with needed amount of water at the right time,
3. Reducing the harmful to the environment because of reducing the usage of spraying the pesticides and
4. High agriculture production by non-toxic, sage and healthy crops production.

Using of WSN in precision agriculture increases the efficiency, productivity and profitability of the agricultural production [2,3,4]. Through WSN, real-time environmental information can be gathered remotely and the data is utilised to discover the problems in the field.

The traditional agricultural approach where the decisions taken based on some hypothetical average condition are not reflect the reality where the WSNs precision agriculture provides a better decision. This integration between WSN with IoT results in plethora of applications for smart-cities, remote healthcare, energy and water control, wildlife monitoring and so on. The Figure 1 shows the common characteristics of IoT.

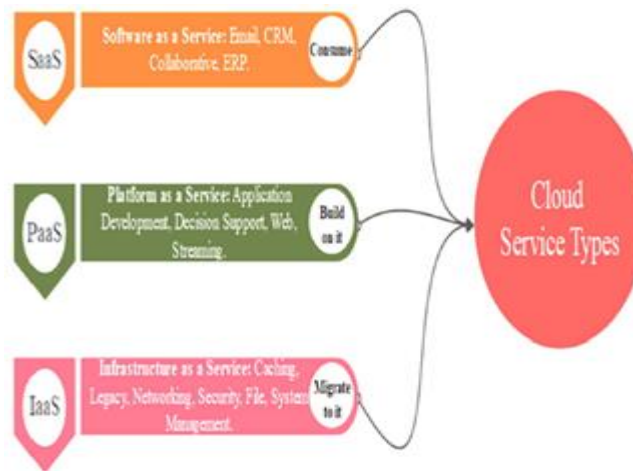


Fig. 1. Common characteristics of IoT

#### A. Essential of IoT Applications in Agriculture

Addressing the security with sustainable agriculture for food security or water security with a sustainable agriculture provides supplementary solution and services as third-party agricultural services and other services for farmers. This provides a centralised repository for a variety of information such as traditional farming techniques, crop diseases and so on through various sources to allow interactive farming through various devices through mobile phone, IVR with multi-lingual support with traditional practice. The Figure 2 presents the role of IoT in agriculture. The system should meet the following requirements:

- **Robustness:** The model features with diversity, complexity, spatio-temporal variability and uncertainties to consider the development of right kind of product and services.
- **Scalability:** Whenever the solution is made for agriculture sector, it may vary based on the size of the farm from small to large. Through testing and deployment happens in the stages where the architecture scale up incrementally with fewer overheads.
- **Sustainability:** The issue of sustainability is important due to the economic pressure intensity and aggressive competition globally.
- **Affordability:** The key of success is the cost of appropriate substantial benefits. This standardised platform, tools and services brings down the cost and volume.

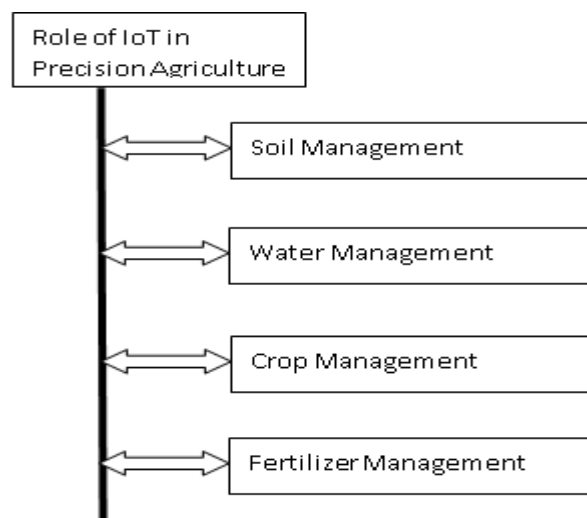


Fig. 2 Role of IoT in agriculture

**B. Benefits of IoT in Agriculture**

The following are some of the benefits of IoT applications in agriculture,

- Use of improved efficiency of inputs such as soil, water, fertilizer, pesticide and so on.
- Reduction in cost production.
- Increased profitability.
- Sustainability.
- Food safety and protection of the environment.

The integration of WSNs with IoT resulted in a plethora of applications such as smart-cities, remote healthcare, energy and water control, precision agriculture, wildlife monitoring, structural and ancient building monitoring, etc.

This contrasts with the traditional agricultural approaches in which decisions are taken based on some hypothetical average condition, which may not reflect the reality.

**C. Cloud Computing**

A new style of computing where dynamically scalable and virtualised resource services are provided over the internet is the general term for cloud computing. The integration of cloud computing with IoT provides a great significance of powerful storage, processing and service ability are combined together with the ability of information collection with composes a real network to comprises a network between people and items and items to items itself. Even though the differences in defining the cloud computing, the common layer architecture is exist. However, the hardware doesnot follows this common layer, as it is not fixed. All these layers provide service for the defined functions based on the defined APIs. The common layers of cloud are defined as Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS) and Data as a Service (DaaS). The DaaS provides valuable data as a service over the internet on a pay per use basis. The Figure 2 shows the common cloud services.

Fig.3 Common Cloud Services

**D. Cloud Computing in rural India**

The rural area are not economical for the farmers to deal with the service providers on individual basis. The comprehensive service providers provides cost effective multiple services. MBR Consumer Services Pvt. Ltd. by Rama Krishna that is one venture to meet the rural market demand. It enables the consumers to have day-to-day transaction with the company. It is an example of a corporate to contribute the development of stores through developing a sustainable business model to provide a customised services for maintaining extensive rural consumer database with micro information. The MBR Consumer Services Pvt. Ltd. set up a chain of centres aims to provide end-to-end ground level support for Indian rural consumers, rural consumer's profit and productivity. Some of the common services provided by MBR includes, FMCG (Fast Moving Consumer Goods) sales and services, Agriculture Allied Services, Soil and water testing services, Crop finance, Supply of agriculture inputs and animal feeds, Information services and other services based on the consumer needs.

In this paper, a survey on smart agriculture IoT with cloud computing is detailed in Section II. Section III presents applications of CloudIoT for precision agriculture and Section IV presents the conclusion and future work.

**LITERATURE REVIEW**

The paper [1] presents agricultural application utilising WSN for monitoring the crop fields. This model comprised with two sensors to measure the humidity, temperature and an image-sensing node is to compare the information through taking crop images. The parameters to specify making healthy crops are to determine the temperature, humidity and so on. The high stability is maintained with low power consumption. Paper [3] proposed a greenhouse monitoring system using agriculture IoT with cloud environment. In a greenhouse, management monitors the different environmental parameters using light sensor, temperature sensor, and soil sensor and so on. Meanwhile on every 30 seconds, the sensors are collecting information from the agriculture field area and stored online through cloud computing and IoT based servers. The paper [4] explains the IoT based Crop-Field Monitoring and Irrigation Automation system. Crop-field system is developed using sensors and based on the decision from the server through sensed data, the irrigation system is automated. The data transmission is forwarded through wireless medium from the web server database. The automated irrigation is

carried out through the moisture and temperature field falls below the proposed potential range. The remote monitoring can control system helps the application that provides a web interface to the user.

In [5] proposed a smart drip irrigation system for crop management. Android application is used to reduce the human interventions in controlling and monitoring the crop area remotely. Wastage of water is reduced using drip irrigation system based on the water level sensors. Some other different sensors are used to monitor the environment. The work [6] proposed a smart irrigation system to calculate humidity and water level of soil through sensors. The sensed information forwarded through a gateway called generic IoT Border Router Wireless Br 1000. From the default gateway, data will be forwarded to a web service through a defined network [7]. The paper [8] presents a survey on Smart Agriculture Irrigation systems to understand IoT based development in agriculture with cloud computing. Weeding, Spraying, Moisture Sensing and other field monitoring and services are performed using IoT based smart agriculture system [9]. A GPS (Global Positioning System) based robot is developed with an intelligent decision making to control and irrigate system to monitor the agriculture area along with the database management system [10]. The collected data from the database management system contains all soil information. The temperature sensor mainly focused on automatic controlling of water flow to the agricultural field. Prediction of rain using weather sensor is intimated to farmers through smartphone. WSNs automatically analyse the sensed data of the agricultural area using intelligent software application to take decision about healthiness of a crop informed to a farmer [11]. The paper proposed a low maintenance and better agricultural farming using novel Eco-friendly and Energy Efficient Sensor Technology. The various parameters such as temperature, moisture fertilizer control and water control is observed using various sensors through remotely.

The general classification of IoT platform is defined in [12], where this develops the top-level generic IoT architecture for smart city application to monitor the precision agriculture. Additionally, it presents a functional view to integrate the architecture of data acquisition and intelligent control system to acquire the greenhouse facility in agriculture. The author represents the functional architecture to promote the development of habitat intelligence monitoring platforms to integrate the development of open IoT platform to utilise the use case model to promote the digital agriculture. This format provides semantically enhanced agriculture ontology and it lacks in implementation as of the real world scenario differs to the above mentioned process.

With the several IoT systems are implemented to monitor the precision agriculture application [13], the goal of increasing crop production and crop monitoring systems are developed nowadays to collect the data from the crop and use the correlation analysis to monitor the production system between the collected information of statistical and information from the crop environment.

The water irrigation system for precision agriculture is under development due to the increasing agriculture based applications through IoT platforms. The author [14] presents a model that allow the user to control the irrigation process through smart phones. The collected information will stored in cloud database to monitor the crop irrigation system. The stored data will be analysed, the requirement for water to the agricultural farms is identified, and additionally the water flow will be monitored.

The IoT and data analytics are combined together to process various agricultural activities. The key parameters of IoT and data analysis are considered in implementing the IoT devices with cloud architecture. The emerged technologies are concerned with food production and quality of the food. Through using IoT applications each and ideal agronomics facet utilises the common logistic and qualitative traceability. The above and other benefits are obtained in combining the IoT and data analytics for agricultural specific areas [15].

This work [16] details the structure, application to use and challenges of IoT agriculture. This optimistic methods achieves precision agriculture through the IoT specific architecture and using the autonomous system to maintain the production and controls the production in accordance to the situation. Some of the problems based on atmosphere, irrigation, soil erosion and so on are eradicated to a maximum level through the IoT applications. Moisture, yield and other properties are employed to agricultural applications. The mobile based sensor automation system for agriculture is introduced to identify and eradicate the agricultural problems. This solves the yield and protects the crop from the other problems. The agricultural applications are connected to WSN to observe the various details of the farms related to collected through the sensors that associated with the internet. The mobile app is developed and it installs the user device and the details will be updated through the internet.

The data-driven procedure is developed for precision agriculture to develop agronomic clarifications. The prediction framework for soil moisture and reactive wireless sensor nodes are developed for a specific application of agriculture and the developed application is tested and major problem for precision agriculture

will be implemented based on the real world scenario. Generally, the machine algorithm are utilised to built small scale applications. Based on the test performance results the application is added to the IoT based precision agriculture system to perform particular tasks. The prediction system that comprises vector machines for meteorological data, soil moisture and so on [17].

The proposed IoT and agricultural data analysis are used to make smart farms. The real-time monitoring is proposed for specific three villages where the crop yield and water irrigation management is proposed based on IoT and sensor devices. Receiving the agriculture field information through the deployed sensors, it passes the web and mobile application through the help of node that deployed with WiFi module. The three sensors soil sensor, moisture sensor and DHT22 sensor with ultrasonic sensor are deployed together to receive the information from the deployed agricultural environment to sense the moisture, temperature and other information of the fields [18].

The author developed a smart agriculture system for India using the IoT and cloud architecture. This IoT based smart agriculture system with different sensors and the support of Raspberry Pi devices efficient food yield is proposed to identify the pests, moisture of soil, intelligent seed identification to identify the seed properties to increase the yield. The design of the system is robust and high cost. Another model proposed by the author for a smart agriculture through soil moisture, temperature, humidity and water level indicator using ARM 7 Processor that analyse data and send to the cloud using Thingspeak. Through the WiFi module, the farmer receives data using smartphones. The four sensors interfaced together using ARM 7 that robust and compare to the other boards [19].

The author [20] introduced a survey on cloud of things for smart agriculture model that provide complete information about detection of rodents that reduces the yield of a crop through integration of cloud and IoT through three-tier architectures named as back-end layer, gateway and front-end layer. Enormous parameters are determined through sensors to identify the humidity and moisture sensors and the values are displayed in the given display board. The three-tier layer architectures are implemented and controlling & monitoring of plant growth conditions are processed using embedded systems. This system helps in monitoring the growth of a plant in excellent predefined working conditions with cost-effective applications to make farming an easier task. Various factors like temperature, moisture conditions, light intensity and pH level monitoring are focused and monitored for the growth of a plant.

The proposed work [21] implemented a design on identifying the soil moisture through sensor to smart water irrigation management. This helps the irrigation and minimise the loss of water resource for the farms than the previous other used techniques. Conventional oven methods is used to measure the water level of the farms and well to identify the need of farms and availability of the resources. The smart devices follow the comparison of resistive and capacitive moisture sensor values to determine the moisture for water management. Arduino Uno board is the hardware specs used for this research work. The energy efficient duty cycling algorithm is introduced with this work for precision agriculture and the collected data are forwarded to the cloud for future identification of the soil condition and weather conditions. The simulations are performed using NS2 scenario.

The proposed method [22] utilise the cloud IoT technique for disease prevention in precision agriculture and this work focus in prevention of potato late blight disease with the collaboration of WSN and cloud IoT Technology. Local gateway, network and cloud are the common three technology combined to form a new and novel technique to identify the above specified disease in potato plants. The sensors are made with low cost and power to deploy it in the any agriculture area. They future enhancement of the work is to enhance the disease prediction and prevention for all farms.

The another work [23] discussed a brief study on smart irrigation system and proposed a crop surveillance using IoT architecture with cloud integration. The above work associated with various sensors like soil moisture, temperature, humidity and so on. The sensors are interfaced using Arduino board and ZigBee module is enabled to process the irrigation system and the decision were recorded in cloud for further references. This work connects the farmers smartphone to communicate the information to the farmer at any time. Compare to the other works this work costs much cheaper and it makes the farmers to utilise the application widely.

After a brief review on effective agricultural monitoring system using IoT, the author [24] designed an architecture that consist of sensors such as humidity, temperature, CO<sub>2</sub>, intensity of the agriculture field through interfacing of Arduino and raspberry pi board. The data will be analysed and processed in cloud server and the same will be updated in the android app through WiFi connectivity. The architecture follows a low-cost design where the four sensors are integrated and it cost minimal.

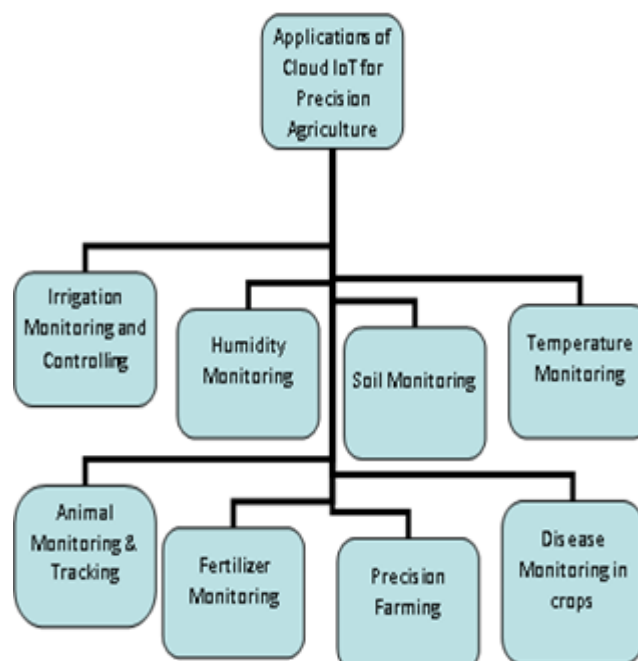
The IoT smart irrigation system for organic garden is proposed [25]. The author implemented the system to monitor home-based organic garden through various sensors to monitor humidity, temperature, soil moisture and water level prediction through ultrasonic sensor are identified with the help of Arduino and Raspberry Pi using IoT Technology. The aim of this work is to reduce the water wastage in irrigation with low and efficient cost. DHT11 temperature sensor with Arduino Uno and MCU are connected with cloud IoT operated with a mobile app named Blynk. The proposed system experimentally proves monitoring values of temperature and humidity of the organic field.

The proposed work [26] introduced the monitoring system through web of things in precision agriculture. With the help of IoT cloud integration the application prototype is proposed for precision farming. The architecture design system helps the farmer through different proposed tier architecture consists of data acquisition tier, gateway tier and IoT Cloud tier. Even though the architecture works well, the implementation of the proposed system costs high. The two sensors humidity and temperature are monitored the agricultural field and the values are stored in the cloud based application such as ubidots and so on. The intelligent IoT based automated system for smart irrigation system.

The proposed intelligent IoT based automated irrigation system [27] focused the paddy growth monitoring with aid of IoT. The author proposed a ML algorithm using K-nearest neighbor artificial neural networks (ANNs) and decision tree algorithm to obtain better-automated irrigation system to help the farmers regarding the sensor data on agriculture field using Arduino and Raspberry Pi board with the help of Ethernet communication to the cloud data. The data will be forwarded to the farmers through mobile application. The hardware block utilise the embedded devices and software designs using PHP. The moisture sensing section maintains the moisture data and displays the same in the webpage. The farmer can monitor the irrigation process remotely and this design cost low compared to the other models.

The smart agricultural model integrating IoT, cloud-based big data analytics and mobile technologies. The main aim of the author is identify the yield production of the crop and supports the data mining techniques to help the farmer to know about crop information such as yield level, water level and so on. The field monitoring and automation of water is developed through this proposed work. It designed an architecture for E-agriculture monitoring through TI-CC3200 launch-pad with specific sensors. The proposed system reduces the traditional agricultural procedure is water usage and thus reduces the cost. Moreover, the IoT devices reduces the complexity of utilising other technologies.

The Monitoring of soil moisture through home made soil sensors with the integration of Arduino Uno board. The author [28] implemented the two more methods to setup soil moisture measurement and identifying the depth of the water content. This data was observed continuously to determine the soil condition and when to irrigate the water to the crop. This system designed with low cost and it forwards the condition to the cloud through Arduino Uno3 using ZigBee module. The framework advise the better conditions to the farmers about cultivating and keep the records of agricultural conditions for further environmental setup and smart irrigation.





The proposed author [29] introduced a design and implementation of cloud based IoT scheme for precision agriculture and it cares about epidemic disease to prevent the crops through applying fungicides, pesticides and fertilizer through WSN, IoT and cloud network. This proposed system has three layers like back-end layer, gateway layer and front-end layer as a common architecture for cloud IoT. The farmers can receive advices about crop precautions through the mobile application and IoT connected mobile phone. This work proposed a low power consumption for proposed cloud IoT architecture.

This proposed work [30] developed an IoT based fertilizer intimation system for smart irrigation for smart agriculture. The novel design NPK sensor is proposed with LDR and LED connectivity through calorimetric principle. The sensor analysed the value of the crop such as protein, NPK value, water level, any disease symptoms in the deployed smart farm. One of the foremost advantage to develop a fuzzy rule-based decision-making system to analyse the present NPK values. Finally, the value will stored to cloud for monitoring the further development of crop and this system consumes less power and cost than the previous architectures.

The proposed work [31] concentrates in advancing the nitrate-N detection using detection sensor. Additionally, it monitors the N value in surface and groundwater along with the current temperature level. With the support of IoT system, the sensing is processed and the sensed information is forwarded to the cloud server for further communication. The soil nutrition level is detected along with the nitrate detection through Raspberry Pi board. It detects the soil content and decides whether the crop is suitable for the given soil or not. The work considers the water level and checks whether the given crop can yield better in the given soil or not. This work identifies the suitable crop list for the soil as per the soil specs received through the proposed architecture.

This efficient proposed work [32] developed an agricultural application system to monitor the soil. It details the moisture level, fertiliser usage, water level in well and soil and so on. This work identifies the soil nutrients like N (Nutrition), P (phosphorus), K (potassium) through the proposed Raspberry Pi board interfaced together with temperature, soil moisture, color sensor and so on. The integrated WiFi device will forward the collected information to the cloud, the cloud forwards the details to the farmer's mobile and mail id that already mentioned. The soil quality is also analysed to rectify the farmer's difficulty in identifying the right crop for their field. Through the above mentioned agro-sensors pest control, water level monitoring, fertilizer analysing and proper irrigation system is specified (analysed). The weather condition also analysed and made necessary arrangements before the unwanted rainfall or maintains good water level in summer to eradicate the water scarcity for the crops. This work adds the fertiliser analysis and reminds the farmer to complete the applying of right pesticides and right time to yield more.

#### Applications of cloudiot for precision agriculture

The decision making IoT system is proposed using sensor stipulation with the THAM index. The major advantage of this work is to develop an accurate decision-making system to determine the nutrition rate of the soil and identifying the NPK level of the fertilizer to determine the optimal soil nutrition rate. The crop with the pH value of 6 and high is detected as the best crop for the given soil. This proposed crop will yield more consumes less fertilizer and water for yielding. This architecture is proposed using Arduino Uno board and the same is implemented using Raspberry Pi to connect the device to the specific cloud to store and control the data and the field remotely. Figure 4 shows the agricultural application domain using IoT.

#### Fig. 4 Agricultural Application Domain using IoT

The primary focus of IoT based precision agriculture applications based on the major domains are monitoring, controlling and tracking is considered. The major applications used in this study are detailed in Figure 5.

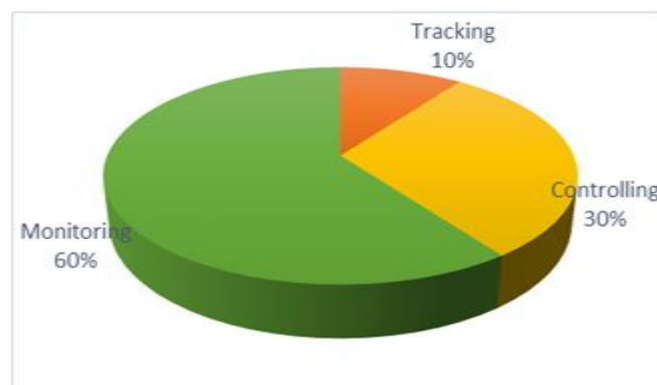
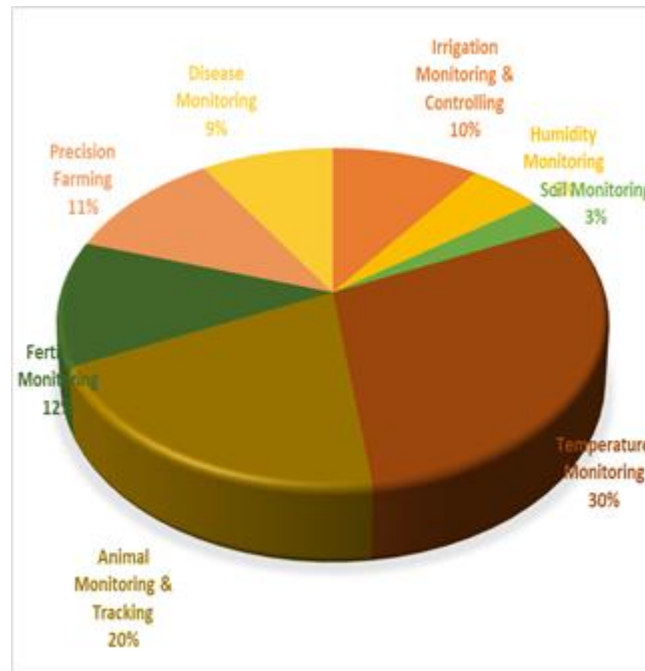


Fig. 5. Major applications of Cloud IoT

The percentage of CloudIoT application for precision agriculture identified through this study is present in Figure 6.



**Fig. 6 Percentage of CloudIoT application for precision agriculture**

#### A. Countries where the IoT agriculture policies implemented

Some technologies with evidence-based policy where the practical implementation are followed in most of the countries in which the precision agriculture is monitored to develop the agriculture and farming. Precision agriculture is the key where the existing government policies can accommodate the CloudIoT agricultural services and regulations to develop the farming worldwide. Some of the agricultural policies adopted by different countries are shown in Table I.

**TABLE I.** AGRICULTURE POLICIES ADOPTED IN WORLDWIDE

Name of the Country	Application Domain
India [33]	An IoT-based robotic has been presented in to measure the agricultural parameters such as pesticides, moisture, and animals movement. When the system was practically implemented, the obtained results were very satisfactory, which shows that the system is user friendly, robust, and reduces the labor cost. Moreover, a remote sensing control system is developed to monitor the greenhouse gas, temperature, soil moisture, and light. These variables were monitored for bell paper plants and the obtained results indicate the yield increment and facilitate the farmer to monitor the farm remotely.
China [33]	To monitor the greenhouse environment conditions, a low-power and low-cost system is developed. Implementations of the developed system show that the system is reliable and reduces the labor cost. Furthermore, IoT technologies implemented in the Shandong Province demonstration park of Zhongyi show that the fertilization and pesticides cost reduced up to 60% and 80%. Whereas, to deal with the 300-mu park, 60 laborers were required, but the utilization of IoT technology reduced the labor cost by approximately 60%.
Thailand [33]	The National Electronics and Computer Technology Center (NECTEC) in Thailand is implementing IoT technology to develop the smart farming, and their main focus is on four agriculture products, namely: rice, rubber, cassava, and sugar. The basic aim of this movement by the Thailand government is to facilitate the farmers in all rural areas for the ecient growth of crops.
Brazil [34]	An IoT-based Agri Prediction model is presented in that provides low-cost prediction methods to measure the soil humidity and temperature. After the implementation of the proposed model, the weight (up to 14.29%) and size (up to 17.94%) of arugula leaf was increased.

Name of the Country	Application Domain
Africa [34]	Authors proposed an animal behavior monitoring system that traces the animals' movement all over the field and monitors their pasture grazing. The designed platform is implemented in Africa to evaluate and track the animals' conditions.
Australia [34]	The Australian Government has invested AU\$134 million to improve their current farming method. As a result of this large investment by a private company in Sydney, the local government created a center for the implementation of IoT technologies in agriculture fields. An innovative network was established in 2014 for the purpose of precision farming to create a collaborative framework in the agriculture fields of Australia. Moreover, in terms of security and privacy, an American farm bureau established a security and privacy set for farm/field data in 2015.
Ireland [35]	A program has been launched by Irish Farmers Association (IFA) to decrease the smart farming implementation costs and improve the soil quality by providing guidance to the farmer regarding how to save the water and power by utilizing IoT technology. The farming community enthusiastically followed these guidelines and obtained results that were very encouraging and positive. Companies saved approximately 8700 euro, 21% savings were achieved in pasture management; there was also a 10% reduction in greenhouses gas emission and 47% savings in soil fertility. To track and trace the farm assets, Ireland VT-Networks launched a SigFox network.
France [35]	In France, the ministry of agriculture has become the partner of the Agriculture Innovation Project 2025, whose basic purpose is to increase the strength of agriculture land, monitor weather parameters, and improve the field conditions by creating incubators. Moreover, the ministry of agriculture shares benchmarked farm data with farmers to develop innovative solutions in agriculture.
USA [35]	In order to fulfill the basic requirements of food and energy, the USA government has initiated many research and development projects related to agricultural technologies. The National Institute of Food and Agriculture is working on a project called the Internet-of-Ag-Things and developed sensing technologies for agricultural practices. The major aim of the project is to provide precision farming techniques to increase the agricultural productivity and make better use of the fertilizers, water, and organic food. A project namely has been started by Department of Agriculture (USDA) to resolve the water management issues and design new techniques to overcome the challenges that are affecting agriculture. Moreover, technologists are using the datasets of the USDA to improve and design the existing agriculture services for water distribution.
Phillipines [35]	The Philippines used remote sensing techniques in order to boost the rice production and satellite imaginary techniques to get information about multiple agricultural conditions. The University of Southeastern Philippines (USEP) developed a smart solution to measure the crop heat stress through IoT technology by collaborating with Western Mindanao State University (WMSU).

## B. Future applications for Agriculture

The future applications for agriculture is presented below [36, 37]. They are,

- Weather Tracking for agriculture field
- Vertical Farming for agriculture
- Machine learning and analytics for agriculture farms
- Satellite imaging for crop detection
- RFID Sensor tracking for field development
- Robots for agriculture monitoring
- **Weather Tracking For Agriculture Field:** This application checks and monitor the climatic conditions of the agriculture field. Farmers can access the advanced notice about fog, hail and other climatic conditions of the land and surroundings of the land to identify and monitor the exact condition of the climate that affects the crop or that develops the crop. Through these applications, the farmer can easily assess the yield and other conditions on time.

- **Vertical Farming For Agriculture:** Through these applications the farmer can easily identify the stacked layers vertically to produce the food in such domains to increase the yields and maintain better earnings through the crops. The agriculture land is also well utilised through these applications in such a way that can yield more from the proposed farming methodologies.
- **Machine Learning and Analysis for Agriculture Farms:** The machine learning algorithms proves that the one among the best algorithm in worldwide for crop production through giving best suggestions for crop breeding based on the location and climate of the field. This algorithm studies the previous market conditions additionally for the benefit of the farmers not to produce a wrong crop in the field which may yield less due to climatic conditions or the crop production may high that turns less profit from the crop production. These applications provides better suggestions for the farmers to do agriculture in a peaceful way. The Figure 7 shows the future applications for agriculture.



**Fig. 7 Future Applications for Agriculture**

- **Satellite Imaging for Crop Detection:** This technology captures real-time image to identify and monitor the growth of the crop. These images are of more than 5-meter pixel resolution to identify the exact level of growth. Through adding crop sensors for soil and water monitoring reduces the consumption of water level (wastage of water) and identifies the moisture and seed status through soil sensor. These technologies generally saves the crop from the natural disasters and save amount and time of the farmers in various terms and conditions.
- **RFID Sensor Tracking for Field Development:** This applications generally identifies the food from the field to store and track through RFID sensors. It helps providing fresh produced products and harmful bacteria were identified and reduced easily by these technological inventions.. These products follows the barcode to scan the field through smartphone so that the farmers can easily monitor and sale the product in online.
- **Robots for Agriculture Monitoring:** The robots that supports agriculture is termed as abbots. This technology developed to support all process of agriculture such as harvesting, ploughing, fruit picking, soil monitoring, weeding, and irrigation and so on. These abbots reduces the farmers work enormously. Figure 8 presents the taxonomy of various IoT cloud platforms.

IoT cloud platforms	Cloud service type	Application development	Monitoring management	Visualization	Cost research
<u>Aekessa</u>	Private (SaaS)	Yes	Yes	Yes	Pay Per Access
<u>Aravant connect TM</u>	SaaS	Yes	Yes	Yes	Low
<u>Axeda</u>	Private (PaaS)	Yes	Yes	Yes	Pay Per Access
Echelon	Private (PaaS)	Yes	Yes	No	High
<u>Etherios</u>	PaaS	Yes	Yes	Yes	Pay Per Access
AWS	PaaS	Yes	Yes	Yes	High
Google server	Public	Yes	Yes	No	Pay Per Access
IBM Watson IoT	PaaS	Yes	Yes	Yes	Pay Per Access
Jasper control centre	Private	Yes	Yes	Yes	High
KAA	Public	Yes	Yes	No	Pay Per Access

Fig. 8. Taxonomy of various IoT Cloud platforms

## CONCLUSION AND FUTURE WORK

This paper presents a detailed study on Cloud IoT in the field of agriculture. In future the sensors, actuators and other sensor devices with cloud integration will rule the agriculture world to intercommunicate between the farms and precise decision making in providing innumerable benefits for the end user through acquiring various services. As discussed above the embedded technologies like Raspberry Pi for interfacing various models used to identify the usage of fertiliser, water irrigation, crop monitoring, weed detection and so on to improve the production from the farms. The wireless technologies like WiFi, ZigBee, Z-Wave, GSM integrate with Node MCU, Arduino boards and Raspberry Pi Boards to detect the disease early to avoid the spread of the disease to the other crops as well as through machine learning applications and it analyse the previous records and helps the crops to avoid affecting from the disease in future. Hope this paper presents modern CloudIoT architecture and applications on precision agriculture for the modern extensive and sophisticated research improvements in agriculture. The future enhancement of this study is to provide CloudIoT architecture for Internet of Agriculture Things (IoAT) with trust management mechanism. The absolute trust degree will be identified and the performance will be monitored against several potential attacks.

## REFERENCES

- Foughali, K., Fathallah, K., & Frihida, A. (2018). Using Cloud IOT for disease prevention in precision agriculture. *Procedia computer science*, 130, 575-582.
- Ferrández-Pastor, F. J., García-Chamizo, J. M., Nieto-Hidalgo, M., & Mora-Martínez, J. (2018). Precision agriculture design method using a distributed computing architecture on internet of things context. *Sensors*, 18(6), 1731.
- Abbasi, M., Yaghmaee, M. H., & Rahnama, F. (2019, April). Internet of Things in agriculture: A survey. In *2019 3rd International Conference on Internet of Things and Applications (IoT)* (pp. 1-12). IEEE.
- Farooq, M. S., Riaz, S., Abid, A., Abid, K., & Naeem, M. A. (2019). A Survey on the Role of IoT in Agriculture for the Implementation of Smart Farming. *IEEE Access*, 7, 156237-156271.
- Kakamoukas, G., Sariciannidis, P., Livanos, G., Zervakis, M., Ramnalis, D., Polychronos, V., ... & Tsitsiokas, N. (2019, December). A Multi-collective, IoT-enabled, Adaptive Smart Farming Architecture. In *2019 IEEE International Conference on Imaging Systems and Techniques (IST)* (pp. 1-6). IEEE.

- Gunasekera, K., Borrero, A. N., Vasuian, F., & Bryceson, K. P. (2018). Experiences in building an IoT infrastructure for agriculture education. *Procedia Computer Science*, 135, 155-162.
- Harun, A. N., Mohamed, N., Ahmad, R., & Ani, N. N. (2019). Improved Internet of Things (IoT) monitoring system for growth optimization of *Brassica chinensis*. *Computers and Electronics in Agriculture*, 164, 104836.
- Mekala, M. S., & Viswanathan, P. (2020). A survey: energy-efficient sensor and VM selection approaches in green computing for X-IoT applications. *International Journal of Computers and Applications*, 42(3), 290-305.
- Zyrianoff, I., Heideker, A., Silva, D., Kleinschmidt, J., Soininen, J. P., Salmon Cinotti, T., & Kamienski, C. (2020). Architecting and deploying IoT smart applications: A performance-oriented approach. *Sensors*, 20(1), 84.
- Pham, T. V. H. (2018). Overview of IoT development in Agriculture and Applications in Vietnam. University of Engineering and Technology, VNU.
- Khattab, A., Habib, S. E., Ismail, H., Zayan, S., Fahmy, Y., & Khairy, M. M. (2019). An IoT-based cognitive monitoring system for early plant disease forecast. *Computers and Electronics in Agriculture*, 166, 105028.
- Navarro, E., Costa, N., & Pereira, A. (2020). A systematic review of IoT solutions for smart farming. *Sensors*, 20(15), 4231.
- Butpheng, C., Yeh, K. H., & Xiong, H. (2020). Security and privacy in IoT-cloud-based e-health systems—A comprehensive review. *Symmetry*, 12(7), 1191.
- Vani, P. D., & Rao, K. R. (2016). Measurement and monitoring of soil moisture using cloud IoT and android system. *Indian Journal of Science and Technology*, 9(31), 1-8.
- Filev Maia, R., Ballester Lurbe, C., Agrahari Baniya, A., & Hornbuckle, J. (2020). IRRISENS: An IoT platform based on microservices applied in commercial-scale crops working in a multi-cloud environment. *Sensors*, 20(24), 7163.
- Visconti, P., Giannoccaro, N. I., de Fazio, R., Strazzella, S., & Cafagna, D. (2020). IoT-oriented software platform applied to sensors-based farming facility with smartphone farmer app. *Bulletin of Electrical Engineering and Informatics*, 9(3), 1095-1105.
- Mentsiev, A. U., Gerikhanov, Z. A., & Isaev, A. R. (2019, December). Automation and IoT for controlling and analysing the growth of crops in agriculture. In *Journal of Physics: Conference Series* (Vol. 1399, No. 4, p. 044022). IOP Publishing.
- Debauche, O., El Moulal, M., Mahmoudi, S., Manneback, P., & Lebeau, F. (2018, April). Irrigation pivot-center connected at low cost for the reduction of crop water requirements. In *2018 International Conference on Advanced Communication Technologies and Networking (CommNet)* (pp. 1-9). IEEE.
- Mentsiev, A. U., Isaev, A. R., Supaeva, K. S., Yunaeva, S. M., & Khatuev, U. A. (2019, December). Advancement of mechanical automation in the agriculture sector and overview of IoT. In *Journal of Physics: Conference Series* (Vol. 1399, No. 4, p. 044042). IOP Publishing.
- Suciu, G., Fratu, O., Vulpe, A., Butca, C., & Suciu, V. (2016, June). IoT agro-meteorology for viticulture disease warning. In *2016 IEEE International Black Sea Conference on Communications and Networking (BlackSeaCom)* (pp. 1-5). IEEE.
- Aazam, M., Zeadally, S., & Harras, K. A. (2018). Offloading in fog computing for IoT: Review, enabling technologies, and research opportunities. *Future Generation Computer Systems*, 87, 278-289.
- Sharma, A. K. (2020). Design and development of cloud based architecture for smart agriculture.
- Al-Turjman, F., Alturjman, S., & Ever, E. (2017, March). Identification framework for smart environments in the era of cloud-IoT. In *Proceedings of the Second International Conference on Internet of things, Data and Cloud Computing* (pp. 1-6).



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- Andrade, E., Nogueira, B., de Farias Júnior, I., & Araújo, D. (2021). Performance and Availability Trade-Offs in Fog-Cloud IoT Environments. *Journal of Network and Systems Management*, 29(1), 1-27.
  - Nayak, S., Nayak, M., & Patel, G. S. IoT in agriculture. *Smart Agriculture: Emerging Pedagogies of Deep Learning, Machine Learning and Internet of Things*, 93.
  - Singh, S., & Mohan Sharma, R. (Eds.). (2019). *Handbook of Research on the IoT, Cloud Computing, and Wireless Network Optimization*. IGI Global.
  - Rekha, H. S., Nayak, J., & Naik, B. (2020). 6 Impact of IoT in agriculture: advances and challenges. *Internet of Things*, 127.
  - Gaur, A. S., Budakoti, J., Lung, C. H., & Redmond, A. (2017, August). IoT-equipped UAV communications with seamless vertical handover. In *2017 IEEE Conference on Dependable and Secure Computing* (pp. 459-465). IEEE.
  - Foughali, K., Fathallah, K., & Frihida, A. (2019). A Cloud-IOT Based Decision Support System for Potato Pest Prevention. *Procedia Computer Science*, 160, 616-623.
  - Vadlamudi, S. (2021). Rethinking Food Sufficiency with Smart Agriculture using Internet of Things. *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, 12(9), 2541-2551.
  - Devi, K. K., Premkumar, J., Kavitha, K., Anitha, P., Kumar, M. S., & Mahaveerakannan, R. (2021). A Review: Smart Farming Using IOT in the Area of Crop Monitoring. *Annals of the Romanian Society for Cell Biology*, 3887-3896.
  - Kang, S., Baek, H., Jun, S., Choi, S., Hwang, H., & Yoo, S. (2018). Laboratory environment monitoring: Implementation experience and field study in a tertiary general hospital. *Healthcare informatics research*, 24(4), 371.
  - Raikar, M. M., Desai, P., Kanthi, N., & Bawoor, S. (2018, September). Blend of Cloud and Internet of Things (IoT) in agriculture sector using lightweight protocol. In *2018 international conference on advances in computing, communications and informatics (ICACCI)* (pp. 185-190). IEEE.
  - Aazam, M., Zeadally, S., & Harras, K. A. (2018). Deploying fog computing in industrial internet of things and industry 4.0. *IEEE Transactions on Industrial Informatics*, 14(10), 4674-4682.
  - Bagwari, S. Impact of Internet of Things Based Monitoring and Prediction System Inprecision Agriculture.
  - Tejić, B., Đukić, N., Tegeltija, S., Ostojić, G., & Stankovski, S. IoT based system for monitoing food products.
  - Kedari, S., Vuppalapati, J. S., Ialapakurti, A., Kedari, S., Vuppalapati, R., & Vuppalapati, C. (2018, January). Adaptive Edge Analytics-A Framework to Improve Performance and Prognostics Capabilities for Dairy IoT Sensor. In *International Conference on Intelligent Human Systems Integration* (pp. 639-645). Springer, Cham.
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**ADVANCEMENT TOWARDS A SUSTAINABLE FUTURE: EUROPEAN UNION'S PROGRESSION FROM LINEAR TO CIRCULAR ECONOMY MODELS**

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**1. ABSTRACT**

*After the end of the second World War, 20<sup>th</sup> century European economic historiography was a witness to the gradual increase in awareness of the soon to be reached limits of linear economy models. This determined the interest for the design of a new model of economic organization called 'Circular Economy (CE)' that would provide the necessary goods and services for maintaining and improving living standards for more and more people without ever increasing the consumption of raw materials and the quantity of waste ejected into the environment. The aim of this paper is to conduct a multidimensional comparative analysis of the transition to CE in European Union (EU) countries. The purpose is also to analyse whether economic development measured by GDP (gross domestic product) affects the analysed CE variables. Based on the hypotheses set, an econometric model was formed where GDP was identified as an independent variable, while the dependent variables were the production of municipal wastes per capita, the recycling rate of municipal wastes, the recycling rate of packaging wastes by types of packaging, the recycling of bio-wastes, and the recycling rate of e-wastes. The first part of the statistical analysis conducted using the Stata software package shows the Pearson correlation between the stated variables, while the second part explores the univariate regression model. The classification of EU countries according to the level of their advancement in the implementation of CE was adopted as a main research task. The comparative analysis was conducted by means of statistical methods. It was found that among all EU countries, those of the old EU are the most advanced in terms of CE. The results point towards the conclusion that the application of the CE model can ensure economic growth and GDP growth while reducing the use of natural resources and ensuring greater environmental protection.*

**KEYWORDS:** Circular Economy (CE); Environmental Protection; European Union (EU); Gross Domestic Product (GDP); Linear Economy; 20<sup>th</sup> Century European Economic Historiography.

**2. INTRODUCTION****2.1. Models and Historical Perspectives with regard to the Economic History of the European Society: Some Past and Present Concerns about the Unsustainable Future of an Unsustainable Society**

Doubts about the future of the modern economy of the European Union (Western style) and European society have been expressed in various ways since Malthus, but more recently, in the 20<sup>th</sup> century, researchers have discovered much since the oil boom in the early 1970s and, at a psychological level, since the 1972 publication of the first report on the Club of Rome. To be scientifically accurate we must state that the previous statement will compel us to assume that the humanity is currently using resources which are exhaustive and that it cannot access in the near future sustainable developmental innovations such as nuclear fusion, anti-gravity or total genetic engineering technologies.

Later, in 1980, Jeremy Rifkin published "Entropy – A New World View", a book in which he identified (among other things) the historical character of linear economy that leads to a constantly growing, developmental model. In a considerable manner Rifkin reminded his readers that although it may seem strange today, before the middle of the 18<sup>th</sup> century (at least in the Western world) the representation of history had been that of a turning point of decline from a "Golden Era" to a dire present. This representation was accepted in ancient Greek and Roman mythology, as shown in the writings of Hesiod and Ovid, such as the gradual decline from the Golden Age to the inferior and lesser qualified ages of Silver, Bronze and Iron. Even in the Christian view, as presented in the Bible, the passage of time has been shown as a decline from the Garden of Eden to an earthly life of hardship and remorse.

It is therefore most interesting that for more than a thousand years the Western world has had a vision in which the distant past was better than the present and that the human existence and nature itself manifested through the cyclicity of seasons (which actually describes the "circular" movement). Thus, for a long time, the European



economic historiography has estimated for centuries that in Western lands the future looks much worse than before or, similarly, the same as before, marked only by phases and cycles of nature.

Even the emergence of Marxism and then of the “Socialist Block” contributed to the support of this linear progress model because socialism was based on the materialist-dialectical approach that, in its turn, was linear and Newtonian (that is mechanistic) in its logic. According to this approach everything had a rational explanation and in order to obtain economic results it was only necessary to properly allocate certain resources.

The post-World War II confrontation between capitalism and socialism has been described (leaving aside ideologies) as a matter of economic efficiency and very seldom, if ever, the relation of these economic and social systems with the environment was put into question. In this context the main topics of international debate were “Market Economy” versus “Centrally Planned Economy”, “Private Property” versus “Collective Property”, “Democracy” versus “Authoritarian Leadership”.

For a long period of time economy (at a global level) represented a tiny fraction in relation with the global ecosystem. Therefore, in a world where humankind occupied just a small part, the idea of unlimited production seemed possible mainly because it was just theoretical.

In the decades after World War II such a large economic proportion occupied by humankind in the global ecosystem dramatically increased and we reached a point in 2021 when the overall needs exceeded by more than 50% the regenerative capacity of the Earth. In this case the continuation of the quantitative increase of resources extracted from environment, of the increase of production (output) sold to the markets and of waste eliminated in the environment became more and more a physical impossibility.

## **2.2. Initial Strategies adopted by the European Union: Sustainable Development, Conservation of Energy, Increase of Efficiency, and Recycling of Natural Resources**

As a result of a multitude of signals coming from the economy (mainly because the increasing costs related either to extraction of resources or to environment protection and waste management), from scientists (who could determine long term effects of current industrial activities), from environment aware citizens and non-governmental organizations (that took into account the public interest and the impact of economic activities on health and well-being) after mid-1970s several attempts were made in order to improve the relation between human activities and environment or at least to alleviate the negative implications.

Immediately after the oil shocks of the early 70s, energy conservation became a priority and this translated in some cases into a substantial increase in efficiency. For example, in the developed countries in the 1960s the relation between economic growth and energy consumption growth had been 1:1, while in 1984, after the implementation of energy conservation measures, the relation became 1:0.4 meaning a reduction of over 2 times of the quantity of energy consumed for the production of a unit of economic growth.

The more pragmatic and rational approaches related to energy conservation and increase of efficiency in energy use were accompanied in the conceptual field by the emergence of the notion of “Sustainable Development”, a concept presented first in 1988 by the Brundtland Commission in its report entitled “Our Common Future” for the UN World Commission on Environment and Development. According to this report, sustainable development is the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

On a more profound level a scientist of Romanian origin, Nicholas Georgescu-Raegan, studied the implications of the entropy law on the economic process and the relation between entropy, value and development and formulated the concept of “Bioeconomy” which proposed the transition from the representation of “the world as a mechanical machine” to the representation of “the world as a living organism”. At the same time, Nicholas Georgescu-Raegan stated very clearly that current generations are closely linked with future generations by the long-term implications that the present activities have on the living conditions in the future.

These theoretical approaches had relatively little impact on the industry, and serious attempts to improve energy efficiency, energy conservation or to limit the negative impact on environment took place only when and where either legislation imposed such measures or when cost arguments transmitted clear signals to decision makers.

In the coming decades after the 1970s there were debates on climate change and global demographic evolution and concerns were expressed on the limited character of natural resources or on the irreversible changes determined by human activity.

More and more people, including significant industrialists, remarked that it is not possible to conceive a continuous increase in the supply and demand of automobiles, TV sets, refrigerators, and other basic

commodities. This is so because an uncontrolled and linear supply chain would not be a sign of a healthy economy but would rather be a sign of capitalism and individual success. In the modern economic framework, the rule of the game is based on profit and therefore, success is measured in profit terms.

Beyond any political or philosophical debates there are some hard facts that point to a negative answer. According to Global Footprint Network by 2010 the global economy used the equivalent of 1.5 Earths to provide the resources needed and to absorb or recycle the waste that is generated as a result of human activity. In other words, planet Earth needs one year and a half to produce and absorb what is consumed as raw materials and eliminated as waste in one year.

According to the estimates of the United Nations, if the current trends continue by 2030, humankind would need two Earths to function and by 2050 three Earths. The situation gets more complicated due to the fact that globalization determined more and more people worldwide, most notably from Asia, to join the ranks of western style middle class and therefore to increase their consumption of resources. The research based on 2011 data, shows that if all the people on Earth would live as an US citizen, then 4.1 Earths would be necessary.

Starting from this we can say that the dilemma of our times is to deny the people outside the western world the right to enjoy a similar standard of living. This would be unacceptable according to any ethical standards. To pursue the achievement of this western living standard for the majority of the world population, with the existing technologies, would be impossible given the limited resources of our planet Earth.

Due to the process of globalization, that dramatically increased the inter-connection and inter-dependence among all actors from the global economy, even if they are transnational corporations, small companies or countries, long term solutions could not be found individually, at whatever level.

A simple example is the strategy adopted by the European Union, by implementing which it enacted stronger environment protection regulations that determined large companies to simply relocate to other parts of the world where environment protection is not that strict. Global governance and global regulations may represent a solution for this type of situations but such a solution is not for the near or even foreseeable future.

### **3. EUROPEAN UNION'S PROGRESSION FROM LINEAR TO CIRCULAR ECONOMY MODELS**

The gradual increase of awareness on the soon to be reached limits of the linear economy determined interest for the design of a new model of economic organization that would provide the necessary goods and services for maintaining and improving living standards for more and more people without ever increasing the consumption of raw materials and the quantity of waste ejected into the environment. To call into question the idea of a perpetual economic growth is still a delicate matter. As Tim Jackson observed in his book "Prosperity Without Growth? The Transition to a Sustainable Economy". According to him, questioning growth is deemed to be the act of lunatics, idealists and revolutionaries. But still, we must question an uncontrolled linear growth.

The difficulty to question the idea of economic growth as a measure of development has also been proofed by the reaction to the economic crisis that started in several parts of the world in 2008. People expected that sooner or later we would return to growth or, in other words, to business as usual. To think about "prosperity without growth" is difficult because this requires a new frame of mind, a new perspective. And above all it requires us to invest in change, a profound change just like the one that had marked the first industrial revolution.

Fortunately, such a new perspective exists, namely the "Circular Economy". It is not the only new perspective and it is not by far perfect and ready to be used out of the box. But it is feasible because it has already been tried by several companies and because it is endorsed by the European Union.

The official position on the European Commission on the circular economy was presented on December 17<sup>th</sup>, 2012 under the name of a manifesto for a "Resource-Efficient Europe". This document emphasized from the first paragraph that: "In a world with growing pressures on resources and the environment, the EU has no choice but to go for the transition to a resource-efficient and ultimately regenerative circular economy". This statement called for a circular economy and for a society that will be able to provide a way out of the crisis and, at the same time, a way towards the reindustrialization of Europe for ensuring an efficient growth that will be sustainable.

The concept of circular economy has already been applied by a number of representative entities from the business sector and in July 2014 it was also more clearly presented in a communication report from the European Commission which refers to a radical change in the perception and use of resources.

In this new perception, resources are no longer something obtained at a cost of the environment in a linear way (a linear way means that more production requires more resources obtained from the environment and more

waste returned into the environment with disregard of the sustainability of the process) but are rather obtained as components of the production process that is designed in a circular way (meaning that resources are initially obtained from the environment but afterwards waste becomes itself a resource and it is indefinitely re-cycled in the economic process).

The circular economy concept mentioned above does not refer to a perpetuum mobile. Energy is indeed consumed in order to put and maintain the economic process in function and waste still exists; but both energy consumption and waste exiting the system are orders of magnitude lower than that in the current economic and technological processes.

The large-scale implementation of the circular economy involves a paradigm shift because it includes all aspects of the social and economic activities. By its comprehensive, all-encompassing content, the circular economy differs from earlier, partial attempts concerning only selective collection of waste or individual attempts to recycle or to increase energy efficiency.

Firstly, the circular economy would imply the ending of the throwaway society to a large extent. Secondly, the circular economy would mean the renunciation of the “Make, Use, Dispose” cycle as a way of organizing production and the transition to a “Reuse and Recycling” approach. A very brief and simple definition of circular economy is that when “your outputs become your inputs”. According to the European Commission, “A circular economy preserves the value added to the products for as long as possible and virtually eliminates waste. The resources are retained within the economy when a product has reached the end of its life, so that the resources remain in productive use and create further value”.

#### **4. HIGHLIGHTING THE DIFFERENCES BETWEEN THE CIRCULAR ECONOMY AND THE LINEAR ECONOMIC METHODS TO IMPROVE ENERGY EFFICIENCY AND RESOURCE CONSERVATION**

Some aspects distinguish the circular economy concept from previous attempts to reduce energy and material consumption as well as to reduce pollution under all its forms of manifestation.

The first aspect refers to the holistic approach that characterizes the circular economy. The circular economy refers to all activities carried out in a society. It starts with the design of products, services and processes. These have to be designed in such a way as to be more durable, repairable and upgradeable, in order to allow remanufacturing and recycling for the same industry or for others. Therefore, the fundamental difference between the circular economy and the linear (existing) economy refers only to some materials and parts that are recycled and consists in the fact that in the circular economy products, services and industrial processes are designed and conceived in a way that allows a longer life cycle and the possibility to be repaired, to be upgraded or to be remanufactured (restored to a brand-new condition). Besides, from the design phase of products and services it should be taken into account that when their life cycle ends, they will represent inputs for other industries.

Such an approach would mean less throw away of products (single use products) and more production of very durable, repairable, and upgradeable products. But the underlying question is how will this approach fit with the current trends and life styles that put a premium on novelty and encourage consumers to buy new products just because they are new remains to be seen. Even this simple question gives an indication of the difficulty with regard to the implementation of this new approach.

The second aspect refers to the scale on which the companies will rely on re-using, recycling and remanufacturing products during their industrial activity. The large-scale implementation of such an approach will reduce the energy needed to produce whatever product and will require less raw materials. At the same time, in order to be successful, such an approach will require an intense networking and collaboration among companies from different sectors of activity and also an intense partnership among companies and consumers. This aspect also points out the fact that the circular economy will require changes in education, values and behaviours of producers and consumers. From this point of view the difference between the linear and the circular economy is the difference between individual decisions and actions related to re-using, recycling and remanufacturing of used products. A circular economic approach facilitates a structured and systemic approach such as the one which was carried out in a regulated manner at the European Union.

We must understand that the essence of the circular economy is to maintain and recycle energy and material resources as much as possible within the economic system. In order to have a functioning economic system in an optimal way it is necessary to secure an efficient inter-linkage among industrial processes, various industries and activities. At this point it may be useful to remind the old saying that a chain is as strong as the weakest

link. Therefore, we cannot have a partial circular economy and, circular economic practices must be strictly adhered to as in case of traffic rules, everybody has to drive by the same rules at the same time in order to secure a fluid traffic without any accidents. Even if such a task may seem gigantic, it is still feasible within the European Union because the mechanism of the single market allows the implementation of rules that are observed by all participants.

From this perspective, the circular economy is feasible as a theoretical model and it is supported by small scale industrial applications that already proved the efficiency of the concept of circular economy. Therefore, the concept is valid from both theoretical and practical points of view.

The third aspect has in view the fact that in order to be functional, the circular economy needs a specific legislative and institutional framework that will cover all aspects of economic and social activity. The European Commission is fully aware of this requirement and it already started this long and very intricate process. In order to underline the complexity and implications of this process we can note that only in case of food waste there is evidence that about 30% of all food produced is lost or wasted. The Commission is considering specific measures for tackling this issue but we cannot expect a simple solution.

The fourth aspect refers to the need of selecting and developing specific indicators that would allow the implementation and further monitoring of the circular economy. While the process is underway, since mid-2014 some possible indicators have been discussed by the European Commission such as: Resource Productivity (RP) measured by GDP relative to Raw Material Consumption (RMC), water use, and usage of finite land resources. Current discussions at the European Commission have in view an increase of Resource Productivity (RP) by more than 30% by 2030.

## 5. IMPLEMENTATION OF THE CONCEPT OF “CIRCULAR ECONOMY” IN THE EUROPEAN UNION: NATIONAL INITIATIVES VERSUS EXPECTED RESULTS

While the European Commission is creating the community framework and guidelines for the transition to a circular economy, some of the more developed member states have already executed national legislation programmes to implement a circular economic approach in their respective countries. Such programmes may represent the best practices to be adopted and adapted to the specific conditions of other EU members.

Some of the most substantial initiatives directly related to the circular economy are the following:

- i. Since 2002 Germany has set an objective for the decoupling of economic growth and material consumption. In 2012 Germany adopted a law that explicitly promoted circular economy and the use of materials in a closed loop.
- ii. Since 2000 the United Kingdom has been developing an initiative named Waste and Resource Action Program (WARP) for promoting circular economy. This initiative has also received a substantial stimulus to boost its scope for augmenting a more global approach in recent years.
- iii. In 2013 France developed a roadmap for the transition to a circular economy and established the French Institute for the Circular Economy. France expected to adapt its national legislation on circular economy by 2017.

European Union as a whole considers that a strong instrument for the dissemination and large-scale implementation of circular economy is represented by the expected results obtained by the early adopters. Such results can further motivate and attract more and more companies, governments and individuals.

Among these results, the following three are worthy of attention:

- i. **Prevention of the loss of valuable resources and materials:** Initially EU economy lost annually about 600 million tonnes of materials despite existing waste management programmes. Taking action in this area has reduced costs, dependence on non-EU suppliers and exposure to high competition for resources at a global level.
- ii. **Development of new businesses and creation of new jobs:** This is maybe the most appealing result to be obtained by implementing circular economy. It was estimated that the increase of the Resource Productivity (RP) by 30% by 2030 will generate over 2 million new jobs; while eco-design, re-use and waste prevention may bring net savings of 8% of the annual turnover of EU businesses.
- iii. **Improvement of the quality of life:** Implementation of the concept of circular economy in the EU has resulted in the improvement of the quality of life by means of creating a bio-friendly economy and a safer and healthier environment.

We appreciate that the European Union has favourable circumstances for setting the European economy on a solid path towards the circular economy. The favourable circumstances have in view the keen interest of all member states and EU institutions for the relaunch of the European economy after the crisis and also for the decision to promote the reindustrialization of Europe. The existence of previous attempts and experiences related to the circular economy can now be integrated in a systemic approach.

A larger favourable circumstance is represented by the fact that other countries and global organizations are already very active in promoting the circular economy. A typical initiative in this respect is “Circular Economy 100” which is defined as a global platform for reuniting global companies, innovators, networks of academics and universities, and regions with a view to accelerate the transition to a circular economy.

Using the advantages of the information society and internet Circular Economy 100 attempts to facilitate this transition by means of three levels of support:

- i. Creating a mechanism for collective problem solving;
- ii. Building a library of best practice guidance to help businesses fast track success;
- iii. Provide a scalable mechanism for building circular economic capabilities within businesses.

The economic motivation for this transition to the circular economy is very significant because according to a recent research done by Ellen Macarthur Foundation, the net material cost savings at a global level determined by the adoption of circular economic measures may annually exceed 1 trillion US dollars by the year of 2025.

## **6. CONCLUSION: IMPORTANCE OF ADOPTING A CIRCULAR ECONOMIC APPROACH AS A FEASIBLE GLOBAL SOLUTION FOR THE UNSUSTAINABLE LINEAR ECONOMIC APPROACH**

The use, implementation and tentative regulation of the circular economy have intensified in the past years, especially in the European Union, marking the end of a more than 100 years old trend characterized by a decline of prices for numerous raw materials, goods and services.

The circular economy represents the opposite of the linear economy (model of production and consumption) that has been used on a larger scale during the 20<sup>th</sup> century. The linear economic model has been defined by the fact that goods and services are produced, sold, used and eliminated as waste once they fulfilled their function.

For many years science and technology allowed for the increase of the efficiency of the linear model and therefore the production of one unit of product or service was possible with a lower consumption of raw materials and energy. Anyway, this increase of efficiency could only postpone the moment when this type of economic system became unsustainable.

By contrast, the circular economy represents an industrial, economic, and social system based on re-use and regeneration at three levels: a) conceptual; b) organizational; and c) operational. Within this system the principles promoting re-use and regeneration are fundamental and intrinsic characteristics and not just additions or improvements of the linear economic model. A significant aspect is that the circular economy is based on the study of the non-linear systems, particularly of the living systems. From this point of view, the concept of circular economy has an approach similar with that of Nicholas Georgescu-Raegen who, at the beginning of the 1970s, proposed and studied the concept of “Bio-Economy”.

At present, the good news is that the gradual transition to the circular economic approach has already started in the real world of business where more and more companies are operating in accordance with the fact that the linear model makes them vulnerable at least from two points of view: a) the prospect of the prices increase and the associated vulnerabilities in the supply of raw materials and energy; and b) the threat of exhaustion of many conventional resources in a foreseeable future, correlated with the climate change and its consequences.

These two aspects must be put into the global context for the emergence of an additional 3 billion people belonging to the middle class by 2030, the majority of them located in the emerging economies of Asia. This will further open huge sale opportunities but, at the same time, will place equally huge pressure and even unsustainable demands on the existing systems of production and supply of raw materials and energy.

As mentioned above, from the year 2014 perspective, one of the most important aspects related to the circular economy is that this concept has been already applied by a large number of global companies which have shown notable results with regard to the implementation of circular economic approaches. One of these companies is the Renault which allows, among other things, the re-conditioning of auto parts (a process which saves 80% of energy, 88% of water and 77% of material waste in comparison with normal technological

processes for obtaining such parts from raw materials for the first time) and the re-positioning of some of its suppliers of industrial fluids as suppliers of industrial solutions (a change of approach and of technological process flow that reduces by 20% the total cost of operation).

Philips is another significant supporter of the circular economy. Applying this new concept, Philips proposed to the local authorities to deliver to them lighting services instead of lighting products. In this case all technical aspects (maintenance, replacement, modernizing, optimizing) remain in the responsibility of the Philips company and two important consequences have positively impacted: a) the beneficiary (local authorities) that is the organization of municipal services as the process has become more simplified with the outsourcing of the lighting services; and b) the supplier (Philips) for which the whole process became more efficient and effective as it vertically integrated the processes of designing, production, choice of lighting solution, implementation, maintenance and re-cycling related to this activity.

These two examples show that the circular economy focuses on optimization of systems and not of components and therefore makes a very clear distinction between the consumption of materials and the use of materials.

As a result, the circular economy proposes a business model in which the economic actors preserve the value of their property and goods and act as suppliers of services, thus selling the use of products and not the products themselves. This approach, from the very beginning, makes the producers design and manufacture their products in such a way as to fulfil the requirements of durability, re-usability and bio-compatibility with the environment.

In my opinion, due to these characteristics, the circular economy may be a comprehensive solution for the complex problems existing today in Europe and in the world economy as a whole. The concept is feasible; it can be implemented with existing technologies and can capitalize on the huge potential of the information economy. At the same time, the concept of circular economy integrates and acts in a synergic manner with other concepts that are widely accepted such as: Sustainable Development, and Low Carbon Economy. All these concepts, if strategically implemented, can ensure a sustainable communion with nature instead of an unsustainable conquest with nature.

The European Union's initiatives regarding the circular economy have all chances to be successful because these aim at assisting a process that has already been introduced and has been partially implemented by significant representatives of the business sector, being at the same time in resonance with other strategies such as Europe 2020 which have a large public support for promoting environment friendly sustainable development.

## **7. REFERENCES**

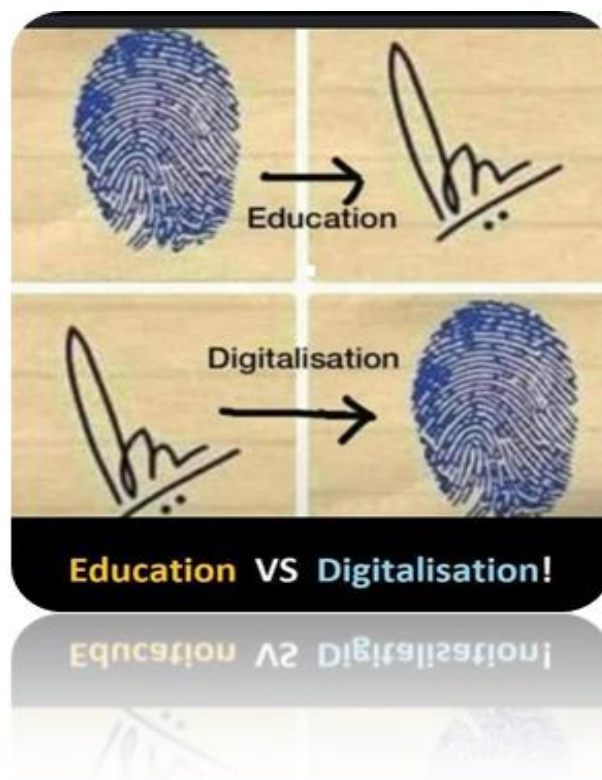
- Donella H. Meadows, Dennis L. Meadows, Jorgen Randers and William W. Behrens III, *Limits to Growth*, New York: New American Library, 1972, p. 189.
- Felix Preston, *A Global Redesign? Shaping the Circular Economy*, Chatham House Briefing Paper, March 2012.
- Ian Johnson, *Limits to Growth Revisited by Ugo Bardi*, Springer Briefs in Energy, 2018, p. 120.
- Jeremy Rifkin, Ted Howard, *Entropy: A New World View*, The Viking Press, New York, 1980, pp. 11-14.

## AI IN ATMS-PERSONALIZED BANKER MACHINE

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*In this modern era, the ATM system is enhancing Banker's job for performing financial transactions like cash withdrawal, cash remittance, check account balances, etc., The current ATM system uses ATM cards and PIN for authentication. Considering the risk of handling cards, the current Pandemic situation, and technological innovation for better client services, this project proposes a smart ATM i.e., Personalized Banker Machine (PBM) using Iris scanner, fingerprint (biometric) authentication, voice recognition & OTP for accessing the user's Bank Account with the help of existing Bank details and UIDAI, in order to interact with customers applying Artificial Intelligence (AI), Machine Language (ML) & Robotic Process Automation (RPA). In this process, the bank will collect customer's fingerprints, mobile numbers, emails and names or extracting data from UIDAI for the new to bank customers and on the other hand, PBM could fetch the existing details of the customers. PBM will store these personal details of a specific user will be stored into the back end, i.e., in the bank's cloud storage. The AI program used in PBM makes interaction easy with the customer and ensures that illiterate people can also access the latest financial technology. The main aim of the proposed research article is to develop a multi-layer security system, reduce the cost to banks, increase onboarding of new customers, cross-selling third-party products, better customer experience, and enable a touch-free PBM system & to enable the use of biometric as a safety feature to reduce the customer walk in and access banking operations during this Pandemic.*

**Keywords:** ATM, Biometric, UIDAI, PBM, ML, AI, RPA.

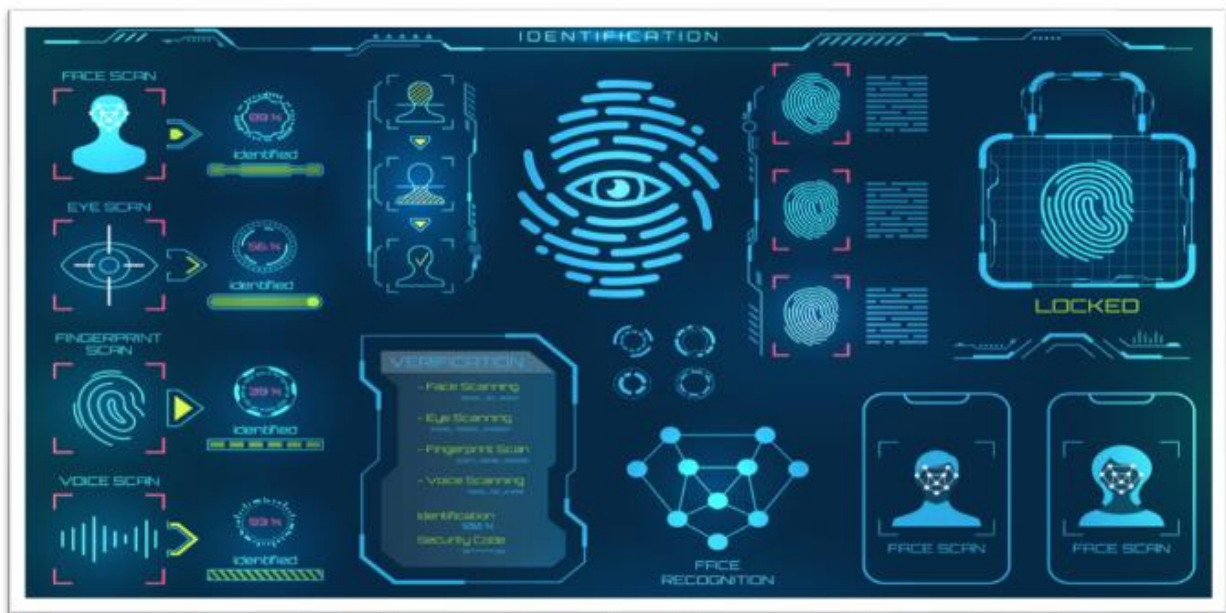
**INTRODUCTION**

ATM (automated teller machine) a computerized telecommunication device that provides customer with access to financial transactions in public space without the need for bank teller. The first ATM was installed in Enfield town in London on June 27, 1967 by Barclays bank. ATMs are known by various names like Automated Transaction Machine, Automated Banking Machine, Cash point (at Britain), Hole in the wall, Ban comet (In Europe and Russia), Any time money (India).





This Research Paper Proposes to create technological awareness in banking and transaction system which is changing the world by its validation, authentication and confirmation of person's identity. Hence, Biometrics is one of the best strategies for security, authenticity and confidentiality. The combination of Iris scanner, fingerprint (biometric), voice recognition & OTP authentication through PBM can improvise security features in Banking system and a facility to be in use with the recent COVID pandemic situation.



## LITERATURE SURVEY

Ankita Mahajan, Radhika Mande, Avinash Mhaske, Parth Shete & Dr. S. B. Dhoot, (2019), "Artificial Intelligence Based Smart ATM". This paper suggests that the Artificial Intelligence program will remove illiteracy and make every banking transaction easier. They have proposed that the AI will avoid theft and non-dependency of PIN number as a security protocol for customers. Instead they have proposed to build a multiple layers of security through Biometric Authentication, automatic door lock system, image processing inside cash tray for detection of insufficient funds and currency scanning so that the torn notes will be scanned and removed to ensure reduction the ATM frauds and improve security level of all financial transactions.

Renu Bhandari, Jasmeen Gill, (2016), "An Artificial Intelligence ATM forecasting system for Hybrid Neural Networks". This paper suggests that random genetic algorithms is the technique suitable for real time & accuracy demanding ATM forecasting system. Neural Networks have become increasingly popular in finance for tasks such as pattern recognition, classification and time series forecasting. This technique will become very necessary to have a forecasting system in order to get a clear picture of demand well in advance.

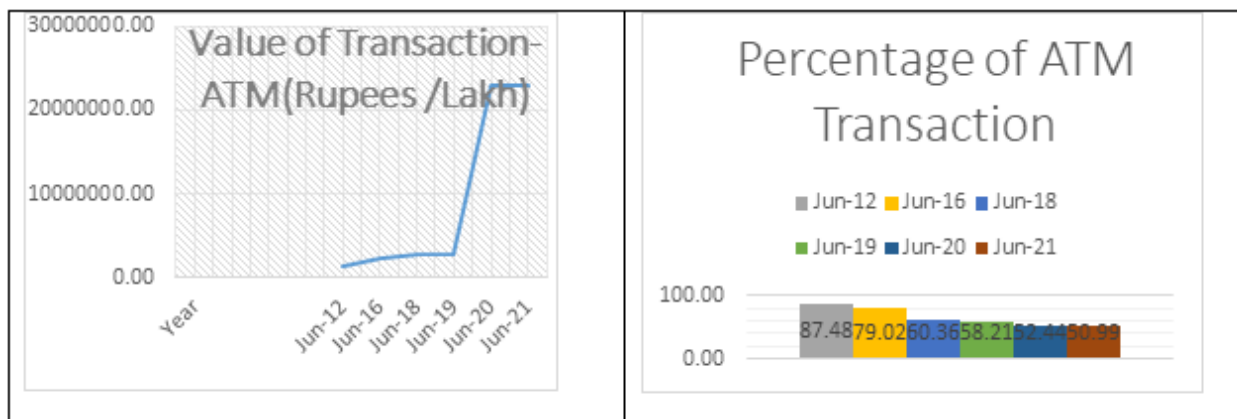
The following set of data from RBI public domain, illustrates the total number of teller machines which has been placed in Metros, Urban, Semi-urban and rural parts of India.



RBI data as per quarter ending June 2021

NAME OF THE BANK/ ENTITY	Total Centers (Metro, Urban, Semi-Urban & Rural)
<b>Scheduled Commercial Banks:</b>	
Public Sector Banks	136,889
Private Sector Banks	73,750
Foreign Banks	841
Payment Banks	130
Small Finance Banks	2,156
White Lab	25,995

As per the latest RBI report for the month June'21, there are about 239,761 ATM's. The existing machine can be upgraded to PBM for this research proposal to replace the existing tellers in all bank branches. Post 2016, Demonetization and Digital India Evolution, the usage of ATM's & internet banking has increased drastically in the banking system through NEFT, RTGS, IMPS & UPI. The customer's need from the banking system towards money and transactions has led to the increase of digital transactions.



### PROBLEM STATEMENT

ATM is the most preferred mode for withdrawal of cash at any time which is more essential in the time of crisis with cash. Our Endeavor is to negate all the disadvantages like cash out, Card skimming, lack of personal service, customer's forgetting PIN etc., of existing ATM and will enhance its services through latest Financial Technologies. The proposed upgraded version of ATM i.e., PBM can transform in accessing with various facilities as follows:

- ATM CASH OUT:** PBM can use the existing ATM cash use data available with bank and with the help of data analysis, it will evaluate the cash requirement of each PBM maintained by the bank. Using Predictive Technology, it can suggest the approximate cash requirement for each PBM in the forthcoming days. This helps to reduce "cash out" notification and also reduce the dead cash deployed by banks and reduces the cost of Bank.
- TARGETED BY CRIMINALS LIKE STEALING PIN OR SKIMMING CARD, OR FORGET YOUR PIN:** To avoid common frauds like Card Skimming and stealing or copying PINs, PBM offers is a Vocal, fingerprint and iris scanner along with OTP enabled authentication. Fraudsters cannot do the same with fingerprints as spoofing fingerprints is a fairly complex process, which is not always a 100% success. As uses for voice recognition software will have more data and information to feed of the customer into the neural networks (banks cloud storage) that power voice recognition systems, thus improving the capabilities and accuracy of the voice recognition products. Live finger has many optical, electrical, and mechanical properties that cannot be presented by a fake replica or a spoof and so customer's hard-earned money is safe.
- TAP FOR CASH:** Almost all new cards both Credit and Debit cards are issued with the facility of wifi or contactless cards from Visa, Mastercard, American Express and Rupay through banking channels. As per the latest RBI norms, starting from 1<sup>st</sup> Jan'21 a customer can use their cards for shopping amounting to INR.5000/- without PIN/SIGNATURE through contactless cards using Near Field Communication (NFC). NFC technology allows users to make secure transactions, exchange digital content, and connect electronic devices with a touch. NFC transmissions are short range (from a touch to a few centimeters). By implanting NFC into PBM machines which can recognize all the wifi enabled cards from a distance up to

4cm. So, both our existing as well as New to Bank customers can just tap to get the cash withdrawn or remitted without any Pin on an ease. Customers can do transactions even without an ATM card and need not remember several pins.

4. **LACK OF PERSONAL SERVICE:** Most of the ATM users in India are either seeking the help of the security personal in the ATM or the customers who are entering the ATM center for their transactions. However, PBM help's the senior citizens, disabled personal, even an illiterate person who doesn't know how to operate an ATM. A person who is waiting for hours together with a token just for a query or for a transaction, will definitely be benefited with this personal service through PBM 24x7.
5. **OTHER SERVICES EXCEPT CASH:** The PBM provides multiple services in a single platform like bill payments, recharges, ticket bookings, insurance payments, etc., or even suggestions for investment or purchase of any wealth products and other suitable offerings. All the transactions can be made by Multi-lingual AI (NLP-Natural Language Processing) voice-based command and Voice to text NLP would be used to decode the instruction and the facilities would be available in English and other 18 local Indian languages like: Hindi, Tamil, Malayalam, etc., The API available with Banks would be used for opening new Bank accounts, error free banking transactions without manual intervention, for providing all the bouquets of services and amount would be debited from Aadhar seeded account of the customer using AePS(Aadhar Enabled Payment System).

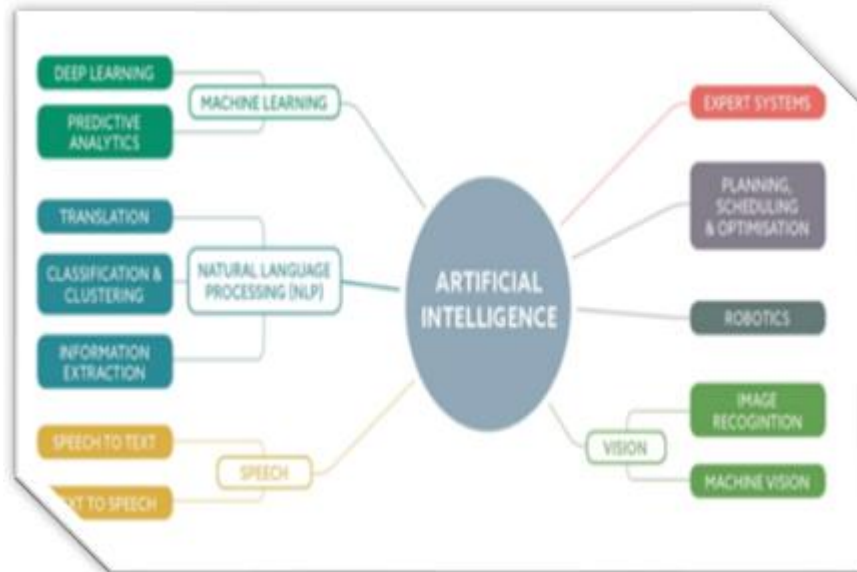
#### AVAILABILITY OF DATA

- For all existing customers in the bank, PBM will fetch the details from the bank's cloud storage. Data like customer name, customer ID, A/c number, contact details, email ID's can be fetched using AI.
- For all new to bank customers, they can directly use their cards or by using their biometric where the data will be fetched from UIDAI from their Aadhaar seeded accounts. This can also help the bank to extract data like name, date of birth, address and mobile number of this new customer using PBM.
- Other data can be fetched with the quantum of cash transactions being done over the years at a specific erstwhile ATM center to manage cash effectively and the Account transaction history of a specific PBM user.
- Details of preferences of the user like use of specific services and payment made.
- Public API data can be collected from different utilities payments bills like water bill, electric bill, travel payments, mobile recharges, etc., using BBPS and data from investment banking products like insurance payments, mutual fund payments, share trading details, etc.,

#### METHODOLOGY

A methodology is the specific procedures or techniques used to identify, select, process and analyze information about the research or project. There are many analytical techniques which are broadly be grouped into regression techniques and machine learning techniques. Under regression techniques, we have Linear regression model, Discrete choice models, Logistic regression, Probit regression, Logit versus probit, Time series models, Survival or duration analysis, Classification and regression trees (CART) and Multivariate adaptive regression splines. But for our research article we are using Machine Language Technique to critically evaluate our study's overall validity and reliability in Iris, speech and biometric recognition.



- Based on the data available, bank's cloud and the customer's activity, we can use Predictive Model (Historical Data) like EMI's, SIP's, different types of transactions (NEFT, RTGS & UPI). Using this historical data, we can use Decision Model to propose the customer's preferences like routine withdrawal/ cash deposits amounting to INR 10,000/-, payment of his/her credit card bills and can propose personal loan/ housing loan based on his /her salary income & EMI commitments.
- For a new to bank customers who is using his/her card or biometric, we can extract data from UIDAI about the customer for details like name, address, DOB, age & contact details. We can use descriptive model (by providing all the banking products) to get the customer onboard. By using Decision model, we will be able to open savings account of a new customer generating a Customer ID & Account number instantly using PBM.



- **SEGMENTATION:** PBM can be used by both existing customers or non-existing customers inside a bank's branch or any ATM center. But based the bank's customer base and demand, each banks can also deploy or install PBM in a place where financial transactions are identified like hospitals, malls, universities, etc., Since PBM is an open interactive machine which can be operated by anyone and anywhere, it doesn't have any time limit or any specific location to be installed.
- **KEYWORD EXTRACTION:** Machine language can mimic some behavior known as keyword extraction in Natural Language Processing (NLP) using Voice recognition through PBM. So, this recognition of customer details will depend on extracted keywords from the sample voice data stored in the bank's cloud. The keyword extraction process not only separates the voice, but saves time by interacting with the customer and taking decision to respond immediately based on their keywords

## CONCLUSION

The following table shows the proposed PBM in the near future:

EXISTING ATM	PROPOSED PBM
	 <p><b>Topper</b> Optional LED Topper Sign Can accept custom inserts</p> <p><b>Integrated Illuminated Sign</b> High Visibility LED Sign Attract Customers</p> <p><b>LCD Screen</b> 8 inch diagonal 32-bit color Backlit TFT LCD panel 800 x 480 Resolution 10.2" touch-screen Optional Customizable Ad Screens</p> <p><b>Printer</b> 56mm (2" standard) 80mm (3" optional) Graphics Capable with 3"</p> <p><b>PIN Entry Device</b> 16-key alphanumeric keypad PCI / Interac Certified Triple-DES (TDES) EPP</p> <p><b>Communication</b> 56Kb Internal modem TCP/IP Ethernet - SSL</p> <p><b>Biometric Reader</b> Fingerprint / Face /Iris /Palm vein recognition</p> <p><b>CPU</b> Samsung 32-bit CPU 64MB RAM / WinCE™ 5.0 OS Electronic Journal &gt; 40K transactions</p> <p><b>Card Reader</b> DIP Style Magnetic Card Reader EMV Optional</p> <p><b>ADA</b> Voice Guidance Lighted Transaction Guidance Accessible Keypad Layout</p> <p><b>Security</b> Business Hours Vault Dial or Electronic Lock</p> <p><b>Cash Dispenser</b></p>

At the World Economic Forum 2018, Justin Trudeau addressed the audience stating that, “The pace of change has never been this fast, yet it will never be this slow again.” The way world is changing at an unimaginable pace with technology being the harbinger of change. Nevertheless, one of the most commonly used technology products, the ATM has rarely been upgraded to offer better customer experience. As technological advancements increase, the need for personalized engagement increases as well. With vast amount of consumer data available, the banking industry has the potential to understand how and when to best engage with customers and to deliver experiences making each engagement more personalized which will be the key to success for any organization. Accordingly, the PBM project tries to address these issues and has lots of benefits like offering all banking functions with no fear of theft, card skimming or stealing of PIN, and can support the Government of India’s ambitious Financial Inclusion project by assisting even the Illiterate people to use PBM, negates the need for remembering multiple Pins, provides apt financial advices, targeted marketing, optimum Cash management for Bank, lower cost than Brick & mortar bank branches and more of a financial supermarket than a mere cash dispensation machine.



## GLOSSARY

<b>ATM</b>	<i>Automated teller machine</i>
<b>PBM</b>	<i>Personal Banker Machine</i>
<b>AI</b>	<i>Artificial Intelligence</i>
<b>ML</b>	<i>Machine Learning</i>
<b>RPA</b>	<i>Robotics Process Automation</i>
<b>NLP</b>	<i>Natural Language Processing</i>
<b>UIDAI</b>	<i>Unique Identification Authority of India</i>
<b>RBI</b>	<i>Reserve Bank of India</i>
<b>AePS</b>	<i>Aadhar Enabled Payment System</i>

## REFERENCE

- <https://www.rbi.org.in/>
- Ankita Mahajan, Radhika Mande, Avinash Mhaske, Parth Shete & Dr. S. B. Dhoot, (2019), “Artificial Intelligence Based Smart ATM”, International Research Journal of Engineering and Technology (IRJET), e-ISSN: 2395-0056, p-ISSN: 2395-0072, Volume: 06 Issue: 11, Pp.1087-1090.
- Renu Bhandari, Jasmeen Gill, (2016), “An Artificial Intelligence ATM forecasting system for Hybrid Neural Networks”, International Journal of Computer Applications (0975 – 8887) Volume 133 – No.3, January 2016, Pp.13-16

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**AN APPROACH TO ENERGY EFFICIENT DESIGN FOR NATURALLY VENTILATED MASS HOUSING USING LIFE CYCLE ENERGY AND LIFE CYCLE COST ANALYSIS**

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**ABSTRACT**

Globally, residential buildings use a large portion of energy among various sectors and hence require energy conserving measures to achieve sustainability. In Himachal Pradesh, a housing board namely Himachal Pradesh Housing and Urban Development Authority (HIMUDA) is responsible for developing mass housing. It is seen that due to lack of energy efficiency regulations, the housing colonies developed using standard house designs for various income groups like HIG, MIG, LIG and EWS, in which the houses of standard design are constructed at various locations in the state that results in development of prototypic colonies at many locations. This paper analyses the most common prototype design of HIG residences used in most of their colonies in Himachal Pradesh including the study area named Nayanagar, Hamirpur. The study calculates, for 50 years as life span, the embodied energy of existing houses using material specifications, operational energy and total Life Cycle Energy and their respective costs using Himachal Pradesh Schedule of Rates /market survey and Rs. 4.7/kWh (current market price) as operational energy cost. The study further identifies and compares the embodied energy, operational energy and Life Cycle Energy and Life Cycle Cost of three other alternatives developed in same plot area of 144m<sup>2</sup> but with varying design characteristics such as house type, room sizes, built up area, exposed surface area, volume, compactness ratio, exposed walls area, window area and Window to Wall Ratio (WWR) and finally the impact of each factor on embodied, operational and total energy and their respective costs is determined. The study analyses the impact of design on Life Cycle Energy and Life Cycle Cost.

*Keywords: Life Cycle Energy; Life Cycle Cost; mass housing; Himachal Pradesh*

**1. INTRODUCTION**

As per International Energy Agency (IEA), the residential buildings consumed about 10% of the world delivered energy in 2013 [1] and has reached 26.92% in 2021 [2], at the rate of 2.12% than anticipated rate of 1.5% per year in 2013. Further, the electricity consumption of residential buildings accounts for 28% of the total energy use in non-Organization for Economic Cooperation and Development (non-OECD) countries which is continuously rising. Hence, there is a need to control energy demand in residential buildings. In Himachal Pradesh, Himachal Pradesh Housing and Urban Development Authority (HIMUDA) was established in 2004, to plan and fulfil Housing needs of different income groups through planned development of Housing colonies [3]. It is responsible for developing and providing mass housing to the people in and outside the state of Himachal Pradesh and provides built houses, residential plots and flats to the masses and has developed many housing colonies in various places in the state. One such development of Housing colony was done at Nayanagar, Hamirpur in 1998 where in 72 HIG and 19 MIG houses were developed under the regulations framed by Town and Country Planning Department [4]. Nowadays, energy efficiency is one of the major targeted objectives, has been introduced by many countries during the last few decades [5]. With the same objective in mind Himachal Pradesh government, in 1994, introduced the Ministry of New and Renewable Energy (MNRE) financed Passive Solar Building Program [6] under which the development of public, semipublic and under various government buildings including Housing board shall have solar passive design. Later on, in 2009, the government included solar passive building design [7] into the Town & Country Planning Rules. Further Energy Conservation Building Code (ECBC) has been notified in the state, but is limited to commercial buildings [8]. Built residential buildings, the outcome of a preconceived design, consume various types of energy throughout their life cycle and hence the design must be made intentionally energy efficient that must be carefully selected among alternatives. Therefore, the preconceived design must be evaluated along with its suitable alternatives for their performance towards various types of energies throughout during its entire designed life span. The scope of this study is to identify the impact of change of design on the Life Cycle Energy use and Life Cycle Cost of the households. In this study the impact of various design characteristics such as total exposed area, volume, compactness ratio and Window to Wall Ratio (WWR) of the existing house and three other alternatives have been compared. The methodology of the study is shown at Fig.1.

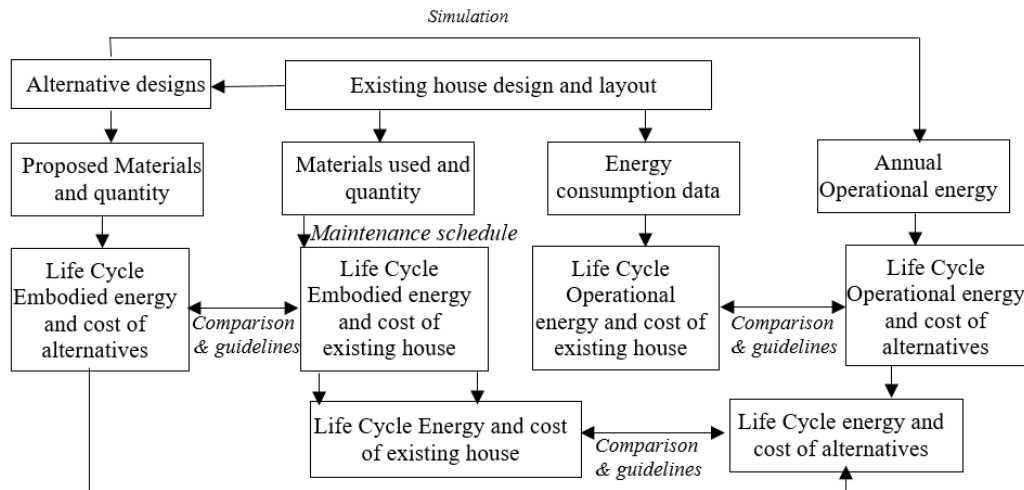


Fig. 1. Methodology

## 2. LITERATURE REVIEW

As per definition given by Ding [9], embodied energy includes the energy consumed by any material during the extraction of raw materials, transportation of the original raw materials, processing, manufacturing of building materials and components and energy use for various processes during construction and demolition of the building. In India, studies by Kumar et al. [10], Reddy and Jagadish [11], TERI [12], Harrison [13], Chani et al. [14], Gumaste [15] and Maini [16] highlighted embodied energy values of various building materials using a cradle to gate approach. Dixit et al. [17], found various factors responsible for variation in the calculation of embodied energy of materials and therefore an embodied energy index of various common materials used in the study area has been developed [18] and the same has been used in this study. Gago et al. [19] developed an energy model considering lighting energy using physical characteristics and energy use pattern of the house for the residential sector in Andalusia, Spain. Kjaerbye et al. [20] studied the effect of the building characteristics, socioeconomic parameters and weather data on energy consumption in single-family houses in Denmark to determine the buildings energy consumption for heating using natural gas over different periods of time (before, after changed regulations). Also, a methodology is developed to determine the energy consumption pattern using classification of residential stock of Hamirpur for energy performance [21]. Andersen & Sattrup [22] studied the impact of height/width ratio of buildings located in urban street with the energy use for heating, daylighting, ventilation and cooling in a building. Similarly Ratti et al. [23] studied the relationship between energy use and urban texture of a typical cluster of 3 cities namely London, Toulouse and Berlin. It was found that energy use is not only dependent on building design, systems used in building & their efficiencies and occupational behaviour, but also on urban geometry as it was found affecting the solar gain and daylight of the building. Hence the surrounding physical characteristics are included in this study. Kaza [24] used RECS 2005 data of 4382 houses and found that household space heating and cooling energy use is dependent on housing type than on housing size. Hence the possible house types are considered in this study. Monteiro et al. [25] suggested to use the Life Cycle Energy Analysis rather than most preferred Operational Energy Analysis, which evaluating the household for energy consumption. Further, in this study, a new house was compared with the existing 25 years old house having improved building envelope conditions in the Portuguese context using the Life Cycle Energy method. It was found that the new design saves more energy than the old design. It is seen that in Life Cycle Analysis, most commonly two forms of energy are considered: embodied and operational for a certain life span of building [26], [27], [28] i.e. 50 years.

## 3. MASS HOUSING AT HAMIRPUR

The housing colony at Nayanagar comprises of 93 houses, designed and developed by HIMUDA and sold to individuals. It consists of 23 Middle Income Group (MIG) and 70 High Income Group (HIG) houses those have 2 access gates from Hamirpur –Galore road. The layout along with a landuse breakup is shown at Fig. 2. The total site area is 29724.88 m<sup>2</sup>. The plot size of HIG plot is 9 x 16 m. And MIG plot is 8 x 14 m. The site is sloping toward southeast side. The specifications of typical HIG house are shown in Table 1. Each house is single storied building having front and rear setbacks of 3 m and 2 m respectively and is naturally ventilated building.





Fig. 2. Layout of mass housing, Nayanagar Hamirpur

Table 1. Specifications of a HIG house

Item	Specifications
Floor	Cement concrete flooring
Concrete slab	125mm RCC + 10mm plaster inside
Walls	230mm brickwork with 10mm plaster both sides
Partition wall 135mm	110mm brickwork with 10mm both side plaster
Doors	38mm wood panel door (inside), Mesh panel with wooden frame (outside)
Casement Window assembly	Wooden frame 120mm X 55mm, 5mm clear glass single glazed (outside), Grill 8 mm square bars, Mesh Panel fixed to wooden frame (inside)

The typical cluster arrangement of HIG houses is shown in Fig. 3. The typical plan of pair of house is shown at Fig. 4.

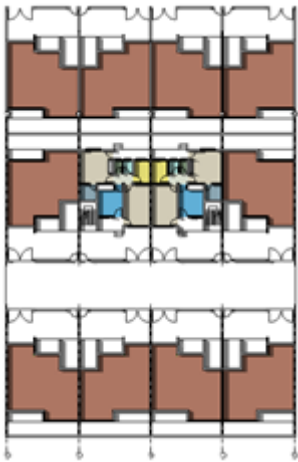


Fig 3: A Typical mass housing cluster



Fig 4: Plan of a pair of Typical HIG House

#### 4. ENERGY CONSUMPTION PATTERN OF EXISTING MASS HOUSING AT HAMIRPUR

As mentioned in the literature review, two types of energy are considered in this study, namely embodied energy and operational energy and their respective procedure adopted are discussed one by one.

##### 4.1 Embodied energy

The embodied energy of every building envelope material has been calculated as mentioned in equation 1, as shown below.

$$EE_{Total} = EE_{init} + EE_{Maint.} \quad \dots (1)$$

Where,

$EE_{init}$  = Initial Embodied energy of the building (MJ) and is calculated using equation 2, and

$EE_{Maint.}$  = Embodied energy for maintenance (MJ) and is calculated using equation 3

$$EE_{init} = \sum_{i=1}^n Q_i EE_i \quad \dots (2)$$

Where,

$Q_i$  = Quantity of material ( $m^2$  or  $m^3$ )

$EE_i$  = Embodied energy of the material (MJ)

$$EE_{Maint.} = \sum_{i=1}^n q_i EE_i \frac{50}{x} \quad \dots (3)$$

Where,

$q_i$  = Quantity of material required for maintenance ( $m^2$  or  $m^3$ )

$EE_i$  = Embodied energy of the material (MJ)

$x$  = Maintenance Span in years (as per maintenance schedule)

The maintenance schedule considered for this study that the structure does not require any maintenance throughout the span of 50 years, except painting work that has to be undertaken in every 5 years.

The embodied cost ( $C_M$ ) is calculated as per equation 4 below.

$$C_M = \sum_{i=1}^n Q_i C_i \quad \dots (4)$$

Where,

$Q_i$  = Quantity of material ( $m^2$  or  $m^3$ )

$C_i$  = Cost of material (Rs.)

##### 4.2 Cost of materials and cost of initial construction

The cost of various identified building envelope assemblies is calculated from the Himachal Pradesh Schedule of Rates (HPSR) 2009 given by [29]. As the cost given are for 2009 and hence, 25% extra is added to the mentioned cost to predict present cost for the year 2021. In the absence of rates for some materials in HPSR, the market rates are taken. Considering the maintenance schedule, the total Life Cycle Embodied Energy and construction cost is determined and shown in Table 2.

**Table 2. Embodied energy of one existing House**

Assembly		Area	Embodied energy/unit assembly (MJ)	Life Cycle Embodied Energy (MJ)	Construction Cost/unit (Rs.)	Total Cost (Rs.)
Wall	Brickwork	255.7	2526.399297	646000.3	5519.674	1411380.672
	Painting	511.4	32	327296	72.5	370765
Windows		20.88	-	10968.1189		252827.9172
Floor		93.2	425.3887409	39646.2307	1187.737	110697.0511
Roof		172.7	353.9695	61130.5327	1400.31	241833.537
Total				1085041.18	Total cost	2387504.18



### 4.3 Operational energy

A survey was conducted using interview method in which data was collected using questionnaire from 12 houses (3 houses of each orientation). Data on one-day energy consumption, for four months each representing a season, of various appliances was recorded along with the appliance wattage to obtain monthly breakup of average energy consumption. Also energy bill information from Himachal Pradesh State Electricity Board, so that the breakup determined must be within 10% range of per day consumption as per day energy meter reading. The data obtained for all houses is shown in Table 3 and average energy consumption breakup was obtained. The cost of one kWh operational energy is taken as Rs. 4.7.

**Table 3. Annual operational energy consumed in each house**

House No.	Annual operational energy breakup							Annual operational energy Total * (kWh)	Annual operational energy cost (Rs.)
	L <sub>D</sub> (kWh)	L <sub>N</sub> (kWh)	H (kWh)	Hw (kWh)	C (kWh)	V (kWh)	M (kWh)		
1	98.55	234.51	547.5	538.38	547.5	2.63	972.76	2941.83	13826.6
2	34.68	88.97	0	116.34	45.63	1.64	333.06	620.32	2915.504
3	180.68	354.05	602.25	246.38	365	12.73	1120.55	2881.63	13543.66
4	70.26	167.9	109.5	150.56	228.13	16.43	731.83	1474.6	6930.62
5	73.91	24.18	0	77.56	228.13	0.12	354.78	758.68	3565.796
6	32.85	153.3	328.5	209.88	273.75	0	781.47	1779.74	8364.778
7	23.73	55.21	27.38	109.5	164.25	2.46	118.63	501.15	2355.405
8	53.38	73	219	219	120.45	0.16	353.5	1038.5	4880.95
9	53.84	93.53	219	212.16	182.5	0.16	199.29	960.48	4514.256
10	37.41	70.26	147.83	383.25	219	0.16	250.85	1108.76	5211.172
11	44.71	121.82	82.13	355.88	182.5	0.16	312.44	1099.64	5168.308
12	38.33	253.68	164.25	504.16	775.63	8.21	759.2	2503.44	11766.17

Note: L<sub>D</sub>- Lighting day time, L<sub>N</sub>- Lighting night time, H- Heating, Hw- Hot water, C- Cooling, V- Ventilation, M- Miscellaneous appliances

### 5. ALTERNATIVE DESIGNS FOR EXISTING MASS HOUSING

The plot size of the existing HIG house was 144m<sup>2</sup> and same is considered for three other comparable alternatives as per detailed given in Table 4.

**Table 4. Alternative designs**

S.	Case	House Type	Plot size (length x width in m)	Room sizes	Built up Area (m <sup>2</sup> )	Exposed Surface area (m <sup>2</sup> )	Volume (m <sup>3</sup> )	Compactness ratio	Exposed Walls area (m <sup>2</sup> )	Window area (m <sup>2</sup> )	WWR
1.	Base case	Row house	Plot size - 144 m <sup>2</sup> (16X9 m <sup>2</sup> )	As per details in Fig. 3	122.8	347	369.8	0.94	119.6	20.9	0.17
2.	Alternative-1	Row house	Plot size - 144 m <sup>2</sup> (16X9 m <sup>2</sup> )	Same number of rooms and room sizes	146	326.8	424.5	0.77	93	23.2	0.25
3.	Alternative-2	Semi detached	Plot size- 144m <sup>2</sup> (15.45X9.35 m <sup>2</sup> )		120.9	301.6	363.1	0.83	97.1	22.2	0.23
4.	Alternative-3	Semi detached	Plot size- 144 m <sup>2</sup> (12X 12 m <sup>2</sup> )		109.6	356.3	328.6	1.08	152.4	18.8	0.12

The designs of all cases are shown in Fig. 6 to Fig. 8.

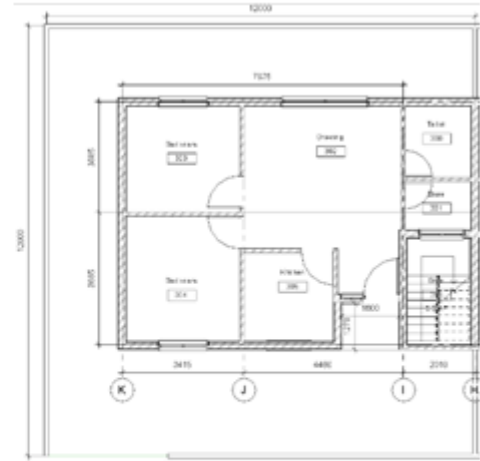
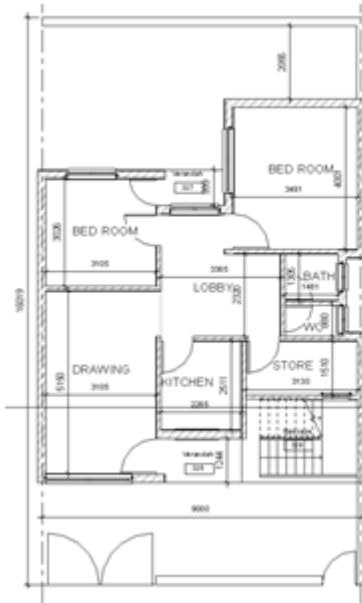


Fig. 6: Alternative-1 Fig. 7: Alternative-2

Fig. 8: Alternative-3

### 5.1 Embodied energy and cost of alternatives

The embodied energy and cost of all the alternatives is calculated and presented in Table 5. The material specification is considered same as in the existing house.

Table 5. Embodied energy and construction cost of the alternatives

Alternative-1					
Assembly		Area (m <sup>2</sup> )	Embodied energy/unit assembly (MJ)	Total Life Cycle Embodied Energy (MJ)	Total construction Cost (Rs.)
Wall	Brickwork	252.00	2526.40	636652.62	1390957.88
	Painting	504.00	32.00	322560.00	365400.00
Windows*		23.22	-	14574.37	247431.11
Floor		178.00	425.39	75719.20	211417.11
Roof		205.00	353.97	72563.75	287063.55
Total				1122069.94	2502269.65
Alternative-2					
Assembly		Area (m <sup>2</sup> )	Embodied energy/unit assembly (MJ)	Total Life Cycle Embodied Energy (MJ)	Total construction Cost (Rs.)
Wall	Brickwork	166.09	2526.40	419600.96	916743.67
	Painting	332.17	32.00	212590.79	240825.51
Windows*		22.19	-	13600.93	265776.31
Floor		155.10	425.39	65978.34	184219.48
Roof		197.64	353.97	69959.50	276761.09
Total				781730.52	1884326.05
Alternative-3					
Assembly		Area (m <sup>2</sup> )	Embodied energy/unit assembly (MJ)	Total Life Cycle Embodied Energy (MJ)	Total construction Cost (Rs.)
Wall	Brickwork	182.40	2526.40	460815.23	1006788.56
	Painting	364.80	32.00	233472.00	264480.00
Windows*		18.79	-	11471.05	240524.36
Floor		140.70	425.39	59852.20	167114.54
Roof		174.20	353.97	61661.49	243934.00
Total				827271.97	1922841.46

\*In windows, the actual quantity of each material is calculated and further their total embodied energy and cost is calculated

## 5.2 Operational energy use of alternatives

The operational energy of alternative designs is determined using energy simulation software named Autodesk Ecotect 2011. The thermal comfort range adopted for this study is 18.9°C to 27.9°C and the weather file used is as determined by author [26] and the simulation parameters are used as mentioned by author [21]. It is assumed that the change in design does not impact the energy demand for ventilation, hot water and appliance consumption and hence is considered constant in all alternative designs. The calculated data is presented in Table 7.

**Table 7: Operational energy consumption of alternative design**

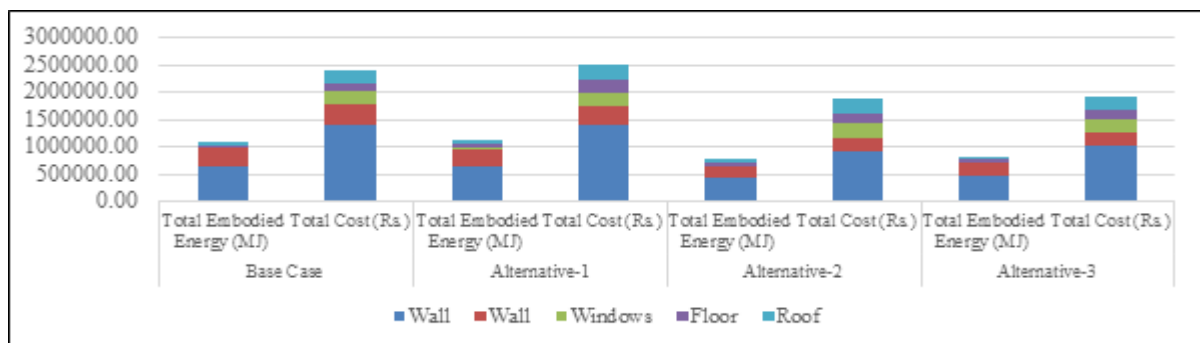
Case	L <sub>T</sub> (kWh)	H (kWh)	Hw (kWh)	C (kWh)	V (kWh)	M (kWh)	Annual operational energy Total (kWh)	Life Cycle	
								Operational energy	Cost @Rs. 4.7/kWh
Existing house	61.9	203.9	277.7	260.3	37.3	524	1365.1	68255	320798.5
Alt-1	11.4	165	277.7	239.1	37.3	524	1254.5	62725	294807.5
Alt-2	28.7	240.2	277.7	191	37.3	524	2619.6	130980	615606
Alt-3	82.8	703.1	277.7	1148.2	37.3	524	2773.1	138655	651678.5

L<sub>T</sub>- Lighting total, H- Heating, Hw- Hot water, C- Cooling, V- Ventilation, M- Miscellaneous appliance

## 6. RESULTS AND DISCUSSION

### 6.1 Embodied energy and cost

The total Life Cycle Embodied energy and total construction cost of all design is calculated and the comparison is presented in Fig. 9.

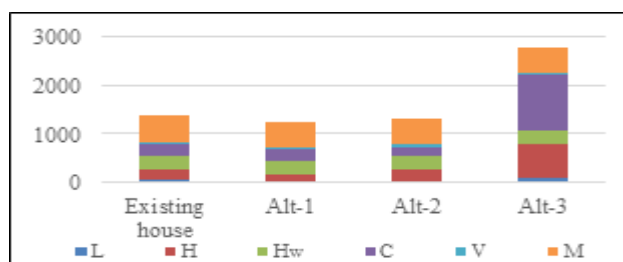


**Fig. 9. Total Life Cycle Embodied Energy and cost of various alternative designs**

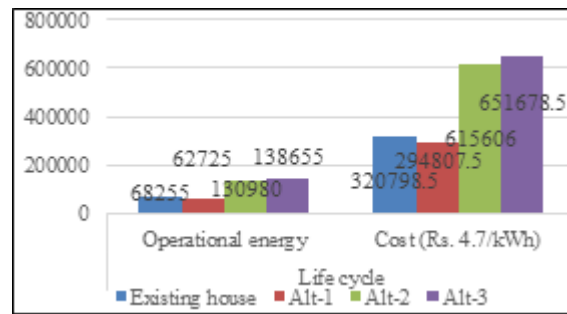
It is seen in Fig. 9 that in alternative 1, 2 and 3 total embodied energy is 103.41%, 72.05% and 76.24% to base case, whereas total construction cost is 104.81%, 78.92% and 80.54% respectively. It is seen that even though with the use of same materials in all alternatives, the increase in embodied energy percentage is not proportionate to increase in total cost of all cases, It is seen that total embodied energy is proportional to built up area, whereas same is not true for exposed surface area, volume, compactness ratio and WWR.

### 6.2 Operational energy and cost

The breakup of operational energy and Life Cycle Operational Energy & Cost is shown in Fig. 11 & 12 respectively.



**Fig. 11. Operational energy breakup**

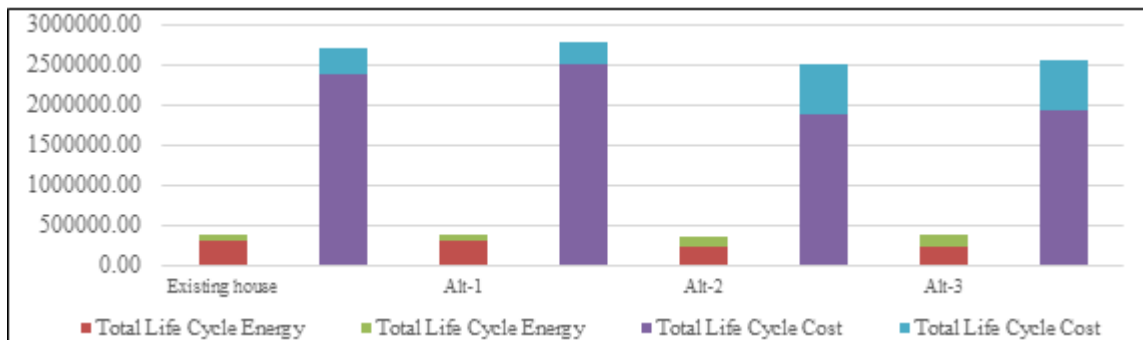


**Fig. 12. Life Cycle Operational Energy and cost**

The energy used in lighting in base case is 61.9 kWh whereas the same has been reduced to 11.4 kWh (18.4%) and 28.7 kWh (46.4%) in alternative-1 and 2 respectively whereas it increased to 82.8 kWh (133.8%) in alternative 3. The heating energy of the base case has been reduced to 80.9% in alternative-1 whereas it has been increased to 117.8% and 344.82% in alternative- 2 and 3 respectively. The cooling energy of the base case has been reduced to 91.9% and 73.38% in alternative-1 and 2 respectively whereas it has been increased to 441.1% in alternative- 3. The total energy consumed together by lighting, heating and cooling has been found reduced to 78.96% and 87.4% in alternative-1 and 2 whereas it increased to 356.24% in alternative-3. The total Life Cycle Operational Energy is found lowest in alternative 1 (91.9%) whereas it is highest in alternative-4 (203.14%). Similar is the trend for operational energy cost as it is directly proportional to the energy consumption.

### 6.3 Life Cycle Energy and cost

The Total Life Cycle Energy and Cost of all cases is presented in Fig. 13. The embodied in MJ has been converted to kWh (1MJ= 0.278 kWh) for comparison.



**Fig. 13. Total Life Cycle Energy and Cost (EE- Embodied energy; OE- Operational energy; CC- Construction cost; OC- operational cost)**

It is seen that the total Life Cycle Energy of existing house is 369896.45 kWh whereas it is 104.81%, 78.92% and 80.54% for alternative-1, and 3 respectively. It is lowest in alternative-3, since the overall proportion of Life Cycle Embodied Energy is much more than operational energy, even though the same consume 191.89% operational energy than existing house. It is seen in Fig. 13 that the proportion of embodied energy and operational energy in existing house is 81.55% and 18.45% respectively in existing house. However, it is 83.26% and 16.96% in alternative-1, 62.39% and 35.41% in alternative-2 and 62.39% and 37.48% in alternative-3 respectively. Hence it is clear that embodied energy contributes much more than operational energy in naturally ventilated residential buildings. Also, the change in design results in huge variations in the embodied and operational energy and their proportion to the total LCE.

## 7. CONCLUSIONS

Considering the Life Cycle Analysis, it is seen than alternative-3 consumes least energy, even though the same is found to be consuming more operational energy than existing house. Hence, it is important to consider the Life Cycle Energy Analysis than usual Operational Energy Analysis. However, it is seen that the Embodied Energy Analysis and Life Cycle Energy Analysis must be performed for building which are naturally ventilated in nature, as the proportion of embodied energy is much higher than operational energy.

It is found that the operational energy use in a building is not a function of built up area, whereas it is more dependent on compactness ratio. Since the solar heat gains, heat losses and daylighting is also dependent on the exposed surface area along with its built up area. Buildings with compact shapes consume lesser energy as their

exposed area is lesser. Hence most compact buildings shall be designed. It can be said that the total energy consumption is directly proportional to the compactness ratio.

The compactness ratio greatly affects the heating and cooling load of a building whereas the lighting load is affected by the Window to Wall ratio (WWR). Higher WWR provides better daylighting but excessive heat gains, heat losses and unwanted glare, hence determining the uppermost desirable WWR is a scope of further research. The total embodied energy and cost is proportional to built up area. Hence the total built up area of proposed development shall be less.

## 8. REFERENCES

- [1]. M. van der Hoeven, "World Energy Outlook," OECD/IEA, 2013.
- [2]. "IEA Database." International Energy Agency, 2021.
- [3]. HIMUDA, Himachal Pradesh Housing and Urban Development Authority Act- 2004. 2004.
- [4]. A. Sharma and B. M. Marwaha, "Review of Building regulations for energy efficiency in Residential Buildings," Glob. Built Environ. Rev., vol. 9, no. 3, pp. 19–38, 2015
- [5]. S. S. Chandel, A. Sharma, and B. M. Marwaha, "Review of energy efficiency initiatives and regulations for residential buildings in India," Renew. Sustain. Energy Rev., vol. 54, pp. 1443–1458, 2016
- [6]. Government of India, "Ministry of New and Renewable Energy (MNRE)." [Online]. Available: <http://www.mnre.gov.in/>
- [7]. Town and Country Planning Department, "Himachal Pradesh Town and Country Planning (Amendment) Rules- 2009 (Solar Passive Design)," 2009. [Online]. Available: [http://www.tcphp.in/Application/uploadDocuments/rule/Rule20150127\\_160705.pdf](http://www.tcphp.in/Application/uploadDocuments/rule/Rule20150127_160705.pdf). [Accessed: 13-Dec-2015].
- [8]. MPP & Power Department, Himachal Pradesh Energy Conservation Building Code Rules, 2018. Government of Himachal Pradesh.
- [9]. G. K. C. Ding, "The development of a multi-criteria approach for the measurement of sustainable performance for built projects and facilities," University of Technology, Sydney, Sydney, Australia, 2004.
- [10]. A. Kumar, D. Buddhi, and D. S. Chauhan, "Indexing of Building Materials with Embodied, Operational energy and Environmental sustainability with Reference to Green Buildings," J. Pure Appl. Sci. Technol., vol. 2, no. 1, pp. 11–22, 2012.
- [11]. B. V. Reddy and K. S. Jagadish, "Embodied energy of common and alternative building materials and technologies," Energy Build., vol. 35, no. 2, pp. 129–137, 2003.
- [12]. I. TERI, Sustainable Building Design Manual, vol. 1 & 2, 2 vols. Delhi: Teripress, Delhi, 2004.
- [13]. A. J. W. Harrison, "Low Carbon Cements and Concretes in Modern Construction," in Proceedings of the UKIERI Concrete Congress–Innovations in Concrete Construction. 5–8 March 2013. Jalandhar, 2013, pp. 723–746.
- [14]. P. S. Chani, K. S. Najamuddin, and S. K. Kaushik, "Comparative analysis of embodied energy rates for walling elements in India," Archit. Eng., vol. 84, pp. 47–50, 2003.
- [15]. K. S. Gumaste, "Embodied energy computations in buildings," Adv. Energy Res., pp. 404–409, 2006.
- [16]. S. Maini, "Calculations from embodied energy of raw materials." Auroville Earth Institute, 2008.
- [17]. M. K. Dixit, J. L. Fernández-Solís, S. Lavy, and C. H. Culp, "Identification of parameters for embodied energy measurement: A literature review," Energy Build., vol. 42, no. 8, pp. 1238–1247, 2010.
- [18]. A. Sharma and B. M. Marwaha, "Alternative building materials analysis for different residential buildings considering embodied energy and construction cost," Int. J. Ecol. Dev., vol. 31, no. 2, pp. 10–34, 2016.
- [19]. E. J. Gago, J. O. García, and A. E. Estrella, "Development of an energy model for the residential sector: electricity consumption in Andalusia, Spain," Energy Build., vol. 43, no. 6, pp. 1315–1321, 2011.
- [20]. V. H. Kjaerbye, M. Togeby, and A. E. Larsen, "Do changes in regulatory requirements for energy

- efficiency in single-family houses result in the expected energy savings,” in Proceedings of the ECEEE Summer Study, 2011.
- [21]. A. Sharma and B. M. Marwaha, “A methodology for energy performance classification of residential building stock of Hamirpur,” HBRC J.
- [22]. J. Strømman-Andersen and P. A. Sattrup, “The urban canyon and building energy use: Urban density versus daylight and passive solar gains,” *Energy Build.*, vol. 43, no. 8, pp. 2011–2020, Aug. 2011.
- [23]. C. Ratti, N. Baker, and K. Steemers, “Energy consumption and urban texture,” *Energy Build.*, vol. 37, no. 7, pp. 762–776, Jul. 2005.
- [24]. N. Kaza, “Understanding the spectrum of residential energy consumption: A quantile regression approach,” *Energy Policy*, vol. 38, no. 11, pp. 6574–6585, Nov. 2010.
- [25]. Monteiro, H., Freire, F., & Soares, N. (2021). Life cycle assessment of a south European house addressing building design options for orientation, window sizing and building shape. *Journal of Building Engineering*, 39, 102276.
- [26]. A. Atmaca and N. Atmaca, “Life cycle energy (LCEA) and carbon dioxide emissions (LCCO 2 A) assessment of two residential buildings in Gaziantep, Turkey,” *Energy Build.*, vol. 102, pp. 417–431, 2015.
- [27]. R. Fay, G. Treloar, and U. Iyer-Raniga, “Life-cycle energy analysis of buildings: a case study,” *Build. Res. Inf.*, vol. 28, no. 1, pp. 31–41, 2000.
- [28]. G. Treloar, R. Fay, P. E. D. Love, and U. Iyer-Raniga, “Analysing the life-cycle energy of an Australian residential building and its householders,” *Build. Res. Inf.*, vol. 28, no. 3, pp. 184–195, 2000.
- [29]. Himachal Pradesh Public Works Department, “Himachal Pradesh Schedule of Rates-2009.” Government of Himachal Pradesh, 2009.
- [30]. A. Sharma and B. M. Marwaha, “Development of simulation weather data for Hour wise Daily Diffused and Direct Solar Radiation from Hourly Global Radiation using statistical estimation method for Subtropical region,” *Int. J. Renew. Energy Res. IJRER*, vol. 5, no. 4, pp. 1230–1240, 2015.

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**AN ASSESSMENT OF TEAM COHESION BETWEEN INTER-UNIVERSITY VOLLEYBALL AND HANDBALL PLAYERS**

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**ABSTRACT**

*Historically, cohesion has been identified as the most important small group variable. Also cohesion has been the object of scientific scrutiny in both Sport and Exercise Psychology. The term cohesion is derived from the Latin word "cohaesus", which means to cleave or stick together. Like many social constructs, cohesion has been defined in a variety of ways. Festinger defined it as "the total field of force that act on members to remain in the group". In sports Psychology, Carron, Brawley and Widmeyer proposed that cohesion is "a dynamic process that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and for the satisfaction of member affective needs". The purpose of the study was to compare the team cohesion between Volleyball and Handball men players. To achieve the purpose of the study investigator had selected eight (N=80) men players, forty men players each from Volleyball and Handball games during the South Zone Inter-University Volleyball and Handball Tournament held at Vijayawada and Bengaluru respectively. The tournaments were conducted during the year 2019. The data pertaining to the selected psychological variable of this study, team cohesion was measured by using Group Environment Questionnaire (GEQ) by Albert V.Carron Et. Al. (1985). To test the hypothesis of the study, the data collected was analyzed by using the statistical technique 't' test with the help of statistical package for the social science (SPSS) and level of significance was set 0.05. The findings and results of the study reveals that There was a significant difference in team cohesion between Volleyball and Handball players.*

*Keywords: Handball, Volleyball, Team Cohesion, Inter-University*

**INTRODUCTION**

Historically, cohesion has been identified as the most important small group variable. Also cohesion has been the object of scientific scrutiny in both Sport and Exercise Psychology. The term cohesion is derived from the Latin word "cohaesus", which means to cleave or stick together. Like many social constructs, cohesion has been defined in a variety of ways. Festinger defined it as "the total field of force that act on members to remain in the group". In sports Psychology, Carron, Brawley and Widmeyer proposed that cohesion is "a dynamic process that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs".

Positive feelings may bind people together to form groups, however, there is no guarantee that a high initial cohesion will last all the way. Cohesion is dynamic in nature; it changes over time and situation. "Cohesion is not a trait. Cohesion in a group can (and most likely does) changes over time in both its extent and various forms throughout the process of group formation, group development, group maintenance, and group dissolution." (Carron and Brawley, 2012, p.732). It is important for group to find ways to maintain and improve its cohesiveness in order to keep the group strong.

Cohesion can be defined as "a dynamic process that is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs" (Carron *et al.*, 1998, p.213) The definition emphasize that cohesion is a dynamic process, it changes and this definition also included most of the existing groups, group with instrumental objective

**Objective of the Study:**

The primary objective of the study was to compare the team cohesion between Inter-University Volleyball and Handball men players.

**Hypothesis of the study:**

It was hypothesised that there would not be any significant differences in team cohesion between Inter-University Volleyball and Handball players.

**Methodology of the study:**

To achieve the purpose of the study investigator had selected eight (N=80) Inter-university men players, Forty players each from Volleyball and Handball games during the South Zone Inter-University Volleyball and Handball Tournament held at Vijayawada and Bengaluru respectively. The tournaments were conducted during the academic year 2019-2020. The data pertaining to the selected psychological variable of this study, team cohesion was measured by using Group Environment Questionnaire (GEQ) by Albert V.Carron Et. Al. (1985). The questionnaire was administered to the subjects during the tournament by taking prior permission from the officials accompanied the teams.

**Statistical Analysis:**

To test the hypothesis of the study, the data collected was analyzed by using the statistical technique paired sample 't' test with the help of statistical package for the social science (SPSS) and level of significance was set at 0.05.

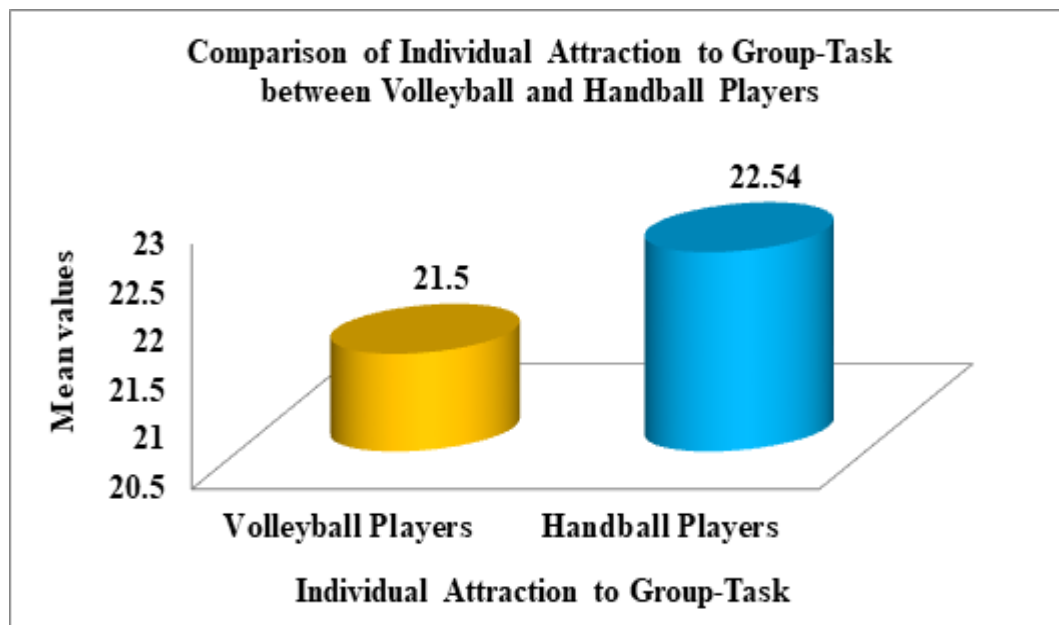
**Result and discussions:**

**Table-1 Show the Mean, Standard Deviation and 't' Value of Individual Attraction to Group-Task of Volleyball and Handball Players.**

Sl. No.	Subjects	N	Mean	Std. Deviation	't' Value
1.	Volleyball Players	40	21.50	5.70	1.06
2.	Handball Players	40	22.54	6.65	

The above table highlights the mean, standard deviation and 't' value of individual attraction to group-task of Volleyball and Handball Players. The table shows that the obtained 't' value is 1.06, which is lesser than the critical value 1.99 (df=79). Hence, the null hypothesis was accepted that there is no significant difference between individual attraction to group -task of Volleyball and Handball Players. Mean values show that Handball players are having more individual attraction to group-task than the Volleyball players.

Graphical representations of mean values of individual attraction to group-task between Volleyball and Handball Players shown in the Figure-1.



**Figure-1: Graphical Representations of mean values of Individual Attraction to Group-Task between Volleyball and Handball Players.**

**Table-2 Show the Mean, Standard Deviation and 't' Value of Individual Attraction to Group-Social of Volleyball and Handball Players.**

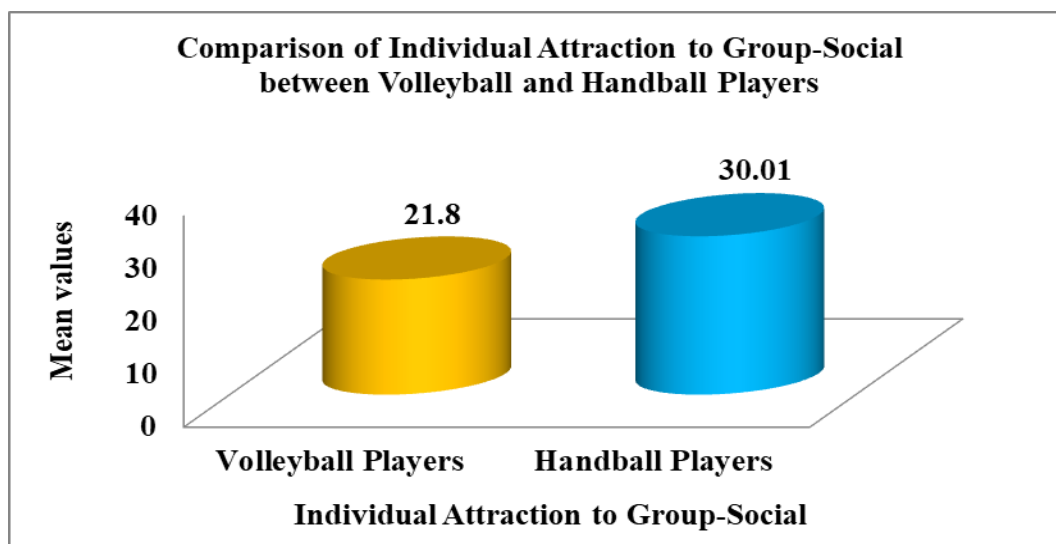
Sl. No.	Subjects	N	Mean	Std. Deviation	't' Value
1.	Volleyball Players	40	21.8	6.98	8.78*
2.	Handball Players	40	30.01	6.64	

\*Significant at 0.05 level.



The above table highlights the mean, standard deviation and 't' value of individual attraction to group-social of Volleyball and Handball Players. The table shows that the obtained 't' value is 8.78, which is greater than the critical value 1.99 (df=79). Hence, the null hypothesis was rejected and formulated the alternative hypothesis that there is a significant difference between individual attraction to group-social of Volleyball and Handball Players. Mean values show that Handball players are having a more individual attraction to group-social than the Volleyball players.

Graphical representations of mean values individual attraction to group-social between Volleyball and Handball Players shown in the Figure-2.



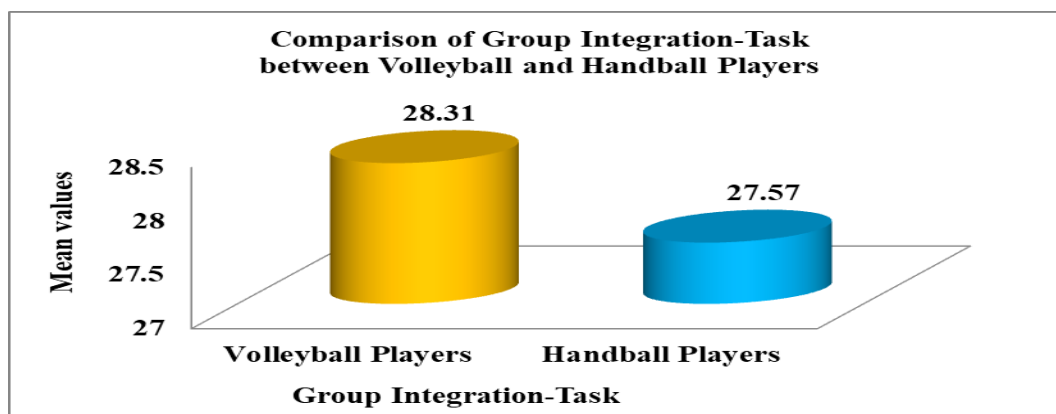
**Figure-2: Graphical Representations of mean values of Individual Attraction to Group-Social between Volleyball and Handball Players.**

**Table-3 Show the Mean, Standard Deviation and 't' Value of Group Integration-Task of Volleyball and Handball Players.**

Sl. No.	Subjects	N	Mean	Std. Deviation	't' Value
1.	Volleyball Players	40	28.31	6.09	0.61
2.	Handball Players	40	27.57	8.38	

The above table highlights the mean, standard deviation and 't' value of group integration-task of Volleyball and Handball Players. The table shows that the obtained 't' value is 0.61, which is lesser than the critical value 1.99 (df=79). Hence, the null hypothesis was accepted that there is no significant difference between group integration-task of Volleyball and Handball Players. Mean values show that Volleyball players are having more group integration-task than the Handball players.

Graphical representations of mean values of group integration-task between Volleyball and Handball Players shown in the Figure-3.



**Figure-3: Graphical Representations of mean values of group integration-task between Volleyball and Handball Players.**

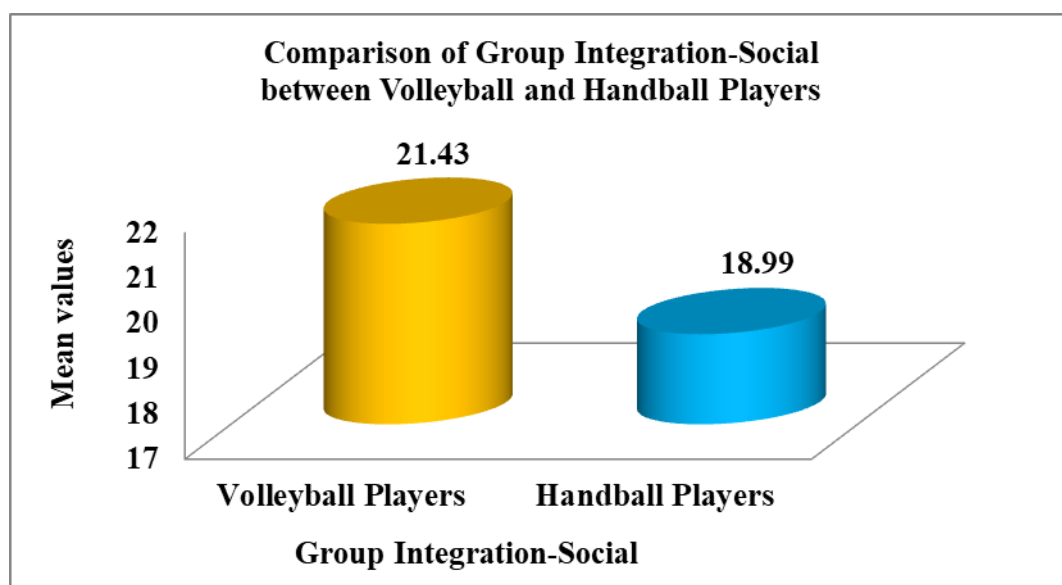
**Table-4 Show the Mean, Standard Deviation and ‘t’ Value of Group Integration-Social of Volleyball and Handball Players.**

Sl. No.	Subjects	N	Mean	Std. Deviation	‘t’ Value
1.	Volleyball Players	40	21.43	4.30	4.06*
2.	Handball Players	40	18.99	5.38	

\*Significant at 0.05 level.

The above table highlights the mean, standard deviation and ‘t’ value of group integration-social of Volleyball and Handball Players. The table shows that the obtained ‘t’ value is 4.06, which is greater than the critical value 1.99 (df=79). Hence, the null hypothesis was rejected and formulated the alternative hypothesis that there is a significant difference between group integration-social of Volleyball and Handball Players. Mean values show that Volleyball players are having more group integration-social than the Handball players.

Graphical representations of mean values of group integration-social of Volleyball and Handball Players shown in the Figure-4.

**Figure-4: Graphical Representations of mean values of group integration-social between Volleyball and Handball Players.**

### CONCLUSIONS:

In the view of the findings of the study following conclusions were drawn.

- After the statistical treatment the result showed that there is a significant differences in individual attraction to the group social and group integration-task between Volleyball and Handball players. There is no significant differences in individual attraction to the group task and group integration-social between Volleyball and Handball players
- In individual attraction to the group task Handball players are better than Volleyball players.
- In individual attraction to the group social Handball players were better than Volleyball players.
- In group integration-task Volleyball players were better than Handball players.
- In group integration-social Volleyball players were better than Handball players.

### REFERENCES:

1. Berardinis, J.D., Barwind, J., Flaningam, R.R., & Jenkins, V. (1983). Enhanced interpersonal relations as predictor of athletic performance. *International Journal of Sport Psychology*, 14, 243-251.
2. Carron, A.V., & Brawley, L.R. (2000). Cohesion: conceptual and measurement issues. *Small Group Research*, 31, 89-106.
3. Carron, A.V., & Cheladurai, P. (1981). Cohesion as a factor in sport performance. *International Review of Sport Sociology*, 16, 2-41.

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4. Hedges, L. V. (1982). Fitting categorical models to effect sizes from a series of experiments. *Journal of Educational Statistics*, 7, 119-137.
  5. Jehn, K., & Shah, P. (1997). Interpersonal relationships and task performance: an examination of mediating processes in friendship and acquaintance groups. *Journal of Personality and Social Psychology*, 72, 775-790.
  6. Kenny, D. A., & La Voie, L. (1985). Separating individual and group effects. *Journal of Personality and Social Psychology*, 48, 339-348.
  7. Shanghi, G.M., & Carron, A.V. (1987). Group cohesion and its relationship with performance and satisfaction among high school basketball players. *Canadian Journal of Sport Sciences*, 12, 20.

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**AN EMPIRICAL EVALUATION ON AWARENESS AND INCLINATION OF CUSTOMERS  
TOWARDS HEALTH INSURANCE DURING PANDEMIC**

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*For every individual in India, Health insurance Policy has become a necessity. It provides a risk coverage against expenditure which is caused by unforeseen medical emergencies. Today, when the medical inflation rates are so high, failing to hold an adequate health cover policy can prove to cost very high, financially. The purpose of this research is to identify how much awareness public have about Health Insurance during pandemic and to identify their inclination to buy health insurance policies. Like privacy, health research has a very high value to the society. This pandemic situation made us to realise the importance of our health and the policy which will safeguard our life. The research was connected only about health insurance policy. Advancement in health information technology are creating a transformation in health sector that could facilitate studies which was not feasible in the past, and thus it leads to a new insights regarding health and disease. For analysis purpose, SPSS software is used to find the solutions to the objective of the research. It can be concluded that insurance companies have to create more awareness level towards health insurance as well.*

*Keywords: Health Insurance, Customer preferences, Inclination, Level of awareness, Perception*

**I INTRODUCTION**

Health in the new found wealth for everyone now. Health is affected by education, housing, food, employment etc. The health is one of main priorities to other concerns, such as unemployment, low wages, wealth, status of living etc. So it has become a major political, social & economic issue and Government is striving hard to meet general public expectations regarding good health. The major objective of Indian government is to improve health of individuals, particularly the socially & economically disadvantaged groups. . The health insurance industry in India has grown significantly mainly due to liberalization of economy and general awareness. By 2010, more than 25% of India population had access to some form of health insurance. Mediciam Health Policies was the first Health Policies in India.

**Health Insurance companies in India**

Till now, there are 31 insurance companies in India that offers Health Insurance products. Out of these, 24 are General Insurance Companies which are offering health insurance plans and the rest 7 are Standalone Health Insurance companies. A general insurance company deals with various insurance products such as travel insurance, motor insurance, health insurance, rural insurance, etc. except life insurance, whereby a standalone health insurance company deals only with health insurance products.

**Objectives of the study**

- To find out the awareness about Health Insurance Policies during COVID-19
- To identify the inclination of customers towards investing in Health Insurance Policy.
- To identify what sort of insurance plans are preferred by customers to invest in Health Insurance Policy.
- To examine the perception of customers towards the benefits provided by Health Insurance Policy.
- To ascertain their preferred Health Insurance Company among customers

**II LITERATURE REVIEW**

Banerjee. A (2014) discussed about the microfinance which has started to bundle their basic loans with health insurance. Bundling loans with insurance led to increase in drop out from microfinance as they need to pay higher interest rates and receive insurance. Binny and Meenu Gupta (2017), discussed about the present trends of health insurance sector in India and identifying the growth opportunities and challenges in the sector. The study is of the opinion that health insurance is a growing sector in India. Companies are required to enhance their business by introduction of new business models with innovative products. Need of a universal health insurance program is recognized to cover families below poverty line. Fan.V.Y (2012), discussed about the Aarogyasri Health insurance being introduced in the state in which within the first nine months of implementation it significantly reduced out of pockets inpatient expenditure and the scheme is not benefiting scheduled caste and scheduled tribe households as much as the rest of the population. Forgia.G.L.A (2012

discussed about the findings on India's major Central and State Government sponsored health insurance schemes, it targeted the poor populations aiming to provide financial protection against catastrophic health shocks and recent trends in Government health financing. Karan. A (2017), discussed about the effects of RSBY on OOP payments and funded for hospitalizations and after few months it was not able to give financial protection for poor households so the scheme was ineffective overall. Lakshmana.B.C, Jayarami Reddy.P, Sravan Kumar.P (2019), discussed about pattern of insurance premium in insurance companies their claim settlement procedure and evaluate performance of companies. Mathiraj Subramanian.S.P and Saroja Devi Rajendran (2016), says that the health insurance as a tool to finance healthcare has very recently gained popularity in India and also the analysis has been made that the growth rate and market share of private health insurance has been increasing and public health insurers has been decreasing, due to number of increasing private health insurer. Satakshi Chatterjee, Arunangshu Giri, and Bandayopadhyay S.N (2018), discussed about the descriptive and various health insurance products offered in India. It attempts to analyse the insurance models of healthcare of selected other countries as well. Health insurance is regarded as an unsaturated market in India and the middle income group i.e. the targeted population of this industry will definitely create a boom in health insurance in years to come. The health insurance sector is required to be made universal irrespective of the income level and background of individual and a family. Ganesan D et.al (2021) found that buying inclination towards wellness products can be influenced by advertisements. Suman Devi and Vazir Singh Nehra (2015), discussed about the new inventions in the health insurance sector. Problems associated with the health insurance are highlighted and probable solutions are given. Other problems like high claim pay-out ratio in public sector insurers, unprofessionalism of TPAs, lack of development of health insurance in rural areas, wrong selection of health insurance policies, and lack of awareness about health insurance policies are highlighted. Swathi.K and Anuradha.R (2017, discussed about the concept and benefits of health insurance besides presenting an overview of health insurance sector in India. A brief of number of persons covered under various schemes such as government sponsored, group insurance, and family insurance, individual policies is portrayed. Sector wise health insurance policies along with number of persons covered by public, private and specialized insurers are depicted. The IRDA is suggested to take initiatives to promote competition in Health insurers as available in telecom service providers.

## RESEARCH METHODOLOGY

Research design is descriptive for the present study. The purpose of the present study is the description of facts related to awareness and preference towards Health Insurance among customer and to identify their inclination towards health insurance policies, preference of company and type of Health Insurance policy. In the present study, convenience sampling technique is used which comes under the non-probability sampling method to gather the data from the targeted respondents. The primary data were collected by using well-structured questionnaire from 165 respondents during June –July 2021 through Google forms. Secondary data was collected from research journals, articles, magazines, newspapers, web sources and from other sources. Analysis has been done by using the statistical tools like one way ANOVA, Regression Analysis, Weighted Average method, Chi-square and Henry Garrett Ranking. Statistical Package for Social Science (SPSS 21) and Microsoft Excel were used for the purpose of data analysis.

## IV RESULTS AND DISCUSSION

**Table 4.1 Gender, Age and Educational Qualification of Respondents.**

S. N O	PARTICULARS		NUMBER OF RESPONDENTS	PERCENT AGE OF RESPONDENTS
1	Gender	Female	108	65.5
2		Male	54	32.7
3		Prefer not to say	3	1.8
TOTAL			165	100
1	Age	15 – 25	127	77
2		26 – 35	30	18.2
3		36 – 50	5	3
4		Above 50	3	1.8
TOTAL			165	100
1	Educational Qualification	Uneducated	3	0.6
2		Higher Secondary	18	10.9

3		Graduation	90	54.5
4		PostGraduation	50	30.3
5		Others	4	3.7
<b>TOTAL</b>			<b>165</b>	<b>100</b>

Source: Primary data

**Interpretation:** From the above table, majority of the respondents are Female (65.5%) followed by male (32.7%) and prefer not to say (1.8%). Majority of the respondents age are from 15 to 25 (77%) followed by 26 to 35 (18.2%) followed by 36 to 50 (3%) and followed by Above 50 (1.8%). Majority of the respondents educational qualification is Graduation (54.5%) followed by post-graduation (30.3%) followed by Higher education (10.9%) followed by others (3.7%) and followed by uneducated (0.6%).

**Table 4.2 Preference of type of health insurance Company by respondents**

S.NO	TYPE OF INSURANCE COMPANY	NUMBER OF RESPONDENTS	PERCENT AGE OF RESPONDENTS
1	Public company	119	72.1
2	Private Company	46	27.04
<b>TOTAL</b>		<b>165</b>	<b>100</b>

Source: Primary data

**Interpretation:** From the above table, 72.1% of the respondents have selected public company followed by 27.9% of private company

**TABLE 4.3 CHI-SQUARE ANALYSIS**

	Value	Df	Asymptotic Significance(2-sided)
Pearson Chi-Square	1.289 <sup>a</sup>	2	.525
Likelihood Ratio	1.321	2	.517
N of Valid Cases	165		
a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .84.			

The rejection of null hypothesis depends upon  $p$  value if it is less than 0.05 and null hypothesis will be accepted if  $p$  value is more than 0.05. The table above showed that the value of  $p$  is greater than 0.05 i.e. 0.525 for Independent Variable 'gender' which indicated that the results are significant at 5% significance level.

$P = 0.525 > 0.05$

Therefore  $H_0$  is accepted @ 5% LOS

**Interpretation:** The chi square test signifies that there is no significant relationship between gender and selection of insurance company.

**TABLE 4.4 ONE WAY ANOVA ANALYSIS:**

$H_0$  – There is no significant relationship found between age and knowledge whether COVID-19 is covered under Health Insurance Policy.

$H_1$  - There is significant relationship found between age and knowledge whether COVID-19 is covered under Health Insurance Policy

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.034 <sup>a</sup>	.001	-.005	1.22086
a. Predictors: (Constant), gender				
b. Dependent Variable: accepting policy				

Age						
Tukey HSD						
Knowledge		N	Subset for alpha = 0.05			
			1			
2.00		42	1.2381			
3.00		51	1.3137			
1.00		72	1.3194			
Sig.			.780			
Means for groups in homogeneous subsets are displayed.						
a. Uses Harmonic Mean Sample Size = 52.350.						
ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.285	1	.285	.191	.663 <sup>b</sup>
	Residual	242.952	163	1.491		
	Total	243.236	164			
a. Dependent Variable: accepting policy						
b. Predictors: (Constant), gender						
b. The group sizes are unequal. The harmonic mean of the group sizes is used.						
Type I error levels are not guaranteed.						

$P = 0.775 > 0.05$

Therefore  $H_0$  is accepted @ 5% LOS

**Interpretation:** From the one way ANOVA table 4.2 it is found out that there is no significant relationship between Age and knowledge whether COVID-19 is covered under Health Insurance Policy.

**TABLE 4. 5 REGRESSION ANALYSIS:**

**Find the regression equation of total variation in accepting policy with their Gender.**

**Homogeneous Subsets**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	2.381	.268		8.890	.000
Gender	.080	.184	.034	.437	.663

a. Dependent Variable: accepting policy

R = Simple correlation= 0.34

$R^2$  = How much of total variation in subscribing and recommending Health Insurance policy can be explained by Gender **ANOVA Table:** P= 0.663 > 0.05

**Coefficient table:**

Subscribing and recommending policy (Y) = 2.381

+ 0.08 [(Gender) (X)]

**Interpretation:** From the table 4.3 of Regression it is understood that, the Gender will not be creating much impact on their inclination on subscribing and recommending Health Insurance policy.

**TABLE 4. 6 HENRY GARRETT RANKING METHOD:**

To find out which company ranks first, Henry Garrett Ranking method is used. With the help of Garrett table, the value of percentage position is found and multiplied by the number of respondents.

Rank the Health Insurance companies according to the preference of the respondents.

$R_{ij}$  – The Rank is given for the  $i$ th variable by the  $j$ th respondents

RANK	PERCENTAGE POSITION	GARRETT VALUE
1	8.33	77
2	25	63
3	41.67	54
4	58.33	46
5	75	36
6	91.67	23

**Interpretation:** From the table 4.4, Star Health Company stood in First Rank, followed by Apollo Munich, HDFC Ergo, ICICI Lombard, TATA AIG and TTK Cigna.

**TABLE 4. 6 WEIGHTED AVERAGE ANALYSIS:** Factors which provide high level of awareness about Health Insurance Policies

STATEMENT	VH	H	M	L	VL	WEIGHTED AVERAGE
Television	59	45	51	8	2	43.06
FM Radio	11	41	74	24	15	33.6
Newspaper &	29	63	52	19	2	39.53



Magazines						
Financial Advisors	31	42	57	22	13	36.73
Friends & Family	54	55	40	9	7	42.33
Online Media	57	51	41	11	5	42.6

### MAJOR FINDINGS

- It is found out that majority of the respondents have selected public limited company for buying their Health Insurance Policy (72.1%).
- It is found out that the chi-square analysis signifies no significant relationship between gender and selection of insurance company.
- It is clear, the one way ANOVA analysis signifies that there is no significant relationship between Age and knowledge whether COVID-19 is covered under Health Insurance Policy.
- It is clear from the Regression Analysis that, the Gender will not be creating much impact on their inclination on subscribing and recommending Health Insurance policy.
- It is found out from the Henry Garrett Ranking that Star Health Company stands first among the other company according to the preference of the people.
- It is found out from the Weighted Average Method that Television has created more awareness about the Covid-19 than other platforms.

### SUGGESTIONS

- Many are not aware about any of the Central Government initiated Health Insurance policies, so Government needs to create more awareness among people.
- As people are more concerned about Government initiated Public Health insurance policies than private ones, so Government needs to propose many types of schemes with benefits for general public.
- The most wanted advertisement and awareness as per my survey is Television and online media, so promotions by these mediums are highly suggested.
- Less than half of the respondents knows about the Health Insurance policy can cover the expenses on COVID-19 treatment, so awareness about that should be suggested more among people.
- Mostly 70% of the respondents are not fully willing to recommends Health Insurance policies, so awareness about the importance of Health Insurance must be create more.
- IRDA (Insurance Regulatory Development Authority) should encourage policies by providing subsidies to increase the benefits of higher policy holdings.

### CONCLUSION:

Everyone has a basic right to stay protected. People are always vulnerable to injury, illnesses from their everyday activities and crisis like COVID-19. Whether it is an individual – family plan or employer or government sponsored coverage, having health insurance is better than not having it at all. Millions of Indians are uninsured in part due to high premium costs. Many are forced to pay high health costs out of their pocket, which creates more problems medically and financially. Since the country's economic reforms, the Indian Health or medical insurance sector has been growing. A big reason why mediclaim insurance in India, has grown is, that it ensures good medical care from reliable health care institutions. Numerous companies are offering health insurance policy with a variety of health insurance plans, so it's hard to decide which plan you should go for. This study helps to understand which Health Insurance plan everyone prefers. In this competitive market you will need to compare policies to find the best health insurance policies or the best medical insurance plans for yourself and for others.

### REFERENCES

1. Abdelfattah, F. A., Rahman, M. and Sabbir, O. M. (2015), "Assessing the Antecedents of Customer Loyalty on Healthcare Insurance Products: Service Quality; Perceived Value Embedded Mode". *Journal of Industrial Engineering and Management*. 8 (5), 1639-1660.
2. Aggarwal, A., Kapoor, N. and Gupta, A. (2013). "Health Insurance: Innovation and Challenges Ahead". *Global Journal of Management and Business Studies*. 3(5), 475-480.

3. Banerjee.A (2014) "Bundling health insurance and microfinance in India: There cannot be adverse selection if there is no demand". *American economic review* , 104(5).
4. Binny, DR. Meenu Gupta (2017) "Health Insurance in India- Opportunities and Challenges", *International Journal of Latest Technology in Engineering, Management & Applied Science*, 6(8), 36-43.
5. Chennappa, D. (2015). "Differential Premium Pricing in Health Insurance". *IRDA Journal*. 8(1), 3-9.
6. Dutt, S. (2012). "Evolution of Health Insurance in India - Positives and Constraints". *IRDA Journal*. 10(12),17-23.
7. Fan.V.Y (2012) "State Health insurance and out of pocket health expenditures in Andhra Pradesh, India", *International Journal of Health Care Finance and Economics* 12(3):189-215.
8. Forgia.G.LA (2012) "Government Sponsored health insurance in India: Are you covered?" *World Bank ISBN: 978-08213-9618-6*.
9. Ganesan D , Shruthi V R , Mounica S ,Reshme A (2021) "An empirical study on efficacy of infomercials on consumers' purchase intention on wellness products in Turkish Journal of Physiotherapy and Rehabilitation 33 (2) , 3453- 3460
10. Harish, B. R., Hugara, S. and Bharath, J. (2018). Health insurance coverage and healthcare expenditure pattern in rural Mandya, Karnataka. *International Journal of Community Medicine and Public Health*. 5(4), 1519-1523.
11. Jayapardha, J. (2012). "Problems and Prospects of Health Insurance in India". *Aadyam, a journal of management*. 1(1), 22-29.
12. Kansra, P. and Gill, H. S. (2016). "Roles and Relevance of intermediaries in Health Insurance Industry". *IRDA Journal*. 14(2), 7-10.
13. Karan.A (2017) "Extending health insurance to the poor in India: An impact evaluation of Rashtriya Swasthya Bima Yojana on out of pocket spending for healthcare", *Social Science & Medicine* 181(2017):83-92.
14. Kumar, D. & Sohal, S. (2018). "Overview of Health Care Expenditure & Healthcare Payment Methods in India". *Health Econ Outcome Research Open Access*, 4(2), 1-6.
15. Lakshman.B.C, Jayarami Reddy.P, Sravan Kumar.P (2019) "Operational efficiency of selected general insurance companies in India", *International Journal of Innovative Technology and Exploring Engineering*, 9(2).
16. Manjushree, S. (2014). "TPAs: A cure for the Indian Health Insurance Sector". *International Journal of Research in Commerce, IT and Management*, 4(3), 57-61.
17. Rath, J. P., & Sahu, M. (2017). "A study on growth and development of health insurance in India in the post privatization era". *International journal of research – granthaalayah* 5(3), 287292.
18. Satakshi Chatterjee, Dr. Arunangshu Giri, Dr. S.N.Bandayopadhyay (2018) "Health Insurance sector in India: A study" *tech vistas*, 1(1).
19. Suman Devi and Dr. Vazir Singh Nehra (2015) "The problems with health insurance sector in India", *Indian journal of research*, March 2015 Pp 6.
20. Swathi.K and Anuradha.R (2017) "Health Insurance in India", *Journal of Business and Management*, e-ISSN: 2278-487X, p-ISSN: 2319-7668, PP 49-52.
21. Thomas, H.T. (2017). "Health insurance in India: A study of consumer insights". *IRDA Journal*, 15(1), 25-31.

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**AN EMPIRICAL STUDY ON FACTORS INFLUENCING IMPULSE BUYING BEHAVIOUR OF CUSTOMERS AT APPAREL STORES**

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**ABSTRACT**

*Impulsive buying is the tendency of a customer to buy goods and services without planning in advance. When a customer takes such buying decisions at the spur of the moment, it is usually triggered by emotions and feelings. Impulsive buying can't be categorized for one specific product category. Impulsive buying can be seen in products such as chocolates, clothes, mobile phones and in big-ticket items such as cars, jewellery etc. Impulsive buying means making an unplanned purchase. It is based on an irrational thinking. Marketers try to tap this behaviour of customers to boost sales. By keeping this view, an attempt has been made to analyse the key factors determining Impulse buying behaviour of the customers at an apparel store. The study used both primary and secondary data and the recorded responses were analysed using statistical tools includes ANOVA, Chi-square and Correlation analysis. It was found that majority of the respondents are much interested in apparel shopping and spending time in fashion related activities, and strategies are suggested to the stores to offer more discounts and coupons to retain the customers and make them to buy more and more in future.*

*Keywords: Impulse Buying, Customers, Purchases, Marketing strategies*

**1. INTRODUCTION**

Impulsive buying is the tendency of a customer to buy goods and services without planning in advance. An empirical study on factors influencing impulse buying behaviour of customers at apparel stores focuses on the triggering factors which leads the customers to perform unplanned buying. Impulsive buying means making an unplanned purchase and it is based on an irrational thinking. Impulse buying behaviour relates to positive emotions and feelings. Impulse buyers experience more positive emotions such as delight and thus spend more. They also have a strong need for arousal and experience an emotional lift from persistent repetitive purchasing behaviours.

In the field of consumer behaviour, an impulse purchase or impulse buying is an unplanned decision by a consumer to buy a product or service, made just before a purchase. The importance of the study is to analyse and present the most influencing factors which leads the buyers to buy more or buy instantly. The study helps to understand how the buying decision of customers change after entering a retail store. Also, the major and minor factors which plays a role to divert the thinking of regular planned buyers. As, it is a recently developed consumer buying trait, hence, to understand its significance an empirical study is made.

Marketers use various impulse factors to create more sales amidst the unplanned customers. A clothes shop or apparel shop is any shop which sells items of ready-made clothing. A small shop which sells expensive, or designer clothing may be called a boutique. A shop that sells clothes for a narrowly restricted market such as school uniforms or outdoor sports may be called an outfitter. These are some of the types of apparel shops. In general, the apparel industry are the industries which make ready- to-wear clothing. Once the product reaches the stores, it is marked with a price and sold to customers. Today the garment industry is the highly competitive industry with many brands and outlets spread across various geographical places to attract the customers and increase the sales. So, an attempt has been made to study the most interesting and valuable factors which leads the consumers to impulse buy in apparel industry.

**2 STATEMENT OF THE PROBLEM**

The empirical study on factors influencing impulse buying behaviour of customers at apparel stores is aimed to identify the highly influencing factors which trigger the customers to go for extra or unplanned purchase than the planned purchase. In recent decade, impulse buying has become part of shopping behaviour of many customers. Lack of interest and impatience at time of buying, domination of sales promotion activities at the moment of buying and quick adaption to the changes or new trends are some of the problems. This study is made to understand the buying behaviour changes of customers at apparel stores.

**3. OBJECTIVES OF THE STUDY**

- To examine the most influencing factors in store environment for impulse buying.
- To identify the specific physical feature of the product leads to impulse buying.

- To examine whether sales promotional strategies are influencing in impulse buying.
- To the attitude of the customers which makes them to do impulse buying.
- To evaluate the role of salespersons in impulse buying behaviour of customers

### 3 REVIEW OF LITERATURE

Mudassir Hussain et al (2019) in Personal and In-store Factors **Influencing Impulse Buying Behaviour among Generation Y Consumers of Small Cities** says for decades, impulse buying is one of the significant factors to increase sales volume in the retail sector. Past studies have investigated the impulsive buying behaviour of generation Y consumers in retail settings of somewhat medium- and large-sized cities. Therefore, how certain situational or in-store factors can propagate impulse buying in the retail settings of small cities has been widely ignored. This article explores the influence of situational variables categorized as personal factors time availability, family influence, money availability and in-store factors store environment, sales promotions, and friendly store employees on generation Y impulse buying behaviour in the Pakistani context in general and the country's small cities.

**Ajith K et al (2018) in The Impact of Visual Merchandising, on Impulse Buying Behaviour of Retail Customers** says visual merchandising has been over the years thought to be marketing tool in retail industries. The researchers embarked upon a study to find the impact of visual merchandising with reference to the retail sector. For this they have taken the reliance trends as a case and has done an in depth study using its sample customers to find the impact of their buying behaviour. A structured questionnaire was used to obtain information and to assess the impact of visual merchandising, on impulse buying behaviour of customers.

**Badri Abbasi (2017) in Relationship between Consumer Characteristics and Impulse Buying Behaviour: The Mediating Role of Buying Intention of New Clothing Buyers** says the purpose of this study was to determine the relationship between consumer characteristics and impulse buying behaviour focusing on buying intention. Participants included new clothing buyers in malls of Rasht during autumn and winter. Data was collected by questionnaire. Results of factor analysis indicated high reliability of the constructs. Results showed that self-esteem, followed by new product knowledge and excitement, respectively, had the greatest effect on impulse buying behavior. The results provided a basis for implementing strategies to take advantage of consumer characteristics for more sales and optimal productivity.

**Unsalan et al (2016) in Stimulating factors of impulse buying behaviour: A literature review says consumers** buy products not only because of need to them but also because of sudden urge to buy them. The impulse buying have been investigated by consumer behaviour researchers and marketing academicians more than a half century. The aim of this study is to present a detailed literature review of the impulse buying behaviour by analysing the various research in the field of consumer behaviour. Development of impulse purchasing concept, process of consumer's impulse purchasing behaviour, various factors that influence impulse purchasing and the relationship between impulse buying and retailing are discussed.

**Vidha Pradhan (2016) in study on impulsive buying behaviour among consumers in supermarket in Kathmandu Valley** discusses some of the factors affecting impulsive buying behaviour of consumers in supermarkets. It also aims to verify the interrelationship between these factors and impulsive buying behaviour. A primary research is carried out among people who shop in supermarkets in Kathmandu valley. A structured questionnaire is used to collect data from respondents of sample size 200. The sample is taken by convenience and quota sampling as per their age group. The findings suggest that majority of supermarket goers buy impulsively. Whenever they visit a supermarket, most of the respondents do not plan ahead. Instead, they scroll through aisles/products and buy what they think they need.

**Nasreen Khan et al (2016) in Impulse Buying Behaviour of Generation Y in Fashion Retail** says Since the past two decades, Generation Y consumers have become global marketers' interest due to their spending power and high likely to engage in impulse buying behaviour. The main objective of the research is to integrate all the possible factors with its dimensions and examine its simultaneous relationship with impulse buying behaviour. After the survey, the results show that demographic factor has the strongest impact on impulse buying behaviour, followed by situational and personal factors. These findings may enable global marketers to develop an effective market segmentation strategy.

**Sanjiv P et al (2015) in their Factors prompting impulse buying behaviour – study among shoppers in India** says impulsive buying has long been identified as a significant behaviour in retail industry. Such purchases are manifested through consumers' tendency to buy spontaneously. It is expected that approximately

70% of all purchasing decisions are made at the point of purchase, with impulse purchases emerging as the prominent buying pattern. The objective of this paper is to identify and rank the factors that influence the impulse buying behaviour among shoppers in India. Accordingly, a multitude of factors influences this spontaneous and unplanned shopping behaviour and reflects how merchandising display and in-store influences have stronger impact than promotional stimuli and socialisation in the Indian context.

**Meysam Moayeri (2014) Effect of Visual Merchandising on Apparel Impulse Buying Behaviours among Iranian Young Adult Females** The purpose of this paper is to investigate the relation between apparel impulse buying behaviour and visual merchandising among Iranian young adult females. For this purpose a sample of 150 young adult females in Iran complete the questionnaire which contained measures of impulse buying, window display, in store form/mannequin display, floor merchandising, promotional signage, cross merchandising design. The results of the present study prove that window display, in store form/mannequin and promotional signage are the main factors

**Rizwan Raheem Ahmed et al (2013) in Factors influencing impulse buying behaviour** highlights the studies on consumers buying behaviour keep on struggling to give a better definition for impulse buying behaviour of consumers over last five decades. Buying impulsive behaviour is defined as “unplanned” and buying plan of consumer, which he/she makes without evaluating product. The author explains about two variables, Dependent variable “consumers’ impulse buying behaviour”, and Independent variables namely promotional approaches, store environment, window display, income level and credit card. Impulsive buying behaviour is dependent because it has influence of independent factors.

**Robin Pentecost et al (2010) in Fashion retailing and the bottom line: The effects of generational cohorts, gender, fashion fanship, attitudes and impulse buying** on fashion expenditure examines the influence of demographic and psychographic drivers on frequency and levels of expenditure on fashion purchases. Using regression analysis, the results suggest that for weekly and monthly expenditure, gender and fashion fanship were significant influences, while for yearly expenditure, gender and impulse buying were significant. Attitudes towards fashion had no significant influence on expenditure. Females purchase more often and were significantly different from males on yearly expenditure, fashion fanship, attitudes and impulse buying. Generation Y is higher on purchase frequency, fashion fanship, attitudes and impulse buying compared with other cohorts under investigation.

#### **4. RESAERCH METHODOLOGY**

##### **a. Research Variables**

This framework is divided into three variables like Independent variables, Dependent variables and Moderating variables.

##### **i) Independent variables:**

Store environment, apparel characteristic, situational factor, type of mood, frequency of purchase, sales promotion strategy, shopping scenario, happiness factor etc.

##### **ii). Dependent variable:**

Impulse buying behaviour of customers at apparel store.

##### **iii). Moderating variables:**

Age, gender, relationship status, occupation and type of living

##### **4. b. Research Design & Sampling**

The research design employed in this study is Descriptive research and it describes the characteristics of the population or phenomenon that is being studied. Convenience sampling was used to select the sample and the size was limited to 500.

##### **4 c. Data Collection**

Primary data were collected through structured questionnaire and the secondary data was also obtained from Journals, Magazines and websites.

##### **4. d. Statistical Tools**

The collected data was analysed using the statistical tools include Anova, Correlation and Chi square

**a) Anova**

An ANOVA test is a way to find out if survey or experiment results are significant. In other words, they help you to figure out if we need to reject the null hypothesis or accept the alternate hypothesis.

$F = MST/MSE$  where  $F$  is the variance ratio for the overall test,  $MST$  is the mean square due to treatments/groups (between groups),  $MSE$  is the mean square due to error (within groups, residual mean square),  $Y_{ij}$  is an observation,  $T_i$  is a group total,  $G$  is the grand total of all observations,  $n_i$  is the number in group  $i$  and  $n$  is the total number of observations.

**b) Correlation**

The correlation coefficient that indicates the strength of the relationship between two variables can be found using the following formula:

$$r_{xy} = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

Where:

- $r_{xy}$  – the correlation coefficient of the linear relationship between the variables  $x$  and  $y$
- $x_i$  – the values of the  $x$ -variable in a sample
- $\bar{x}$  – the mean of the values of the  $x$ -variable
- $y_i$  – the values of the  $y$ -variable in a sample
- $\bar{y}$  – the mean of the values of the  $y$ -variable

**c. Chi Square Test**

A chi-square statistic is one way to show a relationship between two categorical variables. In statistics, there are two types of variables: numerical (countable) variables and non-numerical (categorical) variables.

The chi-squared statistic is a single number that tells you how much difference exists between your observed counts and the counts you would expect if there were no relationship at all in the population.

The formula for the chi-square statistic used in the chi square test is:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

**5. ANALYSIS & INTERPRETATION****5.1. ANOVA**

Table 5.a.1

ANOVA					
Age					
	Sum of Squares	Degree of Freedom	Mean Square	F	Sig.
Between Groups	82.749	3	27.583	265.389	<.001
Within Groups	20.371	196	.104		
Total	103.120	199			

Multiple Comparisons						
Dependent Variable: Age						
Tukey HSD						
(I) Apparel Features	(J) Apparel feature	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Brand	Price	-.446*	.057	<.001	-.59	-.30
	Category	-1.027*	.065	<.001	-1.20	-.86
	Distribution	-1.794*	.067	<.001	-1.97	-1.62
Price	Brand	.446*	.057	<.001	.30	.59
	Category	-.581*	.068	<.001	-.76	-.40
	Distribution	-1.348*	.070	<.001	-1.53	-1.17
Category	Brand	1.027*	.065	<.001	.86	1.20
	Price	.581*	.068	<.001	.40	.76
	Distribution	-.767*	.077	<.001	-.97	-.57
Distribution	Brand	1.794*	.067	<.001	1.62	1.97
	Price	1.348*	.070	<.001	1.17	1.53
	Category	.767*	.077	<.001	.57	.97

\*. The mean difference is significant at the 0.05 level.

Age					
Tukey HSD <sup>a,b</sup>					
Apparel feature	N	Subset for alpha = 0.05			
		1	2	3	4
Brand	73	.00			
Price	56		.45		
Category	37			1.03	
Distribution	34				1.79
Sig.		1.000	1.000	1.000	1.000

### Interpretation

Means for groups in homogeneous subsets are displayed in the above tables.

a. Uses Harmonic Mean Sample Size = 45.457.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

The significance obtained here is 1 and Null hypothesis (Ho) is accepted and

Alternate hypothesis (H1) is rejected.

### 5.2. CHI SQUARE

**Table: 5.2.1 The \_most\_triggered\_impulse\_buying\_intention [count, row %, column %, total %].**

Age	Excitement	New product knowledge	Open to experience	Social respect	Total
Above 35	1	8	8	11	28
	3.57%	28.57%	28.57%	39.29%	100.00 %

	2.17%	14.81%	20.00%	18.33%	14.00%
	0.50%	4.00%	4.00%	5.50%	14.00%
Between 18 - 25	32	30	20	22	104
	30.77%	28.85%	19.23%	21.15%	100.00 %
	69.57%	55.56%	50.00%	36.67%	52.00%
	16.00%	15.00%	10.00%	11.00%	52.00%
Between 25 - 35	13	16	12	27	68
	19.12%	23.53%	17.65%	39.71%	100.00 %
	28.26%	29.63%	30.00%	45.00%	34.00%
	6.50%	8.00%	6.00%	13.50%	34.00%
Total	46	54	40	60	200

	23.00%	27.00%	20.00%	30.00%	100.00%
	100.00%	100.00%	100.00%	100.00%	100.00%
	23.00%	27.00%	20.00%	30.00%	100.00%

Chi-square test results.				
Statistic	Value	df	Asymp. Sig. (2tailed)	
Pearson Chi-Square	15.13	6	0.019	
Likelihood Ratio	17.39	6	0.008	
N of Valid Cases	500			

### INTERPRETATION

The significance obtained here is 0.019 which is smaller than the significance level. Thus, Null Hypothesis (Ho) is rejected, and Alternate Hypothesis (H1) is accepted.

### 5.3. MULTIPLE CORRELATION ANALYSIS

**Table 5.3.1. Table showing the relationship between Apparel feature and Buying intention**

Age	Pearson Correlation	1	.889**	.877**
	Sig. (2-tailed)		<.001	<.001
	N	500	500	200
Apparel feature	Pearson Correlation	.889**	1	.907**
	Sig. (2-tailed)	<.001		<.001
	N	200	200	200
Buying intention	Pearson Correlation	.877**	.907**	1
	Sig. (2-tailed)	<.001	<.001	
	N	200	200	200

\*\*. Correlation is significant at the 0.01 level (2-tailed).



**6.1. SUGGESTIONS**

- People are very much interested in apparel shopping and spending time in fashion related activities, so the stores and brands can offer more discounts and coupons to retain the customers and make customers to buy more.
- As majority of the customers choose to impulse buy, when they are shopping with families the stores can make new strategies like family shopping deals, conducting family contests etc., to attract many family shoppers.
- The stores may ensure that moods of their customers remain positive throughout their shopping time, by providing calm atmosphere, simple layouts, and cheerful salespersons.
- Stores can train and deploy their manpower efficiently because most of the customers believe that salespersons make them to buy right clothes and make them to impulse buy.

**6.2. CONCLUSION**

This study helps to understand the relation between brands, product features, store atmosphere, store layout, store type with impulse buying behaviour of customers. Customers are ready to impulse buy at positive moods, attractive discounts and offers, and to gain social respect. Hence the stores should ensure that they offer brands at discounts, value the time and money of customers and motivate them to impulse buy with celebrity endorsements.

**REFERENCES**

1. Abbasi, Badri. "Relationship between consumer characteristics and impulse buying behavior: The mediating role of buying intention of new clothing buyers." *International Review of Management and Marketing* 7.1 (2017).
2. Husnain, Mudassir, et al. "Personal and in-store factors influencing impulse buying behavior among generation Y consumers of small cities." *Business Perspectives and Research* 7.1 (2019): 92-107.
3. Khan, Nasreen, et al. "Impulse buying behaviour of generation Y in fashion retail." *International Journal of Business and Management* 11.1 (2016): 144
4. Moayery, Meysam, Samar Zamani, and Hosein Vazifehdoost. "Effect of visual merchandising on apparel impulse buying behaviors among Iranian young adult females." *Indian Journal of Science and Technology* 7.3 (2014): 360.
5. Pentecost, Robin, and Lynda Andrews. "Fashion retailing and the bottom line: The effects of generational cohorts, gender, fashion fanship, attitudes and impulse buying on fashion expenditure." *Journal of Retailing and Consumer Services* 17.1 (2010): 43-52.
6. Pradhan, Vidha. "Study on impulsive buying behavior among consumers in supermarket in Kathmandu Valley." *Journal of Business and Social Sciences Research* 1.2 (2016): 215-233.
7. Prashar, Sanjeev, Chandan Parsad, and T. Sai Vijay. "Factors prompting impulse buying behaviour-study among shoppers in India." *International Journal of Indian Culture and Business Management* 11.2 (2015): 219-244.
8. Thomas, Ajith K., Reni Louise, and V. P. Vipinkumar. "Impact of visual merchandising, on impulse buying behavior of retail customers." *International Journal for Research in Applied Science and Engineering Technology* 6.2 (2018): 474-491.
9. Ünsalan, Mustafa. "Stimulating factors of impulse buying behavior: A literature review." *Ankara Hacı Bayram Veli Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi* 18.2 (2016): 572.
10. Vishnu, Parmar, and Ahmed Rizwan Raheem. "Factors influencing impulse buying behavior." *European Journal of Scientific Research* 100.3 (2013): 67-79.

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**CAUSES OF BURNOUT AND ITS EFFECT ON WORK PLACE SUSTAINABILITY AMONG HEALTH CARE PROFESSIONALS IN CHENNAI CITY**

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**ABSTRACT***Purpose*

*The Causes of Burnout and its outcome on the work place sustainability among Health care professionals is inevitable to be analysed in present day health care industry for the benefits of health professionals to align their mind and physique in order to deliver quality care for patients and to contribute for the success of health care practices of the institutions they belong. In overall the ability to sustain by overcoming burnout by health professionals leads to conducive work environment, patient- service provide healthy relationship and enhance social care as well as national health safety practices.*

*Design/Methodology/Approach*

*The research paper is a empirical analysis of causes of burnouts by exploring the factors and to validate its effect on work place sustainability among health care professionals in the categories of doctors, nursing staff and supporting staffs like lab technicians and analyst so on. There were 130 sampling units were interviewed through structured questionnaire and their views on burnout and work place sustainability were identified as factors leads to burnout and its effect on sustainability.*

*Findings*

*The research paper observe that there are six factors namely work place integrity, conflict, work place perception, job incompatibility, awareness, psychological contract and work place sustainability related to work place burnout among health care professionals. It is also understood there are factors like awareness, job incompatibility, psychological contract and conflict which causes burnout significantly influence the work place sustainability of health professionals. In this conflict and incompatibility have negative effect. The psychological contract and awareness have positive effect.*

*Originality/Value*

*The present research further investigated the causes of burnout with special reference to job content in health care professionals. It attempted to further probe other factors away from existing theoretical model based factors. It also tested the significant influence of burnout factors on employee sustainability.*

*Key words*

*Burnout, Work place Sustainability, Health Care Professionals and Working Environment.*

**1. INTRODUCTION**

Healthcare professionals work in environments considered by constant change. Ageing populations and increased injury translate into greater clinical complication, while pressure to decrease healthcare costs reduce hospital stays, further increasing inpatient insight. Alongside these developments are demands from the general public in response to well-planned and cared medical humiliations and poor conditions in the health service. Healthcare professional's work in environments characterised by constant change. Ageing populations and increased morbidity translate into greater clinical complexity, while pressure to decrease healthcare costs reduce hospital stays, further increasing inpatient acuity. Alongside these developments are demands from the general public in response to well-publicised medical scandals and poor conditions in the health service (Collins and Joyce, 2008), for greater quality and laborious healthcare delivery. Recently, these demands have concurred with government concerns about strengthening healthcare costs (Collins and Joyce, 2008) and calls for greater value for money within the health sector. Cost suppression measures, such as staffing decreases, pay restrictions and reduced training budgets affect the workforce and have patient-care implications (Buchan and Seccombe, 2012). Health professionals are essential to healthcare delivery – they are the health system's life blood (Robinson and Clark, 2006). It is sensible therefore that the quality debate includes the health professional's voice and considers care delivery's impact on health professionals, particularly when the impact is negative. Burnout was first applied to health professionals (Penson et al., 2000) who noted that the most dedicated and

committed carers appeared prone to burnout – described as a state of fatigue and frustration (Kanai-Pak et al., 2008) established as physical and emotional exhaustion (Abushaikh and Saca-Hazboun, 2009) characterised by dissatisfaction and stress (Billeter-Koponen and Freden, 2005).

Burnout's impact on the individual is described as combined physical fatigue, cognitive tiredness and emotional exhaustion (Shirom et al., 2010) involving depersonalisation, emotional exhaustion and low personal accomplishment (Maslach et al., 1996). Burnout's sources include daily stress and work overload (Abushaikh and Saca-Hazboun, 2009), poor control or value conflicts in the workplace (Van Bogaert et al., 2009b). Research indicates that burnout can result in staff developing negative self-concepts and job attitudes and a reduced concern for patients (Abushaikh and Saca-Hazboun, 2009), which hinders service quality, and has serious consequences for the worker's personal life (Penson et al., 2000). Health professionals are at a greater risk of experiencing burnout, which can lead to serious consequences in terms of the health care they provide. Additionally, the negative impact of occupational stress and burnout on professionals' health and well-being lead to less job satisfaction, physical and psychological complaints, and higher rates of turnover and absenteeism.

In line with work-organizational sustainability, the sustainability in people as originating from a capability to function when facing different life and work events. Employees and groups need to be able to create new work opportunities, to adapt to emerging events, and to find ways to change their situations. Individuals, groups, and whole organizations stand a chance to influence their purposes in a positive manner when they are able to function. Therefore, human and social sustainability in working life as the ability of employees, groups, and organizations to keep on functioning in any situation faced. In this sense, sustainability in people and work systems is somewhat close to the recent definitions of resilience. (Carl Folke (2006, p. 259)

## **2. STATEMENT OF PROBLEM**

Health care professional in the category of doctors, nursing staff and supporting staff encounters the situation of competitive health care services in present day scenario. The increasing role of technology and advanced medical equipment demands continuous learning process to manage work place situation and enhanced health care services to patients. In addition to that the relationship of patient and health care professional need service – demanding attitude in the above mentioned situation, health care professional need to work more than stipulated working hours and additional emergency services. The changing scenario enclaves work place stress and burnout. The burnout syndromes either to be felt or to be expressed in physical and psychological formats. The outcome of burnout causes job dissatisfaction, intention to quit, absenteeism. These aspect where studied by many researchers in the fields of social and health Sciences. But there are very few studies were attempted to understand the influence of burnout on work place sustainability. It also understood that very negligible study were attempted to understand the effect of burnout on work place sustainability in health care profession.

## **3. LITERATURE REVIEW**

The term “job burnout” described a social problem that had existed for a long time and had several expressions which vary according to the period, researchers, across countries, and languages (Schaufeli et al., 2009). Job burnout is a condition precipitated by prolonged susceptibility to stress at work. It has many costs for the organization and the employees themselves. The value of job burnout is outlined by its association with various types of unfavourable organizational outcomes (e.g., absenteeism), varieties of health problems (e.g., cardiovascular issues) and mental problems (e.g., insomnia) (Cordes and Dougherty, 1993; Maslach and Leiter, 2016b; Schaufeli and Buunk, 2003; Shirom and Melamed, 2005). The negative consequences of burnout have prompted the calls for intervention programs not only to improve employee's quality of life but also to prevent the organizational losses (Awa et al., 2010). The workload is one of the most discussed sources of burnout and the most obviously connected with the exhaustion part of burnout (Maslach and Leiter, 2008). The imbalance in the simplest case can happen through the numerous demands and responsibilities, e.g., (deadline and targets), conducted with a shortage of resources. According to Maslach and Leiter (2008, 2016) and Maslach et al. (2001), any mismatch or imbalance between the person and the six areas of the job may intensify the likelihood of burnout. On the contrary, the higher the fit between the person and the domains, the higher the possibility of engagement (Maslach et al., 2001; Maslach and Leiter, 2008, 2016b). Burnout individuals can affect the relationship at work by causing personal strife and disrupting the workflow (Maslach, 2006). According to Maslach and Leiter (2016), “burnout can be contagious and perpetuates itself through social interactions on the job”(Maslach and Leiter, 2016b. p. 106). Bakker et al. (2005) investigated whether burnout is contagious among 1849 intensive care nurses. Job burnout has been associated with different forms of adverse effects in the workplace. For example, burnout was often regarded as predict for “absenteeism” (Bakker et al., 2003; Borritz et al., 2006) “turnover” (Maslach, 2006; Maslach and Leiter, 2016b; Wright and Cropanzano, 1998) “job

attitudes”(Moore, 2000), and job performance (Halbesleben and Buckley, 2004; Keijsers et al., 1995; Wright and Bonett, 1997). According to Maslach and Goldberg (1998) and Le Blanc and Schaufeli (2008), Integrating the individual and the organizational intervention strategies is likely to be the most effective to reduce or overcome job burnout (Le Blanc and Schaufeli, 2008; Maslach and Goldberg, 1998). However, the majority of the job burnout studies have focused primarily on individual approaches. According to Maslach et al. (2001), this is discrepant with most studies that have found that institutional variables perform a more significant notable role in burnout than individual ones (Maslach et al., 2001).

#### 4. OBJECTIVES OF THE STUDY

1. To describe the personal and professional back ground of health care professional in Chennai city.
2. To understand reasons for choosing health care profession by the selected respondents.
3. To evolve the factors causes for burnout.
4. To verify the influence of factors causes for burnout on work place sustainability among health care professionals

#### 5. HYPOTHESES

1. There is a significant association on the reason for choosing this career based on the selected personal and professional background
2. There is a significant association on the reason for choosing this industry based on the selected personal and professional background
3. There is a significant influence of burnout related factors on work place sustainability.

#### 6. SCOPE OF THE STUDY

The study titled cause of burnout and its effects on work place sustainability among health care professional among Chennai city covers the category of respondents like doctors, nursing staff and Lab technician. The study has chosen the respondents with Diversified work category in the designation of doctors, nursing staff and lab technician. A study explored the causes of burnout with special reference to work place. It also tested the significant influence of burnout related factors on work place sustainability.

#### 7. METHOD

In order study the cause of burnout and its effect on work place sustainability among health care professional in Chennai city, a pilot study was undertaken by reviewing existing literature and discussion with academics and field experts. The outcome of pilot study helped the researcher to design a descriptive research where the cause and effect of burnout on work place sustainability. The population for the study was chosen from health care professional in Chennai. A sampling unit was chosen as doctors, nursing staff and supporting staff (lab technician). A non – probability quota sampling was adopted at the initial stage where the sampling unit was categories as doctors, nursing staff and supporting staff (The details of quota classification is given below)

After choosing the quota, the respondents were chosen on convenient basis.

Category	No. Of samples
Doctors	60
Nursing staff	40
Lab technician	30

The data required for the study was chosen to primary and secondary sources. The secondary source was used to design the research problem, gap analysis and scale construction for questionnaire. The primary data through structured questionnaire with personal interview.

#### 8. MEASURES

A pilot survey was undertaken with academic expert, doctors, nursing staff and supporting staffs on judgemental basis. After the in-depth discussion there are variables related to work place burnout, causes and effects were identified. The developed items were compared with standardized questionnaire referred from literature survey. The refined questionnaire was tested for its content and item validity. A free testing was carried out with 75 respondents in the category of doctors, nursing staff and lab technicians. The obtained responses were tested for its scale reliability and it's internal consistency. Initially the questionnaire comprises 51 variables related to burnout and based on the reliability and scale consistency 37 items were found to be reliable with internal consistency of 0.7 (Cronbach alpha). The study survived 472 respondents. The questionnaire comprises 3 parts the part I covers personal and professional back ground of respondents. Part II

comprised the reasons expressed by respondents for choosing the health care industry. The part III covers the items related to causes of burnout and work place sustainability. These items were measured in a Likert scale (1 = strongly disagree to 5 = strongly agree). The obtained responses were verified for complete responses through data cleaning process.

The personal and professional backgrounds of respondents were described through percentage analysis. The reason sited for choosing health care industry was tested through chi – square test. The respondents' opinion about health care profession based on their selected personal and professional background was tested through one way ANOVAs. The cause for burnout was explored through exploratory factor analysis (EFA). The effect of burnout on work place sustainability was verified through Confirmatory factor analysis (CFA). The confirmatory factor analysis was tested through measurement fit and SEM Model.

## 9. PARTICIPANTS

The study comprised the respondents in the profession of health care belong to the categories of doctors, nursing staff and supporting staffs like lab technician and analyst so on. The sampling unit covered different age group, gender, educational background, marital status, experience level, designation and categories of hospitals like private and government. The below table portrays the personal and professional background of participants

Sl.No.	Attributes	Classification	No. of Respondents	Percentage to Total
1	Age	Less than 40	14	45
		41 to 50	23	50
		Above 50	2	5
2	Sex	Male	26	57
		Female	20	44
3	Educational Background	Under Graduation	6	14
		Post-Graduation	10	22
		Professionals	12	26
		Others	18	38
4	Marital Status	Married	9	55
		Single	5	45
5	Experience	Less than 5 Years	9	55
		6 to 10 Years	13	45
		Above 11 Years	11	21
6	Designation	Doctor	15	53
		Nursing Staff	12	26
		Supporting Staff	12	26
7	Type of Institute	Government	13	28
		Private	16	72
8	Reason to Choose the Career	Growth Prospect	15	58
		Suitability and Convenience	10	22
		Ambition	9	20
9	Reason for choosing the Industry	Passion	10	22
		Career Perspective	21	45
		Service Attitude	8	33
Total			130	100

**Source:** Primary Data

It is understood among the participants in the study, 50 percentage are in the age group of 41 to 50 and 45 percent are less than 40, regarding their gender background 57 percentage are male and 43 percent are female. In terms of their educational background 38 percentages have other qualifications like diploma in nursing, lab technician course and 26 percent are professionals like medicine and so on. About their marital status 55 percent are married and 45 percentages are single. 45 percentages are having 6 to 10 years of experience and 21 percentage have more than 11 years of experience. In terms of their designation, 53 percentage are doctors and remaining 26 percentage are nursing staff and supporting staff. 28 percentage of participants belong to government health care category and remaining 72 belong to private. It is learnt that 58 percentages of

participants chose this career for growth perspective and 45 percentage chose the industry for career perspective. 33 percentage chose with service attitude.

#### 10. Testing of Association between choosing the career and industry with selected personal and professional background of participants (age, gender, experience and designation)

In order to test the association between reason for choosing the career and industry by the participants based on their selected personal and professional background like age, gender, experience and designation, chi-square test was employed. Here the two variables were measured in nominal scale. The level of significance for testing the association was taken as 5 percentage.

#### 11.0. Testing the association between reasons for choosing this career based on selected

-S –Significant

NS- Not significant

Source: Primary data

Sl.No.	Attribute		Age		Gender		Experience		Designation	
			P value	Sig	P value	Sig	P value	Sig	P value	Sig
1	Reasons to choose the career	Growth Prospect	.002	S	0.003	S	0.000	S	0.0041	S
		Suitability and convenience	.004	S	0.000	S	0.000	S	0.000	S
		Ambition	.000	S	0.000	S	0.000	S	0.00145	S
2	Reasons to choose the Industry	Passion	.0032	S	0.0034	S	0.78	NS	0.432	NS
		Career Perspective	.0016	S	0.001	S	0.43	NS	0.000	S
		Service Attitude	.003	S	0.52	NS	0.23	NS	0.000	S

It is observed from the table that there is association exist between age and choosing the career with respect to growth perfect, sustainability & convenience and as well as ambition. Since the level of significance is less than 0.05 and the null hypothesis was rejected. The same with respect to choosing the industry passion, career perspective and service attitude are significantly associated with age, since the obtained significant values are less than 0.05. with respect to gender, all the reasons cited for choosing the career are significantly associated and whereas choosing the industry with respect to gender are independent ( not associated) because the obtained significant values are more than 0.05. In terms of testing the association between choosing the career and industry with respect to experience all the variables under choosing the career are significantly associated and at the same the variables under choosing the industry are not significantly associated. With respect to designation all the variables cited for choosing the career are significantly associated but at the same time the variable 'passion under choosing the industry is not significantly associated but other two variables like career perspective and service attitude are significantly associated.

#### 11. EXPLORATORY FACTOR ANALYSIS

The Exploratory Factor analysis was employed in order to evoke the factors causes burnout among health care professionals and its consequences. A pilot survey based questionnaire which was tested for its content, criteria validity and consistency was used to explore the factors through exploratory factor analysis. The literature based questionnaire developed by Developed by Cheryl L. Tromley, Eastern Academy of Management, Arlington, VA, 1988 was taken as base and further fine tuning through pre testing 51 variables were identified and it was administered to collect responses from the participants. The obtained responses through interval based Likert scale was tested for its internal consistency and found to be reliable (Cronbach alpha value of 0.793). Since the 51 items were reliable, it was further taken to exploratory data reduction and factor identification analysis through SPSS (version 15). The initial data reduction analysis explored 30 variables loaded more than 0.75 were taken to consideration and which found to be loaded under 7 factors with the extracted variance of 78 percentage.

Factor Label	Item Code	Item Description	Reliability	Factor Loading	Convergent Validity	Discriminant Validity
Work Place Integrity	WPI1	I tend to distrust people's motives.	.779	.944	0.835367	0.889
	WPI2	Sometimes I set up situations in which I cannot succeed.	.779	.939		
	WPI3	I need to continually generate excitement to	.783	.927		

		keep away from being bored.				
	WPI4	I am very ambitious.	.776	.918		
	WPI5	I feel as though I am the only one who can do my job right.	.776	.869		
	WPI6	When I make a mistake, I get very upset with myself.	.778	.719		
Conflict	CONFL1	No matter how hard I work in this job, I am not certain that I will get ahead	.773	.936	0.822708	0.861
	CONFL2	I spend my most of time with other people in the course of doing my job	.775	.924		
	CONFL3	There is a great deal of competition in my job.	.774	.915		
	CONFL5	The emergency work demands creates role conflict at my work place.	.776	.896		
	CONFL4	I often feel a conflict between my family and the demands of my job.	.779	.888		
Job Incompatibility	JOBINC1	My job requires skills that I haven't completely mastered.	.781	.787	0.799263	0.804
	JOBINC2	There is a great deal of conflict in my company.	.792	.767		
	JOBINC6	I don't have a say in the decisions that affect me.	.799	.754		
	JOBINC3	I often feel let down by people and situations.	.792	.736		
	JOBINC4	I am impatient with activities, things just don't happen quickly enough.	.795	.731		
	JOBINC5	I am unable to laugh at a joke about myself.	.784	.713		
Work Place Perception	WPER1	I am always worried about what others think of me.	.783	.873	0.822923	0.86
	WPER2	I am uncertain about my job duties and responsibilities.	.785	.868		
	WPER3	I get very upset when other people make mistakes.	.790	.851		
	WPER4	Sometimes I don't have the resources I need to do my job.	.785	.749		
Awareness	AWAR1	I feel very competitive toward my fellow workers.	.781	.855	0.817444	0.843
	AWAR2	I let my problems at work interfere with my personal life.	.786	.844		
	AWAR3	I have difficulty accepting my weaknesses and limitations.	.786	.748		
Work Place Sustainability	SUST1	I often try to do more than I could possibly accomplish.	.787	.870	0.818333	0.812
	SUST2	I tend to be impatient with				

ty		other people's weaknesses and limitations.	.785	.866		
	SUST3	I get upset if things don't go the way I planned.	.787	.826		
Psychologic al Contract	PSYCON 1	I have difficulty relaxing.	.787	.803	0.782667	0.798
	PSYCON 2	I rarely change my mind once I've taken a stand on something.	.785	.785		
	PSYCON 3	I expect too much of myself.		.760		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			0.825			
Bartlett's Test of Sphericity						
Approx. Chi-Square			11444.868			
df			435			
Sig.			.000			
Cumulative Percentage of Variance ( 7 factors)			78.32			

Source : Primary data

The outcome of EFA showed the significance of 0.000 permitted to perform factor analysis and the KMO value of more than 0.7 (0.825) revealed the sample adequacy. Further to that rotated component matrix loaded 30 variables under 7 major factors. The factor loaded with 6 variables which explained about causes of burnout among health professionals with respect to integrity on job was labelled as "Work Place Integrity". The second factor which describes the causes of burnout based on "Work Place Conflict" loaded with five variables. The incompatibility related variables included six items converged under the factor "Work Place Incompatibility" was identified as third factor causes burnout among health care professionals. There are four variables' expressed about perception background were termed as fourth factor "Work Place Perception". The fifth factor explored with three variables which describe the awareness about work was termed as "Awareness" also identified causes for burnout. There are another three variables delineates about psychological contract at work place was termed as sixth factor causes burnout as "Work Place psychological contract". The seventh factor comprise three variables describe about employee work place sustainability was termed as "Work Place sustainability", There are six factors explored with 27 variables identified the causes of burnout and it is also evoked these six factors cause burnout among health care professionals leads to the outcome of employees work place sustainability.

In order to validate the hypothesis about the significant influence of six factors like work place perception, incompatibility, integrity, awareness and conflict on sustainability the confirmatory factor analysis was employed.

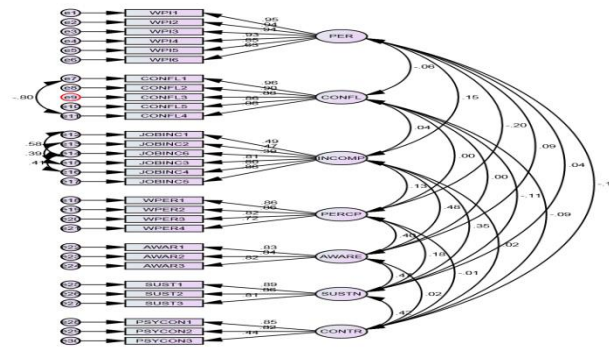
## 12. CONFIRMATORY FACTOR ANALYSIS

The confirmatory factor analysis was employed to test and validate the effect of burnout related factors on work place sustainability among health care professionals. The burnout related six factors namely integrity, perception, conflict, incompatibility, psychological contract and awareness were taken as exogenous factors and work place sustainability was taken as endogenous factors. At the initial stage, the model after model identification, the model fit was measured in order to validate the convergence of items under factors, its discriminate validity, composite reliability and average variance extracted. For this measurement fit was carried out with the help of AMOS 21.0 version. The outcome of initial measurement fit loaded with less than 0.8 GFI and further to applying four modification indices for minimizing model errors, the saturated over identified model was evolved with the required GFI, AGFI, TLI, RFI, NFI and RMSEA. The identified model also produce the necessary convergence, discriminate validity and composite reliability and with MSV.

Since the model fit satisfy the construct validity and item consistency. The model further taken for testing the framed hypothesis of burnout causes factors influence on sustainability through Structural Equation Model through (SEM-Covariance)



## Measurement Fit

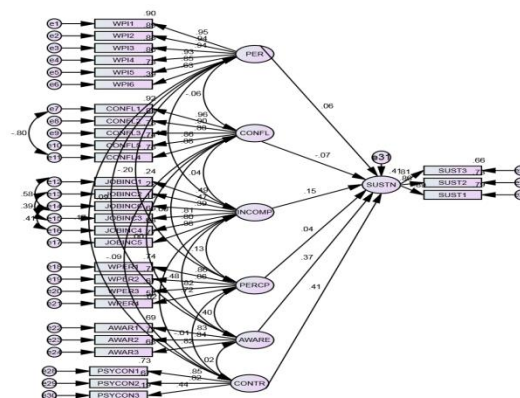


\*\* PER – Work Place Integrity, CONFL – Work Place Conflict, INCOMP – Work Place Incompatibility, WPER – Work Place Perception, AWARE – Employee Awareness, SUSTN – Work Place Sustainability, CONTR – Psychological Contract

Statistics	Model Values	Recommended value for good fit <sup>a</sup>
$\chi^2$	747.401	
Probability level	0.000	$\geq 0.05$
$\chi^2/df$	4.822	$\leq 5.00$
GFI	0.855	$\geq 0.9$
CFI	0.868	$\geq 0.9$
RMSEA	0.096	$\leq 0.08$

## 13. STRUCTURAL EQUATION MODEL

The structural Equation Model was employed in order to test and validate the hypothesis that the burnout evoking factors have significant effect on work place sustainability. There are six burnout causing factors explored was taken as exogenous factors and work place sustainability was taken as endogenous factor. The SEM covariance was employed and the outcome of Structural Equation Model is given below.



\*\* PER – Work Place Integrity, CONFL – Work Place Conflict, INCOMP – Work Place Incompatibility, WPER – Work Place Perception, AWARE – Employee Awareness, SUSTN – Work Place Sustainability, CONTR – Psychological Contract

### 13a. Hypothesis Testing

			Estimate	S.E.	C.R.	P	Label
SUSTN	<---	PER	.042	.031	1.373	.170	Not Supported
SUSTN	<---	CONFL	-.070	.039	-1.800	.072	Supported
SUSTN	<---	INCOMP	.264	.093	-2.846	.004	Supported

			Estimate	S.E.	C.R.	P	Label
SUSTN	<---	PERCP	.032	.044	.726	.468	Not Supported
SUSTN	<---	AWARE	.378	.060	6.305	***	Supported
SUSTN	<---	CONTR	.388	.047	8.258	***	Supported

The above hypothesis testing reveals that there is a significant effect of conflict, work place incompatibility, awareness and work place psychological contract on work place sustainability. In this conflict and work place incompatibility have negative effect on sustainability. It reveals that when work place conflict and incompatibility increases the sustainability decreases. In the case of awareness and psychological contract have positive effect on sustainability? When level of awareness and psychological contract increases the sustainability also increase.

#### 14. CONCLUSION

Work place burnout has become inevitable element in the present day work situation. It's intensity cause quality and service damages at work places. In the case of health care industry, the changing service scenario, design of service, relationship dyad, technological intervention and competition cause burnout among the employees in the sector. The research paper explored the factors cause for work place burnout and its effect on employee sustainability at work places. It evoked major six factors cause for burnout among employees namely work place perception, conflict, incompatibility, integrity, awareness and psychological contract. It also tested about the influence of these six factors on employee sustainability at work places in terms of work, patient management, situation handling and intention to serve. The outcome showed that there is significant negative impact of conflict and incompatibility on employee sustainability. It is also understood the positive effect of work place awareness about work, responsibility, patient relationship and technical knowhow on sustainability. The positive effect also probed about psychological contract at work places by employees on their sustainability.

#### REFERENCES

1. Adriaenssens J, De Gucht and Maes S.(2015):Determinants and prevalence of burnout in emergency nurses: A systematic review of 25 years of research. *International Journal of Nursing Studies*; 52 (2), 649-661.
2. American Psychological Association.(2015): Burnout harms workers' physical health through many pathways. Available at <http://www.apa.org/monitor/jun06/burnout.aspx>. Last accessed 17th October 2015
3. Bakker and Demerouti. (2006): The Job Demands-Resources model: state of the art. *Journal of Managerial Psychology*; 22(3)2007, 309-328.
4. Cimiotti JP, Aiken LH, Sloane DM and Wu ES.(2012): Nurse staffing, burnout, and health care-associated infection. Available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3509207/pdf/nihms387953.pdf> last accessed 15th September 2015
5. Cañadas-De la Fuente GA, Vargas C, San Luis C, García I, Cañadas GR and De la Fuente EI. (2015): Risk factors and prevalence of burnout syndrome in the nursing profession. *International Journal of Nursing Studies*; 52 (1), 240-249.
6. Donley R. (2013) Challenges for Nursing in the 21st Century. Available at [http://www.medscape.com/viewarticle/521379\\_8](http://www.medscape.com/viewarticle/521379_8)
7. Elo S and Kyngas H. (2008). The qualitative content analysis process, in: *Journal of advanced Nursing*, 62(1), 107-115
8. Günüşen N.P and Üstün B (2009): Turkish nurses' perspectives on a programme to reduce burnout. *International Nursing Review*; 56 (2) 237-242.
9. Halbesleben JR and Buckley MR. (2004): Burnout in organizational life. *Journal of management*; 30(6), 859-879.
10. Kozier, Erb J, Berman A, Snyder S, Lake R and Harvey S. (2011): *Fundamentals of nursing; Concepts, process and practice*, second edition
11. Miller JF. (2011): Burnout and Its Impact on Good Work in Nursing. *Journal of Radiology Nursing*; 30 (4), 146-149

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12. Peterson, U., Demerouti, E., Bergstro, G., Samuelsson, M., Marie, A. (2008), Burnout and physical and mental health among Swedish healthcare workers. *Advanced Nursing*, 62(1), 84-95.
  13. Pines, A.M. (2003), Occupational burnout : A cross-cultural Israeli Jewish-Arab perspective and its implications for career counselling. *Career Development International*, 8(2), 97-106.
  14. Rotter, J.B. (1966), Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 80(1), 1-28.
  15. Schaufeli, W.B. (2003), Past performance and future perspectives of burnout research. *Industrial Psychology*, 29(4), 1-15.
  16. Shirom, A., Melamed, S. (2006), A comparison of the construct validity of two burnout measures in two groups of professionals. *International Journal of Stress Management*, 13(2), 176-200.
  17. Shirom, A., Melamed, S., Toker, S. (2005), Burnout and health review: Current knowledge and future research directions. In: Hodgkinson, G.P., Ford, J.K., editors. *International Review of Industrial and Organizational Psychology*. Vol. 20. New Jersey, United States: John Wiley & Sons. p269-308.
  18. Wright, T.A., Cropanzano, R. (1998), Emotional exhaustion as a predictor of job performance and voluntary turnover. *Applied Psychology*, 83(3), 486-493.

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**COMPARATIVE STUDY ON MARITAL ADJUSTMENT AMONG RURAL AND URBAN MARRIED WOMEN**

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**Dr. Manjula G. Kadapatti<sup>1</sup> and Miss Akshatha V Dani<sup>2</sup>**<sup>1</sup>Assistant Professor, Home Science, Smt. V.H.D Central Institute of Home Science, Bangalore<sup>2</sup>Research Scholar, Department of Human Development and Research Centre, Smt. V.H.D Central Institute of Home Science, Bangalore**ABSTRACT**

*Marital adjustment is considered as the major important role of everyone's life. Marriage in reality is a way of living. It is main success and satisfaction in persons life and it's a lifelong processes. Nowday's people's lives under complex environment which is turn causes anxiety and divorce between the marital relationship . The present study was undertaken to study and compare marital adjustment among rural and urban married women. A sample of 120 married women of 60 were living in urban area and 60 were in rural area were randomly selected for the present study. Adjustment inventory a standardized tool developed by Dr. Gayatri Tiwari, Mrs. Jaswant Deora and Ms. Sneha Jain (2018) was used for the present study. The results found a significant difference in association with the classification of respondents by age group, shows that higher percentage of women respondents are in the age group of 38 to 42 years , As regarding to occupational status were also found significant difference between urban and rural married women on their marital adjustment with occupational status . The finding of the study shows that both urban and rural womens' over all mean marital adjustment scores have slight difference responses in marital adjustment. In above average urban married womens' have higher percentage of adjustment level when compared to rural married women.*

*Keywords: marital adjustment, married women, urban and rural married women.*

**INTRODUCTION**

Marital adjustment is the state in which there is an overall feeling in husband and wife of happiness and satisfaction with their marriage and with each other. The adjustment and marital relationship are major challenges in the most of the families. The adjustment of married mates is unlike any other human relationship. Most couples marry filled up with expectations. Some of the expectation will be realistic while others unrealistic. . It is main success and satisfaction in persons life as it is an indicator for individuals ability to adjust with their spouse ,family and to face the problems arises between the family members and maintaining the healthy relationship with partner , in-laws and childrens and other family members.

Marital adjustment is defined as the integration of a couple with different personality traits in a union in order to complement each other to achieve happiness and common goals. For the achievement of unity and solidarity in the family, the couple should agree on economic, managerial and psychosocial issues such as communication, value and goals, decision making, the way to conduct home-related activities, relationship with close relatives, making use of free time and income management, and thus they should establish marital adjustment.

**METHODOLOGY****Objectives:**

1. To study and compare marital adjustment among rural and urban married women.

**Hypothesis:**

- Marital adjustment will not vary among rural and urban married women
- Marital adjustment is better in rural women compared to urban women.

**Procedure:**

The present study was restrained to married womens living in urban and rural area of Gadag, District Karanataka. A sample of 120 married women of 60 were living in urban area and 60 were in rural area were randomly selected for the present study. Adjustment inventory a standardized tool developed by Dr. Gayatri Tiwari, Mrs. Jaswant Deora and Ms. Sneha Jain (2018) was used for the present study. Prior to data collection, permission was taken from married women and gave a brief introduction about the topic. later instructions was given to the respondent and asked to fill the questionnaire and indicate their responses for all stated questions. Data was tabulated using coding plan for the information collected by the respondents and master sheet was prepared. Percentage, Standard deviation, Mean Deviation, t- test and Chi square test was the

statistical methods used for the study. Obtained results were discussed and interpreted in tabular graphical presentation

## RESULTS AND DISCUSSION

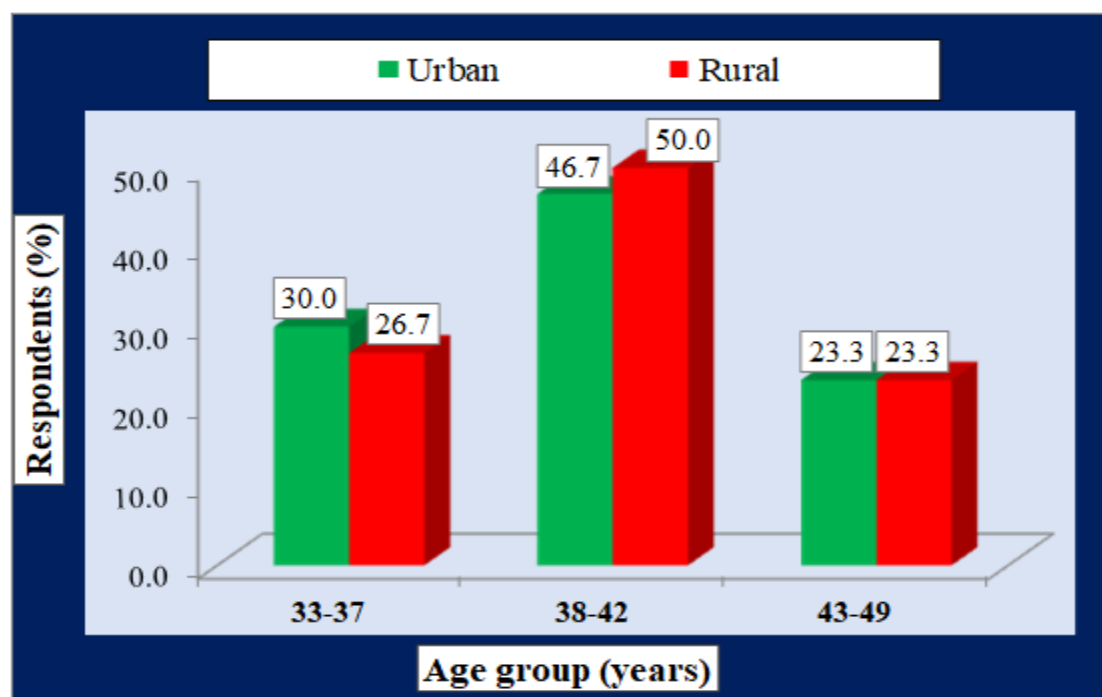
The results of the study are discussed as follows

**TABLE –1 Classification of Respondents by Age group**

Age group (years)	Respondents				‘χ2’ Test
	Urban		Rural		
	N	%	N	%	
33-37	18	30.0	16	26.7	0.19 <sup>NS</sup>
38-42	28	46.7	30	50.0	
43-49	14	23.3	14	23.3	
Total	60	100.0	60	100.0	

NS : Non-significant,  $\chi^2 (0.05, 2df) = 5.991$

Table 1 depicts that the classification of respondents by age group. It indicates that majority of the urban respondents (46.7%) and rural respondents (50%) are from the age group 38-42 years. Whereas 30% of urban respondents and 26.7% of rural respondents are belong to the age group of 33 to 37 years (Fig-1). While urban and rural respondents of same percentage (23.3%) belongs to the 43 to 49 years. Statistically the data is found to be non significant. It shows that there is no much difference in age group of selected urban and rural respondents.



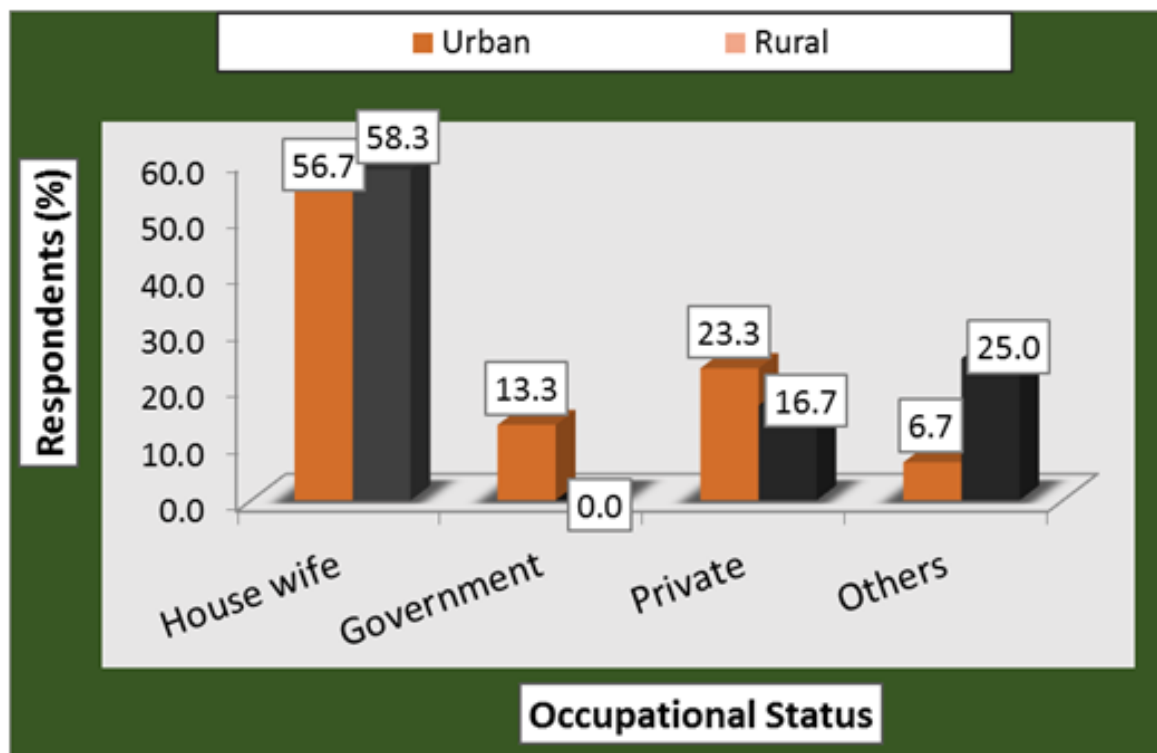
**Figure.1 : Classification of Respondents by Age group**

**TABLE – 2 Classification of Respondents by Occupational status**

Occupational status	Respondents				‘χ2’ Test
	Urban		Rural		
	N	%	N	%	
House wife	34	56.7	35	58.3	15.05*
Government	8	13.3	0	0.0	
Private	14	23.3	10	16.7	
Others( business , agriculture, labour work)	4	6.7	15	25.0	
Total	60	100.0	60	100.0	

\*Significant at 5% level,  $\chi^2 (0.05, 3df) = 7.815$

Table 2 represent that classification of respondents by occupational status. It is found that majority of (56.7%) urban respondents and 58.3% rural respondents are house wife. Only 13.3% of urban respondents are government workers when compared to rural respondents. A percentage of 23.3% of urban respondents and 16.7% of rural respondents are working private sectors. Whereas 6.7% and 25% other sectors (Fig-2) were urban and rural respondents respectively. Statistically the data shows significant difference in association with the classification of respondents by occupational status. It reveals that higher percentage of house wives are from rural area than the urban. There is less percentage of government workers from the urban area were none of respondents from rural area. Whereas more respondents work in private sector are from urban area than the rural area. While major respondents from rural area involved work in other sectors compared to lesser respondents from the urban area.



**Figure. 2 :** Classification of Respondents by Occupational status

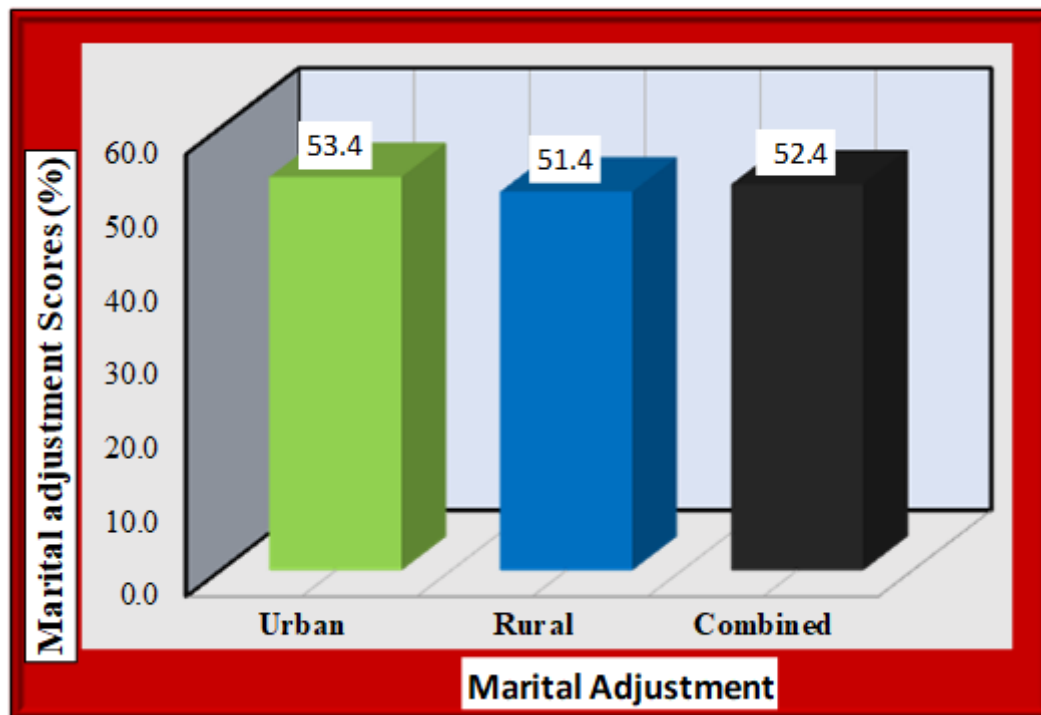
**TABLE – 3** Over all Mean Marital adjustment scores among Urban and Rural Respondents

Respondents	Statem ents	Max. Score	Marital adjustment Scores				't' Test
			Mean	SD	Mean (%)	SD (%)	
Urban (n=60)	90	450	240.28	18.35	53.4	4.1	2.61*
Rural (n=60)	90	450	231.13	19.97	51.4	4.4	
Combined (n=120)	90	450	235.71	19.64	52.4	4.4	

\*Significant at 5% level,

$$t(0.05, 118df) = 2.306$$

Table 3 depicts overall and mean marital adjustment scores among urban and rural respondents. It is seen from finding that the overall marital score found to be 52.4 %. Further there is a slight increase in the mean marital adjustment scores among urban respondents(53.4%) compared to rural respondents(51.4%). It is interesting to note that the difference in the mean marital adjustment scores between urban and rural respondents found to be statistically significant ( $t= 2.61^*$  at 5% level of significance ). The urban married women have better marital adjustment than rural marries women,



**Figure.3 :** Over all Mean Marital adjustment scores among Urban and Rural Respondents

#### CONCLUSION-

Marital adjustment is a life long process; although in the early days of marriage one has to give serious consideration. Couples are under so much of social pressure, strain and stress due to various social demands that it has become important to make all marital adjustment successful so that it does not affect their well being. The adjustment and marital relationship are major challenges in most of the families of urban and rural area. Rural women at present are make more adjustment to the marital relationship because they have to maintain family in rural area where most of the families are joint family and women should give attention in all aspects of home and family members to balance the life. Therefore the present study reach to analysis the study of marital adjustment among urban and rural married women.

#### REFERENCE-

- Dhanraj Singh Slathia(2014), Rashtrasant Tukadoji Maharaj Nagpur University (Maharashtra).
- <https://clinmedjournals.org/articles/ianhc/international-archives-of-nursing-and-health-care-ianhc-4-105.php?jid=ianhc>
- <https://clinmedjournals.org/articles/ianhc/international-archives-of-nursing-and-health-care-ianhc-4-105.php?jid=ianhc>
- <https://doi.org/10.1002/9781119085621.wbefs071>
- <https://doi.org/10.1177/0265407597146004>
- <https://www.homesciencejournal.com/archives/2017/vol3issue1/PartI/3-1-90.pdf>
- [www.journals.com](http://www.journals.com)
- <https://doi.org/10.2224/sbp.1999.27.3.309>

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**COMPLIANCE WITH INTERNATIONAL FINANCIAL REPORTING STANDARDS, IMPORTANCE AND OBSTACLES: EXPERIENCES OF SOME COUNTRIES**

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*International accounting and financial reporting standards are no longer subject to their application in developed countries only, but the need has become urgent in all countries that seek to realize the progress of civilization and engage in the global environment and access to international financial markets to adopt these standards, the research aims to evaluate Iraq's experience in compatibility with International Accounting Standards, the inductive approach was adopted to show the importance and obstacles to adopting international accounting and financial reporting standards, and to present the experiences of a group of selected countries in this field, and to explain the justifications for compatibility with these standards in Iraq and the most important obstacles facing their application, and the research reached a set of conclusions, including, Despite the importance of compatibility between accounting standards in facilitating the process of comparison in the performance of companies, there are clear differences in the positions of countries regarding compatibility with international accounting standards, and that this compatibility process faces obstacles and difficulties, due to the presence of requirements and ingredients that must be met to implement those standards. And that the experience of issuing the Iraqi accounting rules fought by the Accounting Standards and Rules Board of the Office of Financial Supervision, constitutes a faltering experience Compared to the experiences of other countries,*

*Keywords: International Accounting Standards, Compatibility, experiences of some countries*

**INTRODUCTION:**

In light of the globalization of economic activity, the application of the requirements of the World Trade Organization and the International Monetary Fund, and the openness of the Iraqi financial market to global markets, the need to reconcile Iraqi accounting standards with international accounting and financial reporting standards in order to meet the needs of information users in different countries, and thus the research problem can be formulated by the following question: (What is the importance of compatibility with international accounting and financial reporting standards, and what are the obstacles to this compatibility?)

The existence of a difference in the environmental, political, economic, social and cultural factors among the countries of the world must necessarily lead to differences between the accounting standards and procedures followed in them, and the difference of these factors is an obstacle to attempts to reconcile these standards.

Each profession has a constitution that governs and controls it, directs its practices, and unifies its treatment of similar matters, so that there is a unified base for comparison by those interested in the profession, and accounting, like other scientific professions that gain its importance from the important role of information in the economic environment. It has its unified global constitution that stems from the keenness of its workers To show the figures that express a huge amount of financial events and operations with honesty, accuracy and reliability, and many countries of the world are interested in formulating and developing their own accounting policy by issuing accounting standards that reflect the accounting policy pursued by a society and applied in the field of measuring and communicating accounting information related The activities of the economic units in that society, as accounting standards define the characteristics that must be characterized by accounting information, and international accounting and financial reporting standards can be a form of the constitution of the accounting profession.

Referring to the previous literature in accounting, the experiences of some foreign and Arab countries in compatibility with international accounting standards were presented and Iraq's experience in compatibility with those standards was analyzed, to evaluate the strategy of the Accounting Standards and Rules Board in the Republic of Iraq, in adopting international accounting standards as a supreme and permanent body affiliated to the Audit Bureau Federal Finance, whose terms of reference are determined by studying accounting standards and rules and approving them in economic units.

**COMPLIANCE WITH INTERNATIONAL ACCOUNTING STANDARDS**

The importance of financial reports is increasing in light of the globalization of financial markets, the development of communications and the publication of financial reports on the Internet to support the efficiency



of these markets, and the idea of adopting common or unified accounting standards for preparing these reports is increasing, as companies have to prepare internationally accepted financial reports, or at least in the countries that Shares are traded .

Convergence with international accounting standards and reliance on high-quality accounting standards has become a stage of development and a necessary direction to promote and maintain global economic stability and integration into the global economic system. The International Accounting Standards Board has been working since 2001 to develop a uniform, global, and high-quality set of international financial reporting standards, the information of which is transparent and comparable.

The Council expresses its cooperation with countries that issue local accounting standards to achieve compatibility with international standards, and with the increasing impact of globalization on local economies, by simplifying rules, developing laws, implementing reforms in local markets, and expanding the participation of the private sector to be an essential partner in the process of economic development The need to find compatibility between local and international accounting standards has increased in most countries of the world, especially developing countries that do not have specialized and strong professional organizations to issue and develop accounting standards, in order to achieve a greater degree of transparency at the global level, allowing entry into the framework of global accountability. (Youssef, 2013) .

Despite the importance of accounting harmonization and the tendency of many international bodies to demand its establishment, but it did not have a conceptual definition of its concept, as well as sometimes confusing it with some other concepts, and it means harmonization) a degree of coordination or similarity between different sets of standards, methods and forms Financial Statements(Abdullah,2012) .

Compatibility is also defined as reducing the differences between the accounting practices prevailing in the countries in the field of reconciliation, with the aim of providing credibility and reliability in the published data and increasing the reliability of it for comparison purposes, and then increasing the ideal of financial reports in rationalizing decisions (Salim, 2004). Also known compatibility as to reduce the differences between the prevailing accounting practices in countries conciliation in order to provide credibility and reliability in the published data and increase its reliability for comparison purposes and then increase the financial reports are ideal in the rationalization of decisions (Lotfy, 2005), Accounting compatibility is considered an inevitable path, for multinational companies, which are supposed to be able to lift the barriers that hinder international comparisons, even if full comparison is impossible (Chatham, 2020). Often the student of international accounting topics, especially the issue of accounting compatibility, feels that he needs to understand and differentiate between the meanings of the three concepts, which are standardization, calibration and compatibility, which researchers often use overlapping to refer to the process of international compatibility of accounting without a specific definition of it.

Uniformity is considered as a conditional case that indicates that it is a system or plan that includes a set of arrangements for recording data at the level of the economic unit and preparing financial statements within a specific framework of foundations, rules, conventions, definitions, accounts, lists and budgets to serve certain goals, and at the local level it is referred to as accounting uniformity It is a unified accounting system and its objectives are to provide the necessary data for planning, implementation and control at the level of the economic unit in the national accounts as well as facilitating the collection, classification and storage of accounting data. Accounting refers to the imposition of accounting principles and rules for one country on other countries (Sunder, 2009) and standardization refers to the situation in which everything is consistent and homogeneous or not differentiated, as it contains symmetry, which means that all accounting principles and practices are one (Abu Zaid, 2005)

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From this, it is clear that there is an overlapping, connected and mutually influencing relationship between the concepts of accounting compatibility, accounting calibration and accounting standardization, and the accounting literature has emphasized the importance of distinguishing between these concepts, as the focus was on the need to set accounting standards, considering that if it is possible to develop an accounting standard recognized at the country level It must be possible to apply it to the other country, hence the concept of international accounting, and if there is a difficulty in reaching differences in the results of international accounting in different countries, which may result in errors resulting from different applications and accounting practices in the countries of the world, which called for the importance of the concept of consistency. There is no doubt that the focus of the accounting literature on the international scale on the subject of comparing the different systems of the countries of the world and the attempt to bring those differences closer and make them systems that permeate with other systems led to the unification of accounting systems. (Lotfy, 2005)

The local and international accounting organizations have been concerned with coordinating the accounting foundations and minimizing their variance and diversity by trying to coordinate between the different systems, and includes both eliminating poor accounting methods and limiting the alternative methods accepted within the international standards themselves, and making the accounting standards specific to a country give appropriate consideration to financial statements prepared according to the standards of another country (Marshall & Others, 2004) .

(Beke) tracks the benefits of international accounting standards and their contribution to harmonization in business training It has been shown that standard accounting standards will increase market liquidity and division of labour, reduce transaction costs for investors and facilitate the formation and flow of international capital, lower the cost of capital, lower costs will also lead to cross-border investments and more. Cross-border Listings (Beke, 2011)

Thus, it can be said that the accounting compatibility enables investors and financial analysts to obtain reports that are credible, reliable and understandable, and count them as the basis for making investment decisions, and thus increase the efficiency of the capital markets.

## THE EXPERIENCES OF SOME COUNTRIES IN APPLYING INTERNATIONAL ACCOUNTING STANDARDS

The process of setting international accounting standards in the past few years has achieved a number of successes in achieving greater recognition and use of international standards for financial reporting, as many countries have moved towards international standards either to apply them directly or to comply with them. In this topic, the experiences of some countries in applying international accounting standards will be presented, as follows: (Al-Zain, 2011) (Saleh, 2012) (www. gccao. org, 2005) (Abdullah and Othman, 2015)( Abdullah and others,2012)

- 1- **The American experience:** is the experience of the strongest partner in the accounting standards industry, as it has the largest accounting infrastructure represented in national councils and bodies, stock exchanges, investors and universities, as well as human and financial resources. Accounting Principles Board until 1973, then the Financial Accounting Standards Board (FASB). The United States of America has been a partner in all international accounting activities, although it is not committed to it or even fully accepting it, whether in terms of membership in the International Accounting Standards Committee or the current International Accounting Standards Board or a group (4+1), and with the increasing tone of globalization in Accounting Standards After the features and foundations of a coherent international entity of accounting standards were formed, as well as as a result of some accounting disasters that occurred in the United States of America at the beginning of this century, the American Stock Exchange and the Financial Accounting Standards Board began to gradually approach international standards, and this approach was twofold: The first is to change some American standards to conform to international standards, and the second is to change some international standards to conform to American standards. Both the International Accounting Standards Board and the American Financial Accounting Standards Board reached a common understanding that included working to make the standards issued by both of them compatible and applicable, as well as Coordination between them before future releases..
- 2 - **The UK experience:** Although the United Kingdom is one of the founding countries of the International Accounting Standards Committee, and its country hosts the headquarters of the International Organization, and the first president of the International Council is British and served as head of the British Accounting Council, but it did not have a specific plan to comply with international standards, as the British Council issued national standards According to the needs of the British market despite its activity in the formulation

of international standards, the British Council began to study the differences between national standards and international standards in 2002, and the British Accounting Standards Board issued six standards that were considered an important and major step towards harmonizing British accounting standards with international standards, so the strategy of reconciliation with International standards included maintaining British standards, and the introduction of British international standards would be through British standards issued by the British Council.

- 3 - **Singapore experience:** Singapore is among the middle countries in terms of economic resources and accounting infrastructure. The plan that Singapore followed is a government-backed plan, as the plan was adopted by the Ministry of Finance, and included a set of steps that began in 1999. The Ministry of Finance took a decision in line with international standards, and the Ministry of Finance formed a national board for standards Accounting and disclosure in the same year, and as of 2000, the National Standards Board issued a national accounting standard concurrent with the international standard, and in 2001 a government decision was issued by the Ministry of Finance to obligate companies to the standards issued by the National Council and based on international standards, as of 2003.
- 4 - **Japan experience:** Although Japan is a full partner in all international activities, whether in terms of membership in the previous committee or the current council or its retention of liaison membership, on the other hand, it has no intention of conforming to international standards, and the Japanese international dialogue has resulted in common ground that contributes to reducing differences. Between international standards and Japanese standards, on October 12, 2004, talks began between the International Accounting Standards Board and the Japanese Accounting Standards Board on a joint project to reduce the differences between the accounting standards issued by each of them. The talks started based on two foundations: First, these talks are dangerous towards achieving consensus, The second is that consensus contributes to the support and development of global financial markets, and the Japanese position on international standards is summed up in the existence of an agreement to maintain national standards, with the need for coordination between international and Japanese standards, and that coordination focuses on similar economic characteristics, and from this it is understood that coordination in standards related to situations Therefore, the future trend is to maintain national standards despite unification efforts.
- 5 - **Denmark's experience:** Denmark's experience of compatibility with international standards began for a relatively long time, as it followed a set of steps starting in 1993, when the Danish National Council began a policy of reconciling a national standard with each standard first-hand, and in the same period the National Council worked to reduce the differences between international standards and international standards. In 2002, after eliminating most of the differences between national standards and international standards, an accounting law was issued that accepts the revised Danish accounting standards, and a national standard was issued with each international standard. In the same year, the Copenhagen Stock Exchange issued a publication encouraging the early application of international accounting standards, and as of 2005 Listed companies adhere to national standards that are compatible with international standards.
- 6 - **The experience of the European Union:** The European Union countries adopted international standards by virtue of the decision issued in 2002, which required European companies registered in stock exchanges, which numbered about 8000 companies, to follow international standards starting in 2005, and thus 27 countries have applied these international standards, and all other standards have been adopted International Financial Reporting with some exceptions related to some recent amendments thereto.
- 7 - **Malaysia's experience:** Compared with other countries, the accounting profession in Malaysia is relatively young. In 1997, in accordance with the Financial Reporting Act, the Malaysian Accounting Standards Board (MASB) and the Financial Reporting Corporation (FRF) were established as an independent authority to develop and issue accounting and financial reporting standards in Malaysia (Chairas & Radianto, 2001: 63). In Malaysia, 54 accounting standards were issued by non-private companies and 36 standards for private companies, including four local standards. In addition to that, it includes an Islamic intellectual framework, an Islamic standard, and locally developed standards
- 8 - **Iraq experience:** The unified accounting system issued in 1983 and the Public Companies Law No. 22 of 1977 are among the most important regulations and laws that regulate the accounting work in Iraq and that help provide financial and statistical data to serve the relevant authorities, but despite their importance, a number of accounting problems have emerged on the horizon Which requires the presence of an independent, specialized body that has the ability to solve such problems, which led to the formation of the Accounting Standards and Rules Council in the Republic of Iraq as a supreme and permanent body

affiliated to the Board of Financial Supervision. The functions of the Council are determined by studying accounting standards and rules and approving them in the economic and service units in the country, including: This includes mixed and private sector companies and expressing opinion on draft laws, regulations, and financial and accounting instructions or those related to them, as well as providing technical advice related to the application of financial and accounting standards and rules to the relevant authorities. The legislation in force, and in the event that the decisions of the Council conflict with any of the legislation in force, the Board of Oversight shall take over the Finance Submit a recommendation to the Office of the Presidency or the beneficiaries to amend such legislation, and with the exception of what is stipulated in the legislation in force, the Board may adopt any of the international or Arab accounting rules or adapt those rules to suit the nature of work in the country or adopt new rules, the Accounting and Oversight Standards Board accomplished Since its first formation in 1988 and until now, many studies on the laws, regulations, and financial and accounting instructions in force and identified the problems of their application and reached to develop appropriate solutions to bypass them and issued (14) accounting rules and (6) control manuals and supervised the follow-up of their application in the concerned authorities. (www.fbsa.gov.iq, 2018) The Council follows the strategy of adopting international accounting standards and adapting them to suit the Iraqi environment, with the exception of Accounting Rule No. (11) for agricultural activity, which was approved by the Council in 1998, provided that it is applied to the financial statements for the year ending on 12/31/2000 and beyond that preceded the issuance of the standard International Accounting No. (41) on agricultural activity, which was issued in 2001 and became effective on 1/1/2003, as well as Accounting Rule No. 12 (Capital Gains and Losses) issued by the Council in response to the needs of the local accounting environment, which was not met by an international accounting standard, despite The National Accounting Standards Board is the state's accounting voice at the international level, and at the same time, it is the gateway to the international standards of the state, and they are two essential functions that cannot be abandoned and must be supported, if we want to keep pace with global developments. Of the Office of Financial Supervision, it constitutes a faltering experience compared to the experiences of other countries (especially the experience of the Arab Republic of Egypt), given the number of rules issued by the Board and 14 rules so far, compared to 41 international accounting standards, in addition to the failure to issue a standard for the objectives and concepts of accounting that constitute an intellectual framework for accounting standards, and the Council has stopped issuing accounting rules since 2001, due to the lack of time among its members, which created a clear gap between the achievements of this Council and what It was reached by the International Accounting Standards Committee from publications in addition to its continuous amendments to the standards in force. Although the international accounting standards issued by the International Accounting Standards Board are not binding, there is a tendency by some relevant authorities to demand the adoption of these standards, including the Iraqi Securities Authority, as this body obligated all companies registered in the Iraqi Stock Exchange to follow the standards In preparing the financial statements issued by it, this was through the issuance of Law No. 74 of 2004, and the Board of Directors of the Central Bank issued a decision obligating all Iraqi banks to apply international accounting standards, which applies to the final accounts for the year ending on December 31, 2007, according to a timetable ending On 12/31/2009, the entire accounting records and systems of all local banks will be transferred to be in accordance with international standards, no later than 12/31/2009.

### **ACCOUNTING COMPLIANCE CHALLENGES IN IRAQ**

There are many factors that represent a challenge for Iraq to comply with international accounting standards, including:( Škare,2008)( Ismail and Faleh,2019)

- 1- Factors related to the economic and political system.
- 2- Legislative and legal factors .
- 3- The absence of an international legal force that obliges accounting compliance
- 4- The incompatibility of tax systems in Iraq with international systems.
- 5- The difference in determining the objectives of the financial statements.
- 6- The prevailing belief that the accounting consensus represents a violation of national sovereignty.
- 7- The discrepancy in the needs of users of accounting information, as there is a belief that international standards benefit multinational companies.
- 8- Difficulty in understanding international accounting standards due to the low level of education.

- 9- Economic units avoid bearing the additional burdens required to meet the complex requirements of standards.
- 10- The lack of effective local professional institutions that take upon themselves the development of compliance programs and follow-up on their implementation

### **STRATEGIES FOR COMPLIANCE WITH INTERNATIONAL ACCOUNTING STANDARDS IN THE IRAQI ENVIRONMENT**

The following strategies can be followed to comply with international accounting standards:

- 1 - Identifying weaknesses in the Iraqi environment that impede the process of consensus and studying possible remedies .
- 2- Reform of the local economic and political environment in line with the developments of the external environment .
- 3 - Amending laws, legislation and regulations, the most important of which are the Companies Law, the Banking Law, and the regulations related to account control to enhance the ability of the Iraqi environment to respond to the requirements of adopting international standards.
- 4 - Providing financial and technical support to the Accounting and Control Standards Board and expanding its powers, and providing it with the necessary scientific and professional expertise, to activate its role in the process of compatibility with international standards.
- 5- Determining the appropriate mechanisms for developing local accounting rules that address emerging internal problems for which an international standard has not been issued.
- 6 - Developing the accounting educational system and paying attention to updating its vocabulary, and focusing on the practical aspects in line with the changes in accounting applications caused by the adoption of international standards.
- 7 - Seeking to build automated accounting information systems that meet the needs of developments in the local environment
- 8 -Building and developing the capabilities of accountants to work and respond to the requirements of international accounting standards.
- 9 - Developing the accounting culture among investors, and raising their awareness of the importance of the information prepared in accordance with the state accounting standards that form the basis for making their decisions.
- 10- Organizing training courses for accounting and auditing cadres on the guidelines and interpretations attached to international standards, and encouraging research and studies concerned with compatibility with international standards.

The experience of accounting compatibility achieves important results in terms of approximation towards international standards by reducing the fundamental differences between national accounting standards on the one hand and international accounting standards on the other hand. International standards either by explicitly adopting international accounting standards provided that it is mentioned in the financial reports that it was prepared in accordance with international standards, or by adopting international standards by reissuing international accounting standards under the national name, and other countries approaching international standards, as they adopt what they see It is suitable for its local environment of international accounting standards after making some amendments to it, and there is another group of countries that have their own accounting systems and are a strong partner in the manufacture of international accounting standards and at the same time do not allow the use of international accounting standards completely, but allow some companies to use them.

### **CONCLUSIONS:**

Despite the importance of compatibility between accounting standards in facilitating the process of comparison in the performance of companies, there are clear differences in the positions of countries regarding compliance with international accounting standards, that the process of compatibility with international accounting standards faces obstacles and difficulties, in addition to the presence of requirements and ingredients that must be met To apply these standards, as the practical implementation of international accounting standards is not an easy process and requires a number of steps aimed at institutional and organizational building as well as

expertise and huge resources. Certain and not according to international changes and developments, one of the main reasons for the emergence of the gap between the standards issued by this board and international accounting standards.

The researcher recommends that the responsible authorities in the countries adopt a specific, clear and publicized approach to the process of issuing accounting standards, and expand dialogue with economic institutions, accounting experts as well as educational bodies, and benefit from the experiences of countries with previous experiences in the field of compliance with standards, which helps reduce the costs of efforts And the time necessary for the compatibility process, and for the Accounting Standards and Rules Board in the Republic of Iraq to issue rules in accordance with international changes and developments, in addition to issuing them based on the emergence of certain accounting problems that international standards will never address.

**SOURCES:**

- Abdullah, Faisal Najm al-Din and Osman, Fadel Nabi, "The Compatibility between the Iraqi Accounting Rules and International Standards (IASs\IFRSs) and their role in developing the accounting profession in Iraq." Kouvari Zanko Bo Zansteh Marwa Faih Thieh Kahn, Volume 19, Issue 4, 2015
- Abdullah, Mazni& Sulaiman, Noor Adwa& Ismail, Kamisah & Sapiei, Noor Sharoja " Compliance with International Financial Reporting Standards (IFRSs) in a DE loving Country: Evidence From Malaysia" Journal of Accounting Perspectives, Vol 5, December 2012, 23-34
- Abu Zaid, Muhammad Al-Mabrouk, "International Accounting and its Implications for Arab Countries," Dar Al-Handasiyah, Cairo, 2005.
- Al-Zein, Mansouri, "The Importance of Adopting International Financial Reporting Standards and the Dimensions of Disclosure and Transparency: An Analytical Evaluation Study of the New Accounting and Financial System Applied in Algeria" International Forum, Saad Dahlab University, 2011
- Beke, Jeno (International Accounting Standardization and Economics Practice) International Journal of Economics and Management Sciences Vol. 1, No. 1, 2011, pp. 37-50
- Center for Studies and Information, "The International Accounting Standards Industry, Evolution and the Role of National and International Councils and Bodies," Accounting and Auditing Organization for the Cooperation Council for the Arab States of the Gulf, 2005 [www.gccao.org](http://www.gccao.org).
- Chatham, Michael D." Assessing the Extent of Compliance with International Accounting standards"2020, <https://www.researchgate.net/publication>
- Financial Supervision Bureau (Accounting and Regulatory Standards Board) [www.fbsa.gov.iq](http://www.fbsa.gov.iq), 2018
- Ismael, Ardalan & Falih, Basima" Obstacles to the transition from the standard accounting system to international accounting standards in the banking sector" Qadhai Zanst Scientific Journal, Volume (4) - Issue (4),2019
- Lotfy, Amin El-Sayed Ahmed, "Accounting Theory - An International Consensus Perspective", University House, Egypt, 2005.
- Marshall, David H & Others " Accounting What the Numbers Mean " 6th edition ,McGraw-Hill Irwin,2004
- Saleh, Khaled Ashour, "The Extent of Application of International Accounting Standards in Commercial Companies," University of Science and Technology - Republic of Yemen, 2012.
- Salem, Magdy Mohamed, "The Harmonization of Arab Accounting and Auditing Standards and Its Impact on the Quality of Professional Performance in the Arab Countries" Fourth Conference, Faculty of Commerce \ Alexandria University, 2004
- Škare ,Lorena Mošnja (International Accounting Standards Compliance Factors: Two Empirical Researches) <https://www.researchgate.net/publication/27221155>, 2008

- 
- Sunder, Shyam "Adverse Effects of Uniform Written Reporting Standards on Accounting Practice" Education, and Research,2009 <http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid>
  - Youssef, Jamal Ali Muhammad, "Determinants of Compatibility between Saudi Accounting Standards and International Financial Reporting Standards," College of Administrative and Financial Sciences, Al Baha Universit

## DEVELOPMENT AND IN-VITRO EVALUATION OF MEDICATED TRAVEL SICKNESS LOLLIPOP

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## ABSTRACT

*Motion sickness is a sensation of wooziness. Motion sickness is the most common problem in people traveling. The purpose of this study was to resolve related problems, and Meclizine is an antihistamine used to prevent and treat nausea, vomiting, and dizziness caused by motion sickness. It also is used to reduce dizziness and loss of balance caused by inner ear problems. The oral route is the most convenient and usually the safest and least expensive. Medicated lollipops had the potential for drug delivery orally; therefore, the purpose of this study was to formulate medicated lollipops for the oral drug delivery of meclizine hydrochloride. Medicated lollipop was prepared using sucrose, corn syrup, HPMC K 100M, and other ingredients. The lollipops were further evaluated for weight variation, hardness, friability, drug content, and in vitro dissolution study. Stability study shows developed medicated lollipop was stable for one month at 30° C ± 2° C at 65 ± 5% RH (Room Temperature). So, This Medicated lollipop formula is considered a potential vehicle for meclizine hydrochloride for delivery orally.*

**Keywords:** Meclizine hydrochloride, Sucrose, Corn syrup, HPMC K100 M, Citric acid, Calcium carbonate

## .INTRODUCTION

Motion sickness is considered physiological vertigo and is thus not a true sickness in the strict sense of the word but rather is a normal response to an abnormal situation. Certain types of motion cause motion sickness. It is induced during passive locomotion in vehicles, generated by unfamiliar body accelerations, to which the person has not adapted, or by an intersensory conflict between vestibular and visual stimuli.<sup>[1]</sup> The most common treatments for motion sickness include antihistamines and anticholinergics. Motion sickness is more common in children, pregnant women, and people taking certain medicines, but it can attack anyone.<sup>[2]</sup> The most common treatments for motion sickness include antihistamines and anticholinergics. Meclizine is an antihistamine. It reversibly inhibits the interaction of histamine at the H1 receptors; it is a member of the piperazine class of H1 antagonists. The incidence of motion sickness decrease by blocking H1 receptors in the emetic center and decreasing the sensitivity of the vestibular apparatus within the inner ear. In addition to antihistaminic activity, it possesses anticholinergic activity, which is very effective in preventing motion sickness, as anti-motion sickness activity of antihistamines is due to their anticholinergic actions.<sup>[3]</sup> This study aimed to prepare medicated travel sickness lollipop. Medicated lollipops are a more acceptable dosage form for all age groups, specifically in children. This type of system increases the aesthetic appeal, which indirectly increases patient compliance. Medicated lollipops are contained a sweetening agent, flavoring agent, and coloring agent that more attract the pediatrics. The advantages of the medicated lollipops are taste masking of bitter drugs, enhanced bioavailability, and retention of the dosage form enhanced in the oral cavity, which also overcomes gastric irritation.<sup>[4]</sup>

## MATERIALS AND METHODS

## Materials

Meclizine hydrochloride was received as a gift sample from alembic pharmaceuticals ltd. Vadodara, Gujarat, India. All the other chemicals and solvents used were analytical grade.

## Formulation of Medicated Lollipops

Preparation of Medicated lollipops by Heating and congealing method<sup>[5]</sup>

Sugar syrup was prepared by mixing the required quantity of sugar and water. Sucrose was dissolved in a small amount of water and heated to 110°C till sucrose dissolves completely, forming clear, viscous sucrose syrup. Then the sucrose syrup was poured into the corn syrup and heated to 160°C till the color changes to golden yellow. The flavor was added between 120°C to 130°C. Then the temperature was brought down to 90°C, and API, HPMC K100 M, and other ingredients were added and mixed well. The prepared mass was poured into the calibrated mold and kept for 1-2 hours of air dry. The prepared medicated lollipop was stored wrapped in aluminum foil and stored in desiccators to prevent moisture uptake. The final weight of each Medicated lollipop is 5gms.



Table 1 formulation for medicated lollipops

Ingredient (mg)	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>	F <sub>9</sub>
Meclizine HCl	25	25	25	25	25	25	25	25	25
Sucrose Syrup	3800	3650	3500	3800	3650	3500	3800	3650	3500
Corn Syrup	1100	1250	1400	1100	1250	1400	1100	1250	1400
HPMC K100 M	25	25	25	50	50	50	75	75	75
Citric Acid	50	50	50	50	50	50	50	50	50
Flavouring agent	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
Colouring agent	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.

**Characterization of Prepared Lollipops:**

The prepared lollipops were evaluated for various physicochemical parameters like thickness, weight variation, hardness, %friability, moisture content and drug content.

**Thickness:** <sup>[6]</sup>

The thickness of the formulated lollipops was measured by using Vernier calipers.

**Weight Variation:** <sup>[6]</sup>

The formulated lollipops were tested for weight uniformity. Twenty lollipops were collectively and individually. From the collective weight, the average weight was calculated. Each lollipop's weight was then compared with the average weight to ascertain whether it is within permissible limits or not.

$$\% \text{ Weight Variation} = [(\text{Average Weight} - \text{Individual Weight}) / (\text{Average Weight}) \times 100]$$

**Hardness:** <sup>[6]</sup>

The lollipops crushing strength, the force required to break the lollipops by compression in the diametric direction, was measured in triplicate using a Pfizer tablet hardness tester.

**Friability:** <sup>[7]</sup>

The Roche friability test apparatus was used to determine the friability of the lollipops. First, pre-weighed lollipops were placed in the apparatus, which was subjected to 100 revolutions. Then the lollipops were reweighed. The percentage friability calculated was using the formula.

$$\% \text{ Friability} = [(\text{Initial Weight} - \text{Final Weight}) / (\text{Initial Weight}) \times 100]$$

**Drug Content:** <sup>[8]</sup>

Randomly selected lollipops were weighed, crushed to extract the drug from 6.8 pH phosphate buffer by keeping on a mechanical shaker for 12 hours. The drug content was determined using a UV-visible spectrophotometer at a pre-determined wavelength against blank. The amount of drugs existing in the lollipop was determined with the help of a standard graph.

**Moisture content:** <sup>[8]</sup>

One lollipop from each formulation was weighed and crushed. The accurately weighed sample was placed in desiccators for a day. After 24 h the sample was weighed again. The moisture content is determined by subtracting the final weight from the initial weight of the sample of lollipops.

**In-vitro Dissolution Studies:** <sup>[9]</sup>

The USP type-II Paddle apparatus was used to perform in vitro dissolution study at 100 rpm using 100 ml phosphate buffer (6.8 pH) as a dissolution medium at  $37 \pm 0.5$  °C temperature. The 5 mL samples were withdrawn at a specific time interval and replaced with fresh phosphate buffer (6.8 pH) and analyzed for drug content with the aid of a UV-spectrophotometer at 266 nm.

**Stability studies:** <sup>[10]</sup>

Four lollipops were taken from the optimized batch. Stability studies were carried out at 30 °C at 65% relative humidity for 30 days. The drug content and organoleptic tests were conducted to show the effect of these conditions on the dosage form. A UV spectrophotometer determined the drug contents at  $\lambda_{\text{max}}$  266 nm.

## RESULTS AND DISCUSSION

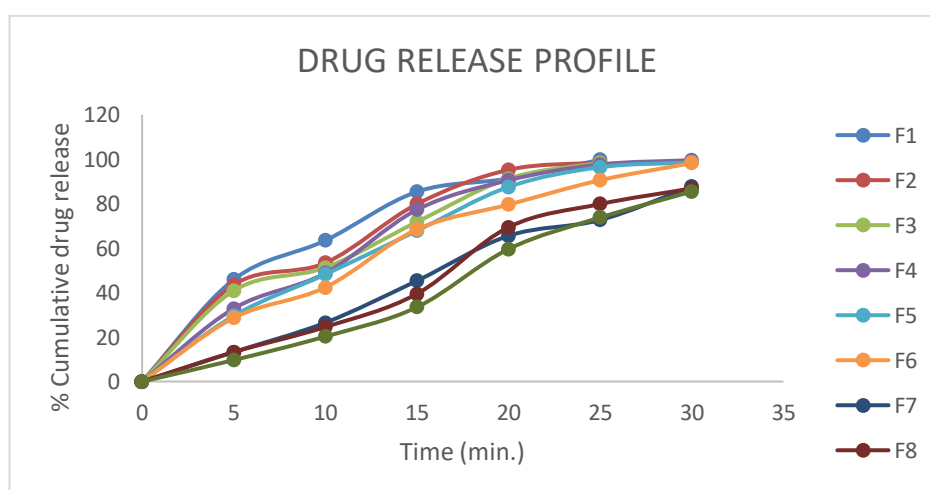
The prepared lollipops were evaluated for various physicochemical parameters like thickness, weight variation, hardness, %friability, moisture content, and drug content. The obtained results are shown in Table 2.

**Table 2: Physicochemical parameters of prepared lollipops.**

Parameter	Batches								
	F <sub>1</sub>	F <sub>2</sub>	F <sub>3</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>7</sub>	F <sub>8</sub>	F <sub>9</sub>
Thickness (mm)	10.5 ±0.05	10.7 ±0.05	10.6 ±0.05	10.9 ±0.05	10.9 ±0.05	10.8 ±0.05	10.6 ±0.05	10.6 ±0.1	10.7 ±0.1
Weight variation (gm)	5.05 ±0.06	5.17 ±0.06	5.1 ±0.06	5.27 ±0.02	5.14 ±0.04	5.16 ±0.03	5.13 ±0.01	5.09 ±0.06	5.17 ±0.06
Hardness (kg/cm <sup>2</sup> )	10.1	10.7	11.5	10.6	11.2	11.8	10.7	11.4	11.9
%Friability	0.78 ±0.02	0.73 ±0.03	0.77 ±0.07	0.69 ±0.04	0.70 ±0.08	0.75 ±0.05	0.75 ±0.05	0.69 ±0.04	0.79 ±0.02
%Moisture content	0.72 ±0.01	0.74 ±0.01	0.75 ±0.01	0.78 ±0.01	0.79 ±0.005	0.79 ±0.01	0.86 ±0.01	0.87 ±0.01	0.88 ±0.005
Drug content	97.37 ±0.65	98.48 ±0.71	98.35 ±0.22	96.41 ±0.37	97.21 ±0.23	96.69 ±0.58	98.48 ±0.41	97.09 ±0.56	98.64 ±0.63

The formulated lollipops were circular with a flat face, good appearance, and uniform color distribution. The thickness of the lollipops ranges between  $10.5 \pm 0.05$  to  $10.9 \pm 0.05$ , which suggests the uniform thickness. The weight variation ranges from  $5.05 \pm 0.06$  to  $5.27 \pm 0.02$ , which was within a limit, and hence all formulation passes the weight variation test. Hardness values of the formulation ranged from 10.1 –11.9 kg/cm<sup>2</sup>, indicating good lollipops strength. The friability was less than 1% for all batches, which was within the limit, so all formulations passed the friability test. Moisture content in the given lollipops ranged from  $0.72 \pm 0.01$  to  $0.88 \pm 0.005$ . The drug content ranged from  $96.41 \pm 0.37$  to  $98.64 \pm 0.63\%$  and was uniform.

All nine formulations were subjected to in vitro release study. The release pattern is shown in figure 1. The release profile of formulations shows that the polymer concentration affects the release pattern. From the result, it concluded that 50 mg polymer releases drug up to 30 minutes.



**Figure 1: % cumulative drug release**

A stability study was performed for batches F4, F5, F6; the results are shown in Table 3.

**Table 3: Physicochemical parameters of prepared lollipops.**

	At Initial	After 30Days	At Initial	After 30Days	At Initial	After 30Days
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Parameter	F <sub>4</sub>	F <sub>4</sub>	F <sub>5</sub>	F <sub>5</sub>	F <sub>6</sub>	F <sub>6</sub>
Hardness (kg/cm <sup>2</sup> )	10.6	10.6	11.2	11.2	11.8	11.8
Drug content	96.41 ±0.37	96.25±0.42	97.21 ±0.23	97.15±0.58	96.69 ±0.58	96.36±0.41
Cumulative %Drug release at 30 mins.	99.58	99.25	98.55	98.56	98.22	98.25

The stability studies found that there was no significant change in hardness, % drug content, and drug release behavior during storage at  $30 \pm 2^\circ\text{C}$  temperature and  $65 \pm 5\%$  RH. So, it concluded that the developed formulation meclizine HCL medicated lollipop was stable after one month.

## REFERENCES

- Schmäl, F. "Neuronal Mechanisms and the Treatment of Motion Sickness." Pharmacology, vol. 91, no. 3-4, 2013, pp. 229–241., doi:10.1159/000350185.
- "Motion Sickness." MedlinePlus, U.S. National Library of Medicine, 23 July 2021, medlineplus.gov/motionsickness.html.
- Patel, Priti N., and Emily M. Ambizas. "Meclizine: Safety and Efficacy in the Treatment and Prevention of Motion Sickness." Clinical Medicine Insights: Therapeutics, vol. 3, 2011, doi:10.4137/cmt.s6237.
- "Medicated Chocolate and Lollipops: A novel drug delivery system for Pediatric Patient." Pharma Science Monitor, www.pharmasm.com/current\_issue2.php?archive=58.
- Jayalakshmi Kamath, Dungrani Jayesh, Johnson Misquith. "Preparation and In-Vitro Evaluation of Levamisole Hydrochloride as A Candy Based Anthelmintic Medicated Lollipops for Pediatrics." International Journal of Pharma Sciences and Research, Vol 3 No 11 Nov 2012, pp. 523-534.
- Rathod, Minakshi, et al. "Development and in-Vitro Evaluation of Candy Based Medicated Lollipops: A Novel System of Drug Delivery." Journal of Drug Delivery and Therapeutics, vol. 8, no. 4, 2018, doi:10.22270/jddt.v8i4.1764.
- "Formulation and Evaluation of Novel Gum Based Drug Delivery System of an Antiemetic Drug." International Journal of Pharmacy Research & Technology, vol. 2, no. 1, 2019, pp.16-20. doi:10.31838/ijprt/02.01.03.
- Suttee, A, et al. "Formulation and Evaluation OF levocetirizine dihydrochloride and ambroxol hydrochloride lozenges." international journal of pharmaceutical quality assurance, vol. 11, no. 03, 2020, pp. 417–423., doi:10.25258/ijpqa.11.3.18.
- Hejaz, Hatem A., et al. "Development and Characterization of Paracetamol Medicated Lollipops." Pharmaceutical Technology in Hospital Pharmacy, vol. 5, no. 1, 2020, doi:10.1515/pthp-2020-0012.
- Purushotham RK, Ashok KC, Afshanlaheji, Anilkumar KB, Manjunath P, Baburao NC. Formulation and evaluation of anti-asthmatic theophylline tablet lozenges. Int J Pharm Sci 2011; 3:125–8.

**DIGITIZATION OF LIBRARY RESOURCES OF GAUTAM BUDH CENTRAL LIBRARY,  
BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY, LUCKNOW: A CASE STUDY****Mohita Pandey<sup>1</sup> and Dr. Ashok Kumar Upadhyay<sup>2</sup>**Research Scholar<sup>1</sup> and Associate Professor<sup>2</sup>, Department of Library & Information Science, Mangalayatan,  
University, Beswan, Aligarh**ABSTRACT**

*This study examines the digitization of library resources in Gautam Budh Central Library Babasaheb Bhimrao Ambedkar University, Lucknow. For this study, certain research objectives have been formulated and research design adopted for this study is descriptive survey. Questionnaire method is used as a tool for getting primary data. Total 20 library staff was selected as a sample of the study. The findings of the study reveals that majority of the library staff have practical approaches for digitization and most of the library professionals are facing various problems during digitization process, i.e., as standby power generating set, solar power system, utility power systems etc..*

*Keywords: Digitization, Library Resources, Library Professionals, Information Resources, ICT Skills, Case Study*

**1. INTRODUCTION**

In the recent development of emerging technologies and exponential growth of information, libraries and librarians has been vast responsibility of embracing to adopt the information communication technologies in libraries. Due to information explosion and changing users information needs as well as taste, there is need of present hours the restructuring the library resources and services. This is led to require convert the existing print resources into digital format though using information communication technologies. Digitization of information resources involved the various kind of process of transferred print and other allied materials to make accessible globally though using information communication technologies. Information communication technologies are leading role played to convert into traditional library to modern library. Due to changing users information needs and enhance the learning, knowledge generation, teaching, research productivities, digitization of information resources are pivotal role played in the activities.

**2. REVIEW OF LITERATURE**

Bellary and Kashinath (2019) explore the role of e- resources for student and teachers learning, research and teaching activities. For this conduction study, authors were used a survey research method and questionnaire was used a tool for getting primary data. the result reveals that 85.71 % teachers were used e- resources for teaching and research purpose while 65 % students were used e- resources for study purpose.

Krishnan and Jayaprakash (2019) conducted a study on usages of digital resources by users of Periyar University library. For this study, authors were used a structure questionnaire for getting primary data. They found in their study- due to easy accessibility, less time consuming, remote access facilities are major factor to encourage the accessibility of digital resources.

Nneji (2018) conducted a study on digitization of information resources in library. for this study author was used a survey research method and questionnaire was used a tool for getting primary data from library staff. Total 13 library staff involved in this study which has digitization practices. The findings of the study, majority of the library staff have less ICT skills and competencies for digitization of information resources.

Narula and Rana (2017) explored the conceptual aspects of digitization of various types of sector such as digital India, digital culture, digital education etc. They are investigate the various process and its strategies of digitization. Authors focused about awareness in all sectors which has not digitized yet and to encourage the digitization.

Khalid and Pedersen (2016) discussed the digital exclusion in higher institution. For this study, authors were reviewed the literature concerned to the digital exclusion. They found that basically three core point which is affected it- social, digital and accessibility exclusion.

**3. OBJECTIVES OF THE STUDY**

1. To explore the needs of digitization
2. To find out the skills and competencies among LIS staff for digitization of information resources
3. To investigate the challenges faced by LIS staff during digitization of information resources

#### 4. RESEARCH METHODOLOGY

For the conduction study, the descriptive survey method was used and structure questionnaire consist of open ended and close ended research questions was used a tools for getting primary data. The total population of the conducted study is 20 and researcher personally visited to library. The total 20 questionnaire was distributed among library professional and 100% questionnaire was received. For data analyzing MS excel application was used in this study.

#### 5. DATA ANALYSIS AND INTERPRETATION

**Table 1 Response Rate**

Questionnaire distributed	Received questionnaire	Percentage
20	20	100%

Table .1 shows the response rate of respondents. The result indicates that total 20 questionnaire was distributed among library professionals in the library out of them 100% library staff response their opinion though questionnaire.

**Table 2 Gender Wise Response Rate**

Gender wise respondent	Response	Percentage
Male	15	75.00
Female	5	25.00

Table 2 shows the gender wise response rate of respondents. The table reveals that 75% male staff was working in library while 25% female staff was working.

**Table 3 Academic Qualification of Respondents**

Academic qualification of respondents	Respondents	Percentage
Ph.D.	3	15.00
MLIS	16	80.00
BLIS	1	5.00
Diploma	0	0.00

Table 3 shows the academic qualification of library staff. The above table reveals that 15% staff was having Ph.D. degree, 80% was having MLIS degree whereas 5% staff was having only BLIS degree. The result indicates that library have no any staff diploma holder.

**Table 4 Needs of Digitization**

S. No.	Item	Response	Percentage
1	To preserve endangered library resources	17	85
2	To increase visibility of institutional outputs	19	95
3	To embrace the benefits of information and communication technologies	17	85
4	To enhance timeless access to library information resources	20	100
5	To promote interlibrary cooperation	16	80
6	To displace the role of librarians in library services	6	30

Table 4 shows the needs of digitization of library resources. The result reveals that 85% respondents were response about to preserve endangered library resources, 95% respondents said that there is needs for digitization due to increase visibility of institutional outputs, 85% respondents said that to embrace the benefits of information and communication technologies, 100% staffs were said that digitization is needs for library due to enhance timeless access to library information resources, 80% respondents said that digitization to promote interlibrary cooperation and only 30% library staffs were said that there is needs for digitization due to displace the role of librarians in library services.

**Table.5 LIS Skills and Competencies on the Digitization of Library Resources**

S. No.	Item	Response	Percentage
1	Ability to use the computer system	19	95
2	Ability to convert traditional library resources into digital images	17	85
3	Ability to develop system software for digitization of library resources	2	10
4	Ability to establish, run and maintain a digital library database	18	90
5	Ability to make use of the web and electronic databases	20	100

Skills and competencies in an organization was widely role played to fulfill the aim and purpose of an organization. The table 5 shows the LIS skills and competencies on the digitization of library resources. The table 5 reveals that 95% LIS professionals have skills and competencies about to use the computer system, 85% LIS professionals have skills and competencies to convert traditional library resources into digital images, 10% LIS professionals have skills and competencies to develop system software for digitization of library resources, 90% LIS professionals have skills and competencies to establish, run and maintain a digital library database while 100% % LIS professionals have skills and competencies to make use of the web and electronic databases.

**Table 6 Challenges to Digitization in Library**

S. No.	Item	Response	Percentage
1	Funding of digitization projects	20	100
2	Staff capacity to manage the process of digitization	16	80
3	Intellectual property rights	19	95
4	Infrastructure to contain the digitization process	17	85
5	Users depend solely on traditional library resources	13	65
6	Hardware and software obsolescence	18	90
7	Power supply	15	75
8	Security of databases	18	90

Table 6 shows the challenges to digitization of information resources in the library. The table above indicates that 100% staff said that less fund was major challenges for digitization, 80% library staff said that due to staff capacity was another challenges for digitization of resources, 95% said that intellectual property rights, 85% library staff response that due to less infrastructure to contain the digitization process, 65% library staff response that users depend solely on traditional library resources was another challenges for digitization, 90% library staff response that due to hardware and software obsolescence and security of databases was another challenges for digitization and 75% said that power supply was challenges for digitization of information resources.

**Table.7 Solutions to the Challenges to Digitization in Library**

S. No.	Item	Response	Percentage
1	Management should increase the library budget quota	20	100
2	Update of software data applications and hardware devices	19	95
3	Installation of anti-virus, malware and hacks proof software	18	90
4	Installation of alternative to power supply such as standby power generating set, solar power system, utility power systems, etc.	19	95
5	Library user education should include skills needed for use of digital libraries	20	100
6	Inclusion of digitization sections while planning for library buildings	17	85
7	Staff skill development in management of digital libraries	18	90
8	Copyright should exclude digitization practices by librarians	19	95

The above table 7 shows the solution of challenges to digitization of information resources. The result indicates that 100% library staff response that management should increase the library budget quota and library user education should include skills needed for use of digital libraries, 95% library staff said that there is needs for present hour to update of software data applications and hardware devices, Installation of alternative to power supply such as standby power generating set, solar power system, utility power systems, etc., Copyright should exclude digitization practices by librarians, 90% library staff said that should be promote the installation of anti-virus, malware and hacks proof software and it should be enhance the staff skill development in management of digital libraries while 85% library staff said that should be inclusion of digitization sections while planning for library buildings.

## **6. CONCLUSION AND SUGGESTIONS**

Digitization of information resources are widely role played in teaching, learning, knowledge generation and research activities. Due to emergence of new technologies and changing user's information needs it is essential for library to transforming into traditional libraries to digital libraries. Digital libraries are not only save the time of users and staff but also enhancing the raking of institutions. The findings of the study, majority of the library staff said that there is need for digitization to preserve endangered library resources and to increase visibility of institutional outputs and several other needed is fulfill the digitization of resources likewise to embrace the benefits of information and communication technologies, to enhance timeless access to library information resource etc. The study reveals that most of the library staff have ICT skills and competencies to digitization of information resources in library but same challenges are facing such as fewer library budget, less staff capacity, power interrupted, Hardware and software obsolescence etc. The analysis of primary data, the university authority and University Grant Commission to should be increases the special budget for digitization of resources and provisioning for increases ICT skills and competencies among library staff time to time due to disruptive technologies.

## **REFERENCES:**

- Bellary, R. N. & Kashinath, S.S.(2019). E-Resources are boon for the teaching and research work of an academic institute: Asurvey on usage and awareness of e-resources by the NMIMS (Deemed University) engineering faculties. *Library Philosophy and Practice*. Retrieved from <https://digitalcommons.unl.edu/libphilprac/2369>
- Krishnan, R., & Jayaprakash, M. (2019). Use and Impact of Electronic Journals among the Users of Periyar University in Salem , Tamilnadu , India. *Library Philosophy and Practice*.Retrieved from <https://digitalcommons.unl.edu/libphilprac/2199>
- Nneji, K.O. (2018) Digitization of academic library resources: A case study of Donal E. U. Ekong Library. *Library Philosophy and Practice (e-journal)*. 1990. <http://digitalcommons.unl.edu/libphilprac/1990>
- Narula, T.K. & Rana,S. (2017).Digitalization in India. *International Journal on Emerging Technologies*, 8(1), 298-303.
- Khalid, M. S., & Pedersen, M. J.L.(2016). Digital Exclusion in Higher Education Contexts: A Systematic Literature. *ReviewProcedia - Social and Behavioral Sciences*, 228, 614–621. Retrieved from <https://doi.org/10.1016/j.sbspro.2016.07.094>

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**ECONOMICS OF PRODUCTION AND MARKETING OF SUMMER GROUNDNUT IN WASHIM DISTRICT**

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**ABSTRACT**

*The present study on economics of production and marketing of summer groundnut in washim district was carried out during the year 2019-2020. The standard cost concept were used along with the simple tabular analysis for working out cost and returns of Summer groundnut..*

*Washim district in Maharashtra was selected purposively to carry out the present study. Three tahsils viz. Washim, Malegoan and Risod were selected. Villages from each tahsil were selected randomly based on maximum potential area and production of Summer groundnut and from each tahsil 3 villages were selected. For present study 10 farmers from each village i.e. total 90 farmers were selected randomly from chosen area. The study revealed that the average size of holding of Summer groundnut farmers for small, medium and large size groups are 1.42, 2.79 and 5.90 respectively. The average per hectare hired human labour use was 52.51 man days and family human labour use was 26.67 man days, while the use of bullock pair was 4.03 pair days, seed rate used was 110.99 kg and use of N, P, K was 25.52, 49.53 and 30.13 kg respectively. The average per hectare Cost A, B and C were Rs. 40502.20/-, Rs. 58254.90/- and Rs. 69356.15/-, respectively. The average productivity was to extent upto 17.25 quintals. The benefit cost ratio of summer groundnut cultivation at cost 'C' was 1.42 indicated that the summer groundnut crop is profitable crop enterprise. Different marketing channels such as Producer - oil miller (consumer), Producer - wholesaler - oil miller (consumer) and Producer - village trader - wholesaler - oil miller (consumer) were followed by the sample farmers. However, in channel II Producer - wholesaler - oil miller observed the highest producers share to consumer rupee i.e. 95.89 per cent. Per quintal marketing cost was found highest in channel III i.e. Rs. 268.00/-. The major items of cost were transportation charges and cost of gunny bags. The major constraint faced by summer groundnut growers during production is unavailability of irrigation facilities which was observed about 96.67 per cent followed by high cost of inputs, unavailability of quality seeds during sowing, high wage rate and electricity problem which was observed as 87.78 per cent, 85.60 per cent, 81.11 per cent and 80.00 per cent, respectively.*

*Keyword: Production, Marketing, Summer groundnut, cost and returns, cost concept, cost-benefit ratio, gross income, gross returns, net returns, price spread,*

**INTRODUCTION:**

India is the fourth leading oilseeds producing country in the world next to the USA. The agricultural economy of the country significantly depends on oilseed sector. Oilseed crops are second to food grains in terms of acreage, production and economic value. Oilseeds sector have an annual turnover of about Rs. 80,000 crores which subjugate a vital position in agrarian economy of the country. India accounted for 19 per cent of oilseeds area and 2.7 per cent of oilseed production in world. The groundnut production in India was 37.35 lakh tonnes in 2018-19. It is decreased by 29.19 percent as compared to groundnut production of previous year 2017-18. Five states, Gujarat (14,67,600 ha; 37.7%), Andhra Pradesh (6,60,000 ha; 17%), Rajasthan (5,49,052 ha; 14.1%), Karnataka (3,82,940 ha; 9.8%) Maharashtra (1,95,594 ha; 5.0%) jointly accounted for 83.7% of national acreage. Among the surveyed states by APEDA, the highest yield of 2051 kg/ha was estimated for Rajasthan, then followed by 1421 kg/ha for Gujarat, 1361 kg/ha for Maharashtra, 883 kg/ha for Andhra Pradesh, and 750 kg/ha for Karnataka. In Maharashtra, Groundnut oil has a very important position in the Indian diet. The oil content of the seed varies from 44 to 50 per cent depending upon the varieties and agro-climatic condition. Groundnut oil is edible oil. It contributes 67 per cent to the total edible oils used in India. Groundnut contains amino acid including cysteine which is useful for animal growth

The present study on economics of production and marketing of Summer groundnut in Washim region will provide the basis for farmers to decide about enterprise mix and also help in making investment decisions. Therefore, to examine variability in cost of cultivation, marketing practices, marketing costs in different markets and problems faces by groundnut farmers in production and marketing of summer groundnut.

**Objectives:**

1. To estimate costs, returns and profitability of Summer groundnut.
2. To study the marketing channels and price spread in Summer groundnut.



3. To identify the constraints in production and marketing of Summer groundnut.

### METHODOLOGY

The present study was undertaken in Washim district which was selected purposively. Washim district lies between 19.61 to 21.16 north latitude and 76.07 to 77.14 east longitudes and 600M MSL altitude. The average annual temperature in Washim is 26.2 °C. Washim District falls in two agro ecological zone type viz. Assured rainfall zone (ACZ -7) and Moderate Rainfall Zone (ACZ -8). Three tashils namely Washim, Malegaon and Risod of Washim district were selected purposively based on maximum potential area and production of Summer groundnut and from each tashil 3 villages were selected. The list of villages growing Summer groundnut were collected from the Taluka Agriculture office of respective taluka of Washim district. The list of Summer groundnut farmers were obtained from talathi of respective village. For present study 10 farmers from each village i.e. total 90 farmers were selected randomly. Selected farmers then categorized into small, medium and large farmers according to their size of land holding. The data collected from summer groundnut farmers was with the help of pretested interview schedule and pertaining for the year 2019-20. The data collected was related to socio-economic characteristics, costs, returns and profitability, market channels and price spread, constraints of summer groundnut farmers in production and marketing. To accomplish the objectives of the study the simple tabular analysis were be used.

### RESULT AND DISCUSSION:

**Table 1. Per hectare cost of cultivation of Summer groundnut of overall farmers**

Sr. No.	Item	Unit		Input/ ha.	Cost / Unit of input	Total Cost Per Ha.	% to Cost "C <sub>3</sub> "
1	2	3		4	5	6	7
1	Hired Human Labour	Male	Days	14.03	200.06	2806.87	4.05
		Female	Days	38.48	149.99	5771.46	8.32
2	Bullock Labour		(Pair days)	4.03	489.89	1974.25	2.85
3	Machine charges		Hours	4.15	290.86	1207.08	1.74
4	Seed		Kg.	110.99	150.00	16648.07	24.00
5	Manures		CARTS	10.60	200.02	2120.17	3.06
6	Fertilizer	N	Kg.	25.52	16.18	412.83	0.60
		P	Kg.	49.53	53.75	2662.12	3.84
		K	Kg.	30.13	31.66	953.88	1.38
7	Irrigation charges	(Rs.)				2253.22	3.25
8	Insecticide (Plant Protection)	(Rs.)				827.25	1.19
9	Incidental charges	(Rs.)				98.82	0.14
10	Repairing Charges	(Rs.)				90.13	0.13
11	Miscellaneous Charges	(Rs.)				110.73	0.16
12	Working Capital (1 to 11)	(Rs.)				<b>37936.88</b>	54.70
13	Interest on working Capital					569.05	0.82
14	Depreciation	(Rs.)				1836.27	2.65
15	Land Revenue	(Rs.)				160.00	0.23
16	<b>COST "A" (Items 12 to 15)</b>	(Rs.)				<b>40502.20</b>	58.40
17	Rental Value Leased in land					<b>0.00</b>	0.00
18	<b>COST "A2" (Items 16 to 17)</b>					<b>40502.20</b>	58.40
19	Int. on Fix.Cap. @ 10%					3797.00	5.47
20	<b>COST "B1" (Items 16 + 19)</b>					<b>44299.20</b>	63.87
21	Rental Value of Land	(Rs.)				13955.70	20.12
22	<b>COST "B2" (Items 20 to 21)</b>					<b>58254.90</b>	83.99

23	Family Human Labour	Male	Days	15.90	200.02	3180.26	4.59
		Female	Days	10.77	150.04	1615.88	2.33
24	<b>Cost " C1 " (Items 20+23 )</b>	(Rs.)				<b>49095.34</b>	70.79
25	<b>Cost " C2 " (Items 22+23 )</b>	(Rs.)				<b>63051.04</b>	90.91
26	<b>Additional Value of human labour</b>					0.00	0.00
27	<b>Cost " C2* " (Items 25+26 )</b>					<b>63051.04</b>	90.91
28	<b>10% Cost C2*</b>					<b>6305.10</b>	9.09
29	<b>Cost " C3 " (Items 27+ 28)</b>					<b>69356.15</b>	100.00
30	Yield per hectare	(Rs.)		17.25	5711.00	98514.81	
31	Value of By-produce/ha.	(Rs.)		0.00	0.00	0.00	
32	Main Produce +By produce			17.25	5711.00	98514.81	
33	<b>Per quintal cost of Production</b>	(Rs.)				<b>3655.13</b>	

Table 1 revealed that per hectare cost of cultivation of Summer groundnut for overall farmer was Rs. 69356.15 /- The major item was seed (24.00 per cent) followed by rental value of land 20.12 per cent, Hired human labour 12.37 per cent and family human labour 6.92 per cent share to cost C<sub>3</sub> respectively. The per cent share of Cost A<sub>2</sub> and Cost B<sub>2</sub> were Rs 58.40 per cent and Rs. 83.99 per cent in total cost respectively. The per ha yield was 17.25 quintal.

**Table 2. Per hectare cost and returns from summer groundnut**

Sr. No.	Particulars	Size group			
		Small	Medium	Large	Overall
1	Value of Main Produce	96235.71	97424.70	100835.11	98514.81
2	Value of By- Produce	0.0	0.0	0.0	0.0
3	Gross Returns	96235.71	97424.70	100835.11	98514.81
4	Cost of Cultivation at				
	Cost"A1"	38725.40	40966.19	41188.29	40502.20
	Cost"A2"	38725.40	40966.19	41188.29	40502.20
	Cost"B1"	42261.11	44697.52	45198.93	44299.20
	Cost"B2"	56020.75	58550.57	59362.07	58254.90
	Cost"C1"	46819.15	49628.24	50222.19	49095.34
	Cost"C2"	60578.79	63481.29	64385.33	63051.04
	Cost"C2*"	60578.79	63481.29	64385.33	63051.04
	Cost"C3"	66636.67	69829.42	70823.86	69356.15
5	Net Return at				
	Cost"A1"	57510.31	56458.51	59646.82	58012.61
	Cost"A2"	57510.31	56458.51	59646.82	58012.61
	Cost"B1"	53974.60	52727.18	55636.18	54215.61
	Cost"B2"	40214.96	38874.13	41473.04	40259.91
	Cost"C1"	49416.56	47796.46	50612.92	49419.47
	Cost"C2"	35656.92	33943.41	36449.78	35463.77
	Cost"C2*"	35656.92	33943.41	36449.78	35463.77
	Cost"C3"	29599.04	27595.28	30011.25	29158.66
6	Input- Output ratio at				
	Cost"A1"	2.49	2.38	2.45	2.43
	Cost"A2"	2.49	2.38	2.45	2.43
	Cost"B1"	2.28	2.18	2.23	2.22
	Cost"B2"	1.72	1.66	1.70	1.69
	Cost"C1"	2.06	1.96	2.01	2.01

	Cost"C2"	1.59	1.53	1.57	1.56
	Cost"C2*"	1.59	1.53	1.57	1.56
	Cost"C3"	1.44	1.40	1.42	1.42

The Table 2 indicates that the per hectare production of summer groundnut for small, medium and large farmer was 17.32, 17.11 and 18.11 quintal respectively. At overall level it was 17.25 q/ha. The average per hectare net return received by the the small, medium and large cultivator was Rs. 29599.04/-, Rs. 27595.28/- and Rs. 30011.25/-. At an overall the net returns was Rs. 29158.66/-. The input-output ratio at cost C<sub>3</sub> was 1.44, 1.40 and 1.42 for small, medium and large farmer respectively. The overall input-output ratio was 1.42. It indicates that the summer groundnut cultivation was profitable.

### MARKETING OF SUMMER GROUNDNUT

Marketing channels are the root through which produce move from producer to consumer. Following important channels of were identified and distribution have been observed while studying the marketing of summer groundnut under study area. As such various aspects pertaining to marketing of summer groundnut viz., channels of distribution, price spread, producers share in consumer's rupees etc. have been studied.

### MARKETING CHANNELS OF SUMMER GROUNDNUT

Following channel of distribution have been observed while marketing of Summer groundnut.

Channel I : Producer - Oil miller (consumer)

Channel II : Producer - Wholesaler - Oil miller (consumer)

Channel III : Producer - Village trader - Wholesaler - Oil miller (consumer)

**Table 3**

**Marketing cost of Summer groundnut**

Sr. No.	Particulars	Channel I	Channel II	Channel III
<b>A</b>	<b>Marketing cost incurred by producer</b>			
1	Cost of gunny bags	20.60	20.50	20.04
2	Transport charges	36.00	35.70	34.56
3	Loading and unloading charges	10.50	10.00	10.00
4	Weighing Charges	4.73	4.70	4.62
5	Labour charges	10.00	10.00	10.00
6	Losses	10.27	10.20	9.36
	Total market cost	92.10	91.10	88.58
	Selling price of producer	5600.00	5729.50	5752.00
	Net price received by producer	5507.90	5638.42	5663.42
<b>B</b>	<b>Marketing cost incurred by village trader</b>			
1	Gunny bags	-	-	20.00
2	Transport charges	-	-	30.04
3	Loading and unloading charges	-	-	10.00
4	Weighing Charges	-	-	4.07
5	Labour charges	-	-	15.22
6	Losses	-	-	9.56
	Total market cost	-	-	88.89
	Marketing margin	-	-	59.11
	Selling price of village trader	-	-	5900.00
<b>C</b>	<b>Marketing cost incurred by wholesaler</b>			
1	Gunny bags	-	20.00	20.00
2	Transport charges	-	35.70	31.24
3	Loading and unloading charges	-	10.00	10.00
4	Weighing Charges	-	4.30	4.09
5	Labour charges	-	17.90	16.80
6	Losses	-	9.90	8.40
	Total market cost	-	97.80	90.53
	Marketing margin	-	52.70	9.47
	Selling price of Wholesaler	-	5880.00	6000.00

	Purchase price of consumer	-	5880.00	6000.00
D	Total marketing cost		188.90	268.00
E	Total margin	-	52.68	68.58

It is revealed from Table 3 that the per quintal marketing cost incurred by the summer groundnut farmer was found highest in channel I (Rs.92.10) followed by channel II (Rs. 91.10) and channel III (Rs. 88.58). The total marketing cost incurred by wholesaler in channel II and III was Rs. 97.80/- and Rs. 90.53/- respectively. Total marketing cost incurred by village trader in channel III was Rs. 88.89/-. Total marketing cost of channel I, channel II and channel III was Rs. 92.10/-, Rs. 188.90/- and Rs. 268.00/- respectively. While total marketing margin of channel II and channel III was Rs. 52.68/- and Rs. 68.58/- respectively.

**Table 4. Price spread in marketing of Summer groundnut (Rs./qtl.)**

Particulars	Total Price		
	Channel I	Channel II	Channel III
<b>Producer</b>			
Gross Price received by Producer	5600.00 (96.39)	5729.50 (97.44)	5752.00 (95.87)
Marketing cost incurred	92.10 (1.59)	91.10 (1.55)	88.58 (1.48)
Net Price received by Producer	5507.90 (94.80)	5638.42 (95.89)	5663.42 (94.39)
<b>Village Trader</b>			
Purchase price	0.00	0.00	5752 (95.87)
Marketing cost incurred	0.00	0.00	88.89 (1.48)
Net Margin	0.00	0.00	59.11 (0.99)
Selling price	0.00	0.00	5900.00 (98.33)
<b>Wholesaler</b>			
Purchase price	0.00	5729.5 (97.44)	5900.00 (98.33)
Marketing cost incurred	0.00	97.8 (1.66)	90.53 (1.51)
Net Margin	0.00	52.7 (0.90)	9.47 (0.16)
Selling price	0.00	5880.00 (100.00)	6000.00 (100.00)
<b>Consumer</b>			
Purchase price	5810.00	5880.00	6000.00
Net price received by producer	5507.90	5638.42	5663.42
Price spread	302.10	241.58	336.58
Producer's share in consumer Rs.	94.80	95.89	94.39

(Figures in parentheses indicates the percentage to price paid by consumer)

Table 4 revealed that net price received by summer groundnut farmer was highest in channel II i.e. 95.89 per cent followed by channel I and channel III which was 94.80 per cent and 94.39 per cent respectively. Marketing cost incurred by village trader was 1.48 per cent in channel III while marketing cost incurred by wholesaler in channel II and channel III was 1.66 per cent and 1.51 per cent respectively. Price spread was observed highest in channel III i.e. Rs. 336.58/- followed by channel I and channel II which was Rs. 302.10/- and Rs. 241.58 respectively. Producer's share in consumer rupee was observed highest in channel II i.e. 95.89 per cent. It was found that comparatively channel II found more profitable than channel I and channel III in summer groundnut marketing.

**Constraints :** All the selected summer groundnut farmers were interviewed for the problems they are facing while producing the summer groundnut. The information regarding the important problems faced by the summer groundnut farmers are presented in Table 5.14.

**Table 5. Constraints in production and marketing of Summer groundnut**

Sr. No.	Particulars	Land holding size			
		Small	Medium	Large	Overall
<b>A)</b>	<b>Constraints in production of Summer groundnut</b>				
1	Unavailability of irrigation facilities	35 (97.22)	31 (96.88)	21 (95.45)	87 (96.67)
2	High cost of inputs	32 (88.89)	28 (87.50)	19 (86.36)	79 (87.78)
3	High wage rate	29 (80.56)	26 (81.25)	18 (81.82)	73 (81.11)
4	Unavailability of quality seeds	30 (83.33)	28 (87.50)	19 (86.36)	77 (85.60)
5	Electricity problem	30 (83.33)	25 (78.13)	17 (77.27)	72 (80.00)
<b>B)</b>	<b>Constraints in marketing of Summer groundnut</b>				
6	Lack of storage facility	28 (77.80)	25 (78.13)	17 (77.27)	70 (77.80)
7	Uncertainty of prices	33 (91.67)	29 (90.63)	18 (81.82)	80 (88.89)
8	High transportation cost	29 (80.56)	27 (84.38)	18 (81.82)	74 (82.20)
9	Delay in payment	31 (86.11)	28 (87.50)	19 (86.36)	78 (86.67)
10	Lack of marketing intelligence	30 (83.30)	27 (84.38)	18 (81.82)	75 (83.33)
	<b>Total</b>	<b>36 (100.00)</b>	<b>32 (100.00)</b>	<b>22 (100.00)</b>	<b>90 (100.00)</b>

(Figures in parentheses indicates the percentages to total)

Table 5 revealed that overall major constraint faced by summer groundnut farmers during production is unavailability of irrigation facilities which was observed about 96.67 per cent followed by high cost of inputs, unavailability of quality seeds during sowing, high wage rate and electricity problem which was observed as 87.78 percent, 85.60 per cent, 81.11 per cent and 80.00 per cent respectively. In overall major constraint faced by summer groundnut farmers during marketing is uncertainty of prices which was observed about 88.89 per cent followed by delay in payment, lack of market intelligence, high transportation cost and lack of storage facilities which was observed as 86.67 percent, 83.33 per cent, 82.20 per cent and 77.80 per cent respectively.

#### CONCLUSION:

1. The per hectare total cost of cultivation of Summer groundnut i.e. cost 'C<sub>3</sub>' was highest in the large size group i.e. Rs. 70823.86 /- per hectare followed by medium size group (Rs. 69829.42/-) and small size group (Rs.66636.67/-) respectively.
2. The benefit cost ratio of Summer groundnut cultivation at cost 'C<sub>3</sub>' was higher in small size group i.e. 1.44, followed by large size group (1.42) and medium size group (1.40).
3. The marketing cost incurred by producer was highest in channel III (Rs. 268.00/-) and then followed by channel II and Channel I.
4. Total market margin and price spread was highest in channel III i.e. Rs. 68.58/- and Rs. 94.39/- respectively.
5. Producer share in consumer rupee was observed highest in channel II (95.89) then followed by channel I (94.80) channel III (94.39).
6. Major constraint in production of Summer groundnut was unavailability of irrigation facility which is about 96.67 per cent and major constraint in marketing of Summer groundnut was uncertainty in prices which shows 88.89 per cent.

#### REFERENCES

- Mane, P.S., B.R. Pawar and P.M. Dahiwade, 2014. Price spread in marketing channels of Summer groundnut in Maharashtra. Agriculture Update, 9(2): 201-203.
- Raut Vinay, K.P. Thakur, Chaudhari, D. Dinesh and Workneh, S. Yigzaw, 2015. Cost of cultivation of *Kharif* groundnut in Sabar kanthadistrict of Gujarat state. International Res. J. of Agri. Eco. & Statistics., 6(1): 186-188.

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- Shelke, R.D., D.V. Nagure and S.N. Patil, 2009. Price spread & marketing pattern in Maharashtra state', Agriculture update, 4(3&4); 376-378.
  - Sonar, K.T., R.B. Changule, B.B. Maine and G.P. Gaikwad, 2012. Economics of Rabi sunflower production in Latur district of Maharashtra, International Res. J. of Agri.Econ & Statistics, 3(2):310-313.

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**EFFECT OF DIFFERENT DIMENSIONS ON MARITAL ADJUSTMENT AMONG MARRIED WOMEN**

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*Marital adjustment describes the accommodation of spouse to each other. Factors contributing to level of marital adjustment include marital satisfaction, cohesion, agreement, affection, and conflict. Well-adjusted couples are expected to have long-lasting, stable marriage, whereas poorly adjusted marriages are expected to experience instability and/or to end in divorce. Other predictors of marital adjustment include age differences between spouses, length of time married and number of children. A study was conducted to know the "Effect of different dimensions on marital adjustment among married women". The marital adjustment standardised tool developed by Dr. Gayatri Tiwari, Mrs. Jaswant Deora and Ms. Sneha Jain (2018) was administered to the women. A sample of 120 married women's were 60 respondents from working and 60 respondents were from non-working women respondents of the age group of above 30 years was randomly selected for the present study. The data was collected and tabulated and the tests used to analyse the data were student t-test and chi-square test. The finding showed that respondents from working and non-working married woman have a moderate lifestyle. The results also indicate that working married women have higher mean score percentage in the dimension of socially oriented and were found to enjoy every social gathering. And non-working married women were found to be family oriented and maintain family values and spend money keeping in view of family status.*

*Key words: Marital adjustment, couples, working and non-working women.*

**INTRODUCTION**

Marriage is one of the most popular institutions found among human beings. A good marital relationship in marital adjustment is essential. **Sinha & Mukerjee (1990)** defines **marital adjustment** as "The state in which there is an overall feeling in husband and wife of happiness and satisfaction with their marriage and with each other". Marital adjustment is defined as the condition in which there is usually a feeling of pleasure and contentment in husband and wife and with each other. (Hashmi, Khurshid, and Hassan, 2007).

Marital adjustment denotes emotional stability, intellectual efficiency and social effectiveness people. Factors contributing to level of marital adjustment include marital satisfaction, cohesion, agreement, affection, and conflict. The person both husband and wife must learn to live together to share, compromise, accommodate, adjust and plan together.

**METHODOLOGY**

A study on Effect of Different Dimensions on Marital Adjustment among Married Women was conducted during the year 2020-21 during the academic years in Bangalore, Karnataka state.

**OBJECTIVES:**

1. To know the effect of physical, social, economic, psychological and emotional dimension of marital adjustment among married women respondents.
2. To know the effect of physical, social, economic, psychological and emotional dimension of marital adjustment among working and non-working married women respondents.

**HYPOTHESIS**

- There is no effect of physical, social, economic, psychological and emotional dimension of marital adjustment among working and non-working married women respondents.

**PROCEDURE:**

The present study was restrained to working and non-working married women living in Bangalore. A sample of 120 working and non-working women of the age group of 30-45 years from urban Bangalore was randomly selected for the present study, where in 60 working married women and 60 non-working married women.. The marital adjustment designed by Dr. Gayatri Tiwari, Mrs. Jaswant Deora and Ms. Sneha Jain (2018) was administered to the women. The data was tabulated using coding plan for the information collected by the

respondents and master sheet was prepared. Percentage, standard deviation, mean deviation, t-test and chi-square test were the statistical methods used for the study. Obtained results were discussed and interpreted in tabular graphical presentation.

## RESULTS AND DISCUSSION

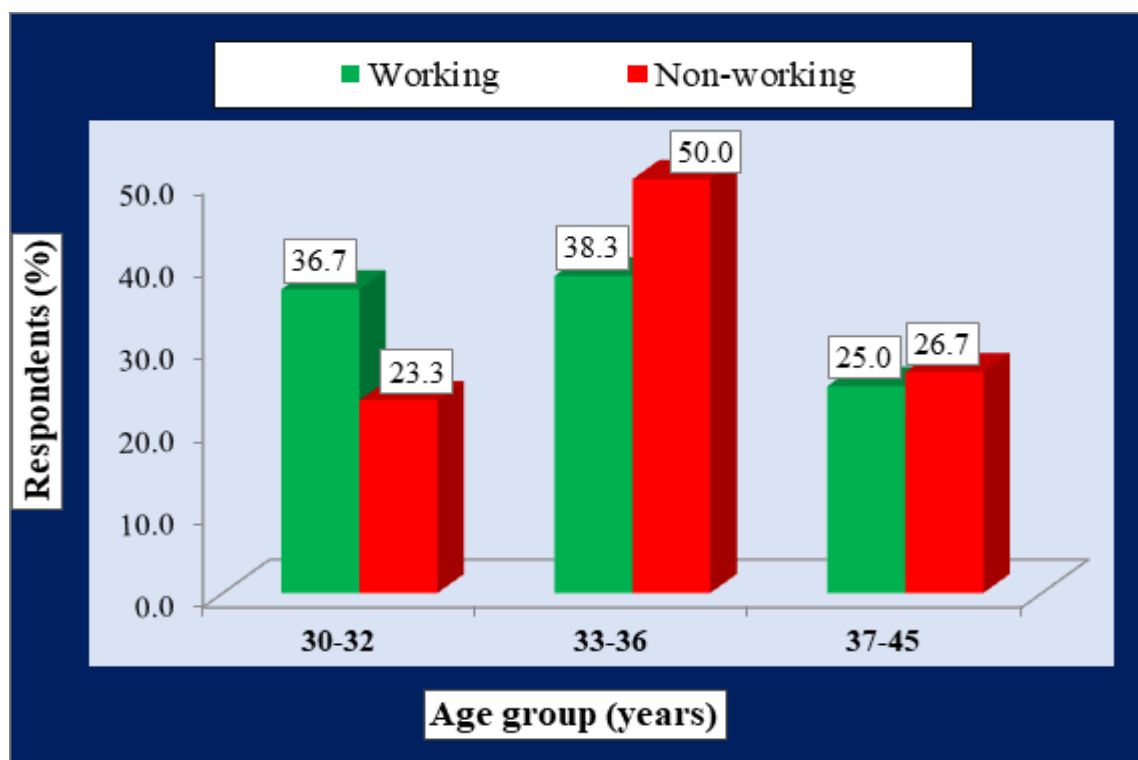
Obtained results are discussed and interpreted in tabular and graphical presentation as follows.

**TABLE – 1 Classification of Respondents by Age group**

Age group (years)	Respondents				‘χ2’ Test
	Working		Non-working		
	N	%	N	%	
30-32	22	36.7	14	23.3	2.74 <sup>NS</sup>
33-36	23	38.3	30	50.0	
37-45	15	25.0	16	26.7	
Total	60	100.0	60	100.0	

NS : Non-significant,  $\chi^2 (0.05, 2df) = 5.991$

Table 1 depicts that the classification of respondents by age group, it reveals that majority of the 50% (Fig-1) of non-working and 38% of working women respondents were in the age group of 33-36 years. Whereas in the age group of 30-32 years of working women respondents of 36 percentage have a high percentage compared to non-working women (23.3%). About 26% of non-working and 25% working women respondents were in the age group of 37-45 years. Statistically it was found that there is no significant difference in the chi-square value with regards to the classification of the respondents by age group.



**Figure . 1 : Classification of Respondents by Age group**

**TABLE – 2 Classification of Respondents by Educational Qualification**

Qualification	Respondents				‘χ2’ Test
	Working		Non-working		
	N	%	N	%	
Illiterate	12	20.0	13	21.7	0.97 <sup>NS</sup>
Up to SSLC	22	36.7	17	28.3	
PUC	26	43.3	30	50.0	
Total	60	100.0	60	100.0	

NS: Non-significant,  $\chi^2 (0.05, 2df) = 5.991$



Table 2 indicates the classification of respondents by educational qualification it is seen that 50% of non-working and 43.3% of working women studied PUC and 36.7% of working and 28.3% non-working women studied up to SSLC where as 21.7% of non-working and 20 percentage of working women were illiterate. Statistically the classification of respondents by educational qualification shows that there is no significance difference in the chi-square value.

**TABLE – 3 Classification of Respondents by Occupational status**

Occupational status	Respondents				‘ $\chi^2$ ’ Test
	Working		Non-working		
	N	%	N	%	
Home maker	0	0.0	60	100.0	120.00*
Government	24	40.0	0	0.0	
Private	36	60.0	0	0.0	
Total	60	100.0	60	100.0	

\*Significant at 5% level,  $\chi^2 (0.05, 2df) = 5.991$

Table 3 shows that classification of respondents by occupational status. It is seen that 100% of non-working were homemaker. And 60% of working respondents are working in private sector and 40% of them working as government employees. Statistically it was found to be significant.

**Table- 4 Aspect wise Mean Marital adjustment scores among Working Respondents**

No.	Aspects	State ments	Max. Score	Marital adjustment Scores(%)			
				Mean	SD	Mean (%)	SD (%)
I	Physical aspects	20	100	67.05	3.77	67.1	3.8
II	Economic & Social	36	180	119.13	6.51	66.2	3.6
III	Psychological & Emotional	34	170	117.50	6.54	69.1	3.8
	<b>Combined</b>	<b>90</b>	<b>450</b>	<b>303.68</b>	<b>10.44</b>	<b>67.5</b>	<b>2.3</b>

The cursory representation table 3 depicts the aspect wise mean marital adjustment scores among working respondents. Regarding the aspects wise it is seen that higher martial adjustment score found was 69.1% in psychological and emotional aspects followed by physical aspects was 67.1% and economic and social aspects 66.2%. The overall mean average marital adjustment was found that 67.5%.

**TABLE – 5 Aspect wise Mean Marital adjustment scores among Non-working Respondents**

No.	Aspects	State ments	Max. Score	Marital adjustment Scores(%)			
				Mean	SD	Mean (%)	SD (%)
I	Physical aspects	20	100	65.13	4.50	65.1	4.5
II	Economic & Social	36	180	112.73	7.61	62.6	4.2
III	Psychological & Emotional	34	170	117.08	5.61	68.9	3.3
	<b>Combined</b>	<b>90</b>	<b>450</b>	<b>294.95</b>	<b>10.09</b>	<b>65.5</b>	<b>2.2</b>

The cursory representation of table 5 depicts the aspect wise mean marital adjustment scores among non-working respondents. Regarding the aspects wise it is seen that higher martial adjustment score found to be in psychological and emotional aspects which was 68.9% followed by physical aspects 65.1% and economic and social aspects 62.6%. The overall mean average marital adjustment found that 65.5%.

**TABLE – 6 Aspect wise Mean Marital adjustment scores among Working and Non-working Respondents**

No.	Aspects	State- ments	Marital adjustment Scores (%)				‘t’ Test
			Working (n=60)		Non-working (n=60)		
			Mean	SD	Mean	SD	
I	Physical aspects	20	67.1	3.8	65.1	4.5	2.53*
II	Economic & Social	36	66.2	3.6	62.6	4.2	4.95*
III	Psychological & Emotional	34	69.1	3.8	68.9	3.3	0.37 <sup>NS</sup>
	Combined	90	67.5	2.3	65.5	2.2	4.66*

\*Significant at 5% level, NS : Non- Significant,  $t(0.05, 118df) = 1.96$

to be non significant( $t = .37^{*NS}$ ).

The table 6 depicts the aspects wise mean marital adjustment scores among working and non-working respondents. It shows the mean score of physical aspects of working respondents found to be 67.1% that is slightly higher compared to non-working respondents 65.1%. However the difference in marital adjustment between physical aspects statistically found to be significant with t value being ( $t=2.53^{*}$ ).

The working respondents showed higher mean average of (66.2%) and moderate mean score was obtained by non-working respondents (62.6%). It shows that the difference in the response between working and non-working respondents is found to be statistically significant with respect to economic and social aspects. The t-test value found to be ( $t=4.95^{*}$ ) significant at 5 percentage level.

In all the aspects it is evident from finding that the marital adjustment in all the aspects almost equal mean average score and non-significant difference can be seen from above table between working and non-working respondents. A higher mean score obtained by working respondents (69.1%) as compared to non-working respondents (68.9%) in the psychological and emotional aspects. It was found to be non-significant results with t-value being ( $t=0.37^{NS}$ ). However the difference in marital adjustment score between psychological and emotional, economic and social found to be significant ( $t=4.66^{*}$  at 5% level of significance)

## CONCLUSION

Well-adjusted couples are expected to have long-lasting, stable marriage relationship, whereas poorly adjusted marriages are expected to experience instability and /or to end in divorce. Marital adjustment reflects the quality of life of marriage relation. The major factor in predicting marital adjustment is satisfaction with lifestyle. It has been found that material resources such as family income positively affect both spouses' marital adjustment. Both the husband's and the wife's satisfaction with their jobs enhances better-adjusted marriages. Furthermore, the husband's satisfaction with his wife's work status also affects marital adjustment.

## REFERENCES

- 1). Vries, W.G (2006). Marriage in honor .Retrieved from [www.splindleworks.com/library/devries/001mh.htm](http://www.splindleworks.com/library/devries/001mh.htm)
- 2). Hashmi, H.A ;Khurshid ,M and Hassan, I.(2007). Marital adjustment stress.
- 3). [https://www.researchgate.net/2738..\(PDF\) Marriage and marital adjustment research gate](https://www.researchgate.net/2738..(PDF) Marriage and marital adjustment research gate).
- 4). Sinha & Mukerjee (1990) defines marital adjustment the international journal of India psychology 4(2) 34-42, 2017 book.google.com

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**EFFECTIVENESS OF E – LEARNING AND ONLINE SESSIONS AMONG COLLEGE STUDENTS  
IN MADURAI DISTRICT – THE STUDENT’S PERSPECTIVE**

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**ABSTRACT**

*E-learning refers to the utilization of data and communication technologies to enable the access to online learning/teaching resources. The web is widely used as a research and academic tool, providing a society with access to global information and instant communication. The COVID-19 has resulted in colleges shut all across the world. Globally, over 1.2 billion children are out of the classroom. As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms. The aim of the study was to investigate the Effectiveness of e – learning and online sessions among college students in Madurai District. Data were collected from 100 college students studying in Madurai district.*

*Keywords: E-learning, online learning, Academic performance.*

**INTRODUCTION**

Learning is a process of achieving knowledge, skill, and performance. Thus learning is ultimately considered one among the elemental pillars of society changes. Nowadays, technology has obviously made our lives easier. Internet technology has been considered as a crucial medium for several aspects of our lives including academic learning. E-learning or online learning has received much attention in recent years globally, with an estimated 5-7 million students now are enrolling in at least one online course annually.

The Tamil Nadu government has ordered for the closure of colleges from 17<sup>th</sup> March 2020 amid the corona virus outbreak gripping the country. Most governments round the nation have temporarily closed educational institutions in an effort to contain the spread of the COVID-19 pandemic.

These nationwide closures are impacting hundreds of millions of students. Several other countries have implemented localized closures impacting millions of additional learners.

UNESCO is supporting countries in their efforts to mitigate the immediate impact of school and college closures, particularly for more vulnerable and disadvantaged communities, and to facilitate the continuity of education for all through remote learning.

The COVID-19 has resulted in colleges shut all across the world. Globally, over 1.2 billion children are out of the classroom. As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms. Research suggests that online learning has been shown to extend retention of information, and take less time, meaning the changes corona virus have caused could be here to remain.

**THE CONCEPT AND DEFINITION OF E – LEARNING**

The Internet has become one of the vital ways to make available resources for research and learning for both teachers and students to share and acquire information (Richard and Haya 2009). Technology-based e-learning encompasses the use of the internet and other important technologies to produce materials for learning, teach learners, and also regulate courses in an organization (Fry, 2001). There has been extensive debate about a common definition of the term e-learning. Existing definitions according to Dublin (2003) tend to reveal the specialization and interest of the researchers. E-learning as a concept covers a range of applications, learning methods and processes (Rossi, 2009). It is therefore difficult to find a commonly accepted definition for the term e-learning, and according to Oblinger and Hawkins (2005) and Dublin (2003), there is even no common definition for the term. Holmes and Gardner (2006) also made a comment on these inconsistencies by saying that there may be as many definitions of the term e-learning as there are learning went on to ask the following questions: Is e-learning an on-line coursework for students at a distance? Does it mean using a virtual learning environment to support the provision of campus based education? Does it refer to an on-line tool to enrich, extend and enhance collaboration? OR is it a totally on-line learning or part of blended learning? (Dublin, 2005). Some of the definitions of the term e-learning as given by different researchers and institutions are reviewed below.

In some definitions e-Learning encompasses more than just the offering of wholly on-line courses. For instance Oblinger and Hawkins (2005) noted that e-Learning has transformed from a fully-online course to using

technology to deliver part or all of a course independent of permanent time and place. Also the European Commission (2001) describes, e-Learning as the use of new multimedia technologies and the Internet to increase learning quality by easing access to facilities and services as well as distant exchanges and collaboration. The following are also different definitions of e-learning.

E-learning refers to the use of information and communication technologies to enable the access to online learning/teaching resources. In its broadest sense, Abbad et al (2009), defined Elearning to mean any learning that is enabled electronically. They however narrowed this definition down to mean learning that is empowered by the use of digital technologies. This definition is further narrowed by some researchers as any learning that is internet-enabled or web-based (LaRose et al, 1998; Keller and Cernerud, 2002).

Algahtani (2011) in his evaluation of the effectiveness of the e-learning experience in Saudi Arabia categorized the definitions of e-learning from three different perspectives: the distance learning perspective (Perraton, 2002; Alarifi, 2003; Holmes and Gardner, 2006), the technological perspective (Wentling et al. 2000; Nichols, 2003) and also from the perspective of e-learning as pedagogy (Khan, 2005; Schank, 2000).

Aparicio et al. (2016) claim that e-learning concept was not the first term to be used in conceptualizing the use of computerized systems to enable or facilitate the learning process. They identified 23 concepts that belong to the use of computers for learning purposes (e.g., online learning, virtual learning, distance education, m-learning, MOOC, learning management systems). E-learning should not be confused with the concept blended learning, which is defined as the effective integration, fusion even, of face-to-face and online learning depending on the educational need and purpose

Rodrigues et al. (2019) define e-learning as an innovative web-based system based on digital technologies and other forms of educational materials whose primary goal is to provide students with a personalized, learner-centered, open, enjoyable, and interactive learning environment supporting and enhancing the learning processes.

It can therefore be concluded from the above that it is difficult to identify a common definition for e-learning. Some of the authors refer to e-learning as providing complete on-line courses only whereas comprise web-supplemented and web-dependent services for the provision of educational and support processes.

## RESEARCH OBJECTIVES

The research was conducted to:

- To investigate the effectiveness of e learning and online sessions among college students.
- To determine the level of exposure of e learning among college students.

## RESEARCH DESIGN

The main aim of this study was to create an inclusive definition of e-learning that would be accepted by the majority of the student community and would also define the boundaries for future activity in this sector. Two main research activities were carried out to achieve this aim.

1. An extensive literature review: Indexed and peer-reviewed journals, government reports, web pages, and books were considered and analyzed. The main objective of this activity was to collect the available definitions of e-learning in order to compare and categorize them according to their main perspective and focus.
2. This quantitative study involved 100 arts & science college students studying at Madurai District. Copies of e - questionnaire consisting of four sections were used as instruments to collect data. Section 1 contains demographic factors of the students. Section 2 was to identify the student's exposure to e-learning. Section 3 was to investigate the effectiveness of using E-learning among the college students.

## RESULTS AND DISCUSSION

**Table 1 Gender of the respondent**

Gender	Frequency	Percentage
Male	62	62%
Female	38	38%
Total	100	100

Table 1 shows the gender of the respondents. A total of 100 students participated in the study. 62% were male while 38% were female students.

**Table 2 Age level of the respondent**

Age level	Frequency	Percentage
Below 18 years	16	16%
18 to 21 years	70	70%
Above 21 years	14	14%
Total	100	100

Table 2 shows 16% of the respondents were below 18 years old while 70% were 18 to 21 years old and 14% were above 21 years.

**Table 3 Place of residence of the respondent**

Place of residence	Frequency	Percentage
Rural	42	42%
Semi Urban	15	15%
Urban	43	43%
Total	100	100

Table 3 shows the place of residence of the respondent. 42% of the respondents reside in rural area, 15% of the respondents reside in semi urban area and 14% of the respondents reside in urban area.

**Table 4 Name of the institution**

Name of the institution	Frequency	Percentage
MCW	38	38%
LDC	25	25%
MC	18	18%
SLCS	12	12%
AC	07	07%
Total	100	100

Table 4 shows the college where the respondents studying. 38% of the respondents are studying in Mangayarkarasi College of Arts & Science for Women (MCW), 25% of the respondents are studying in Lady Doak College (LDC), 18% of the respondents are studying in Madura College (MC), 12% of the respondents are studying in Subbalakshmi Lakshmi pathy College of Science (SLCS) and 7% of the respondents are studying in The American College (AC).

**Table 5 Degree Pursuing**

Degree Pursuing	Frequency	Percentage
Under Graduate	76	76%
Post Graduate	24	24%
Total	100	100

Table 5 shows the degree pursuing by the respondent. 76% of the respondents are pursuing Under Graduate and 24% of the respondents are pursuing Post Graduate.

**Table 6 e – learning over Conventional method**

Particulars	Frequency	Percentage
Yes	54	54%
No	30	30%
Somewhat	16	16%
Total	100	100

Table 6 shows the opinion of respondents whether they like e-learning over conventional teaching. 54% of the respondents like e-learning, 30% of the respondents like conventional method and remaining 16% of the respondents like both the method.

**Table 7 Online classes attended per day**

Class	Frequency	Percentage
1 Hour	3	3%
2 Hours	3	3%
3 Hours	39	39%
4 Hours	41	41%
More than 4 Hours	14	14%
Total	100	100

Table 7 shows that the number of online classes attended by the respondents per day. 3% of the respondents attend one class per day, 3% of the respondents attend two classes per day, 39% of the respondents attend three classes per day, 41% of the respondents attend four classes and 14% of the respondents attend more than four online classes per day.

**Table 8 Type of e-learning attracted**

Type	Frequency	Percentage
Interactive	80	80%
Text driven	9	9%
Stimulation	11	11%
Total	100	100

Table 8 shows the type of e – learning attracts the respondents. 80% of the respondents were attracted with interactive online session, 9% of the respondents with text driven and 11% with stimulation.

**Table 9 shows the mean and SD of the students attitude towards e-learning.**

Statement	M	SD
e-learning improved my academic performance	3.4	1.131
e-learning increases to learn faster	3.8	1.629
e-learning would be interested in studying	3.2	1.084
e-learning gives me the opportunity to acquire new knowledge	3.6	1.449
e-learning enhances my learning experience	3.5	1.311
Overall I feel positive towards e-learning	3.4	1.131

As presented in Table 9 generally, students in the experimental group feel positive attitudes towards e-learning.

**Table 10 Major challenges faced in online learning**

Particulars	Frequency	Percentage
Technical issues	41	41%
Lack of in-person interaction	19	19%
Distraction	17	17%
Time Management	12	12%
Lack of Self motivation	11	11%
Total	100	100

Table 10 shows the major challenges faced by the students in online learning, 41% of the respondents were facing technical issues, 19% of the respondents were lack of in-personal interaction, 17% of the respondents were distracted, 12% of the respondents were lack in time management and 11% of the respondents were lack in self motivation.

**Table 11 Overall opinion about effectiveness of online session to reach learning objectives**

Particulars	Frequency	Percentage
Highly Satisfied	12	12%
Satisfied	41	41%
Moderate	33	33%
Dissatisfied	07	07%
Highly Dissatisfied	07	07%
Total	100	100

Table 10 shows the overall opinion about the effectiveness of online session to reach students learning objectives. 12% of the respondents were highly satisfied, 41% of the respondents were satisfied, 33% of the respondents were moderate, 7% of the respondents were dissatisfied and 7% of the respondents were highly dissatisfied.

## CONCLUSION

E learning and teaching is that the only source of platform in the pandemic situation. E-learning if used in education makes the learners/ students undergo contemplation, remoteness, also lack of interaction or relation. It therefore requires a very strong inspiration as well as skills with to the management of time in order to scale back such effects. The government must provide the appropriate infrastructure, like high-speed Internet lines, convenient and inexpensive hardware and software support of scientific founders of these scientific projects and therefore the promotion of e-learning among the people to create a fertile ground for the growth and promotion of scientific level of the country. Although e-learning is in its start and at the beginning of its movement towards the future, it can't be ignored, and background needed for its use should be provided. With a review of the literature, it is found that e-learning features a significant impact on learning and teaching and should be considered.

## REFERENCES

1. Algahtani, A.F. (2011). Evaluating the Effectiveness of the E-learning Experience in Some Universities in Saudi Arabia from Male Students' Perceptions, Durham theses, Durham University.
2. Aparicio, M.; Bacao, F.; Oliveira, T. An e-Learning Theoretical Framework. J. Educ. Technol. Soc. 2016, 19, 292–307.
3. Banihashem, Seyyed Kazem, et al. "The effect of E-learning on students creativity." Scientific Information Database, Vol. 5, No. 4, 2015, pp. 53-61.
4. Dublin, L. (2003). If you only look under the street lamps.....Or nine e-Learning Myths.The eLearning developers journal.<http://www.eLearningguild.com>
5. Fry, K. (2001). E-learning markets and providers: some issues and prospects. Education Training, 233-239.
6. Holmes, B. & Gardner, J. (2006). E-Learning: Concepts and Practice, London: SAGE Publications.
7. Keller, C. & Cernerud, L. (2002).Students' perception of e-learning in university education. Learning, Media and Technology, 27(1), 55-67.
8. Khan, B. H. (2005). Managing E-learning: Design, Delivery, Implementation and Evaluation, Hershey, PA: Information Science Publishing
9. Liaw, Shu-Sheng. "Investigating students' perceived satisfaction, behavioral intention, and effectiveness of elearning: A case study of the blackboard system." Computers and Education, Vol. 51, No. 2, 2008, pp. 864-73.
10. Oblinger, D. G., & Hawkins, B. L. (2005). The myth about E-learning. Educause review.
11. Perraton, H. (2002). Open and Distance Learning in the Developing World, London: Routledge.
12. Richard, H., & Haya, A. (2009). Examining student decision to adopt web 2.0 technologies: theory and empirical tests. Journal of computing in higher education, 21(3), 183-198.
13. Rodrigues, H.; Almeida, F.; Figueiredo, V.; Lopes, S.L. Tracking e-learning through published papers: A systematic review. Comput. Educ. 2019, 136, 87–98. [CrossRef]
14. Rossi.P.G. (2009). Learning environment with artificial intelligence elements. Journal of e-learning and knowledge society, 5(1), 67-75.
15. Wentling T.L, Waight C, Gallagher J, La Fleur J, Wang C, Kanfer A. (2000). E-learning -a review of literature. Knowledge and Learning Systems Group NCSA 9.1–73.

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**ENHANCED DISEASE PREDICTION MODEL FOR DIABETES MELLITUS USING NOVEL WAY OF MACHINE LEARNING**

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*Currently a lot of people are affected by diabetes and it leads to other severe health problems. Existing many methods identifies the disease in the beginning stage and most of the methods fail to met the accuracy and also more time complexity. The proposed method is enhanced by eliminating the existing issues. Imbalanced dataset become balanced dataset using sampling techniques, which in initialized by the amount of training is increased with sliding window technique. The diabetic prediction process is enhanced by using the Intensity Weighted Firefly Optimization techniques, which is used to pick the features based on the correlation between the features which removes the irrelevant features in the diabetic prediction process. Different type of features is handled by applying the PCA based feature transformation technique. Normal and diabetes classes are classified by hybrid random formed by applying the selected features. Prediction accuracy is maximized by applying the relevance between each features. Different datasets are applied to the present study to improve the efficiency of the diabetes prediction system. Minimum misclassification error rate and maximum accuracy is predicted with the proposed model when compared to other methods.*

*Keywords: Diabetes prediction, Machine learning, feature selection, Random forest, Fire fly optimization.*

**INTRODUCTION**

The Healthcare industry has huge volume of records and dataset but the maximum amount of the data is either properly retrieved or compared to find out the unknown information [1]. There are many challenges and research avenues presented by many researchers over the two decades to predict with the useful records available to make meaningful patterns for predictions. The growth in the field of healthcare information technology involves on medical industries to move automated analysis of disease comparison and diagnosis [2]. To achieve this task, several knowledge discovery techniques have been used on medical records or data for various type of disease diagnosis.

By detecting the diabetes disease at beginning stage, serious issues like eye problem and mortality rate can be reduced [3]. The earnest of diabetes prediction thread needs to meet an expert system to diagnose the diabetes in the beginning stage. The already existing diabetes disease prediction system is difficult to maintain and it leads to complexity due to the high dimensionality of data. For overcoming the above problems, different optimized methods are developed by expert system to predict the disease in an accurate and well manner.

In addition Traditional process is faced difficulty to analyze the large set of diabetes data and difficult to predict the overwhelmed data from the collection of features. These difficulties are creates complexities and also consumes a lot time that leads to get the confusion about clinical decision. Hence the earlier detecting diabetes expert system is created for predicting the abnormal diabetes features from the feature list. Hence the major objective of the diabetes prediction system is to improve the recognition rate in any situation using the optimized and effective feature selection and classification techniques. To enhance the diabetes prediction accuracy is the essential goal of the work.

The proposed study focused to develop an early diagnostic prediction model with efficient feature selection approach and best classifier. The traditional methodology of firefly algorithm is enhanced for feature selection process. Further the feature transformation method is used in order to handle the different types of features. The hybrid random forest is adopted as classifier. The efficiency of the proposed model is calculated using different dataset which is available publically.

The introduced diabetes recognition system utilized the various mining and machine learning techniques to compare the patient's data for predicting diabetes diseases. The introduced technique has many processing steps such as class imbalance, feature selection, feature transformation and diabetes disease classification process. Each step has specific methodology for processing with their functionality.

The objectives of proposed method includes the dataset of training data is improved with sliding window in order to enhance the predictive performance metrics, class imbalance problems are handled with Ranked Cluster Based Adaptive Sampling, different features are retrieved and selected applying IWFO and PCA approach to



improve the prediction factors and hybrid random forest is applied to the diabetes disease for prediction and minimizes the misclassification rate.

### RELATED WORK

Malav, A. and Kadam, K. (2018) concluded a diagnosed model for heart disease called as hybrid approach. This algorithm is combined with artificial neural network and k-means. The data was initially classified according to their properties and the classifier was implemented by developing a combined algorithm using k-means and ANN. The model mainly relies on the data classification according to the cardiovascular disease that has a better diagnosis model.

Ranganatha *et al.* (2013) analyzed the medical filed predict the patient care activity based on the secondary research resource, which stores the patients data for treatment and algorithms were allowed to run on that information card. The results were represented in a simple understandable description words and graphs. The choosing of algorithm was based on the availability of data and if the data is very large then the models such as ID3 and naïve Bayesian algorithm models were used. The use of decision tree algorithm ID3 made the output generation easy and understandable.

Alghamdi *et al.* (2017) explained about the importance of machine learning technology to identify incident diabetes using cardiac-respiratory system. Machine learning methods were gaining predominance in the medical healthcare community because of the improving performance and increasing use. The machine learning technique used was a random under-sampling technique, along with the five classification models this method shows without improvement. A significant improvement in prediction was done with Synthetic Minority Oversampling Technique (SMOTE) method.

Kamrul Hasan et al [9] applied machine learning methods to develop a novel diabetes detection model. The model is started with outlier rejection, missing value elimination and feature selection based on correlation approaches. k-nearest Neighbour, Decision Trees, Random Forest, AdaBoost, Naive Bayes, and XGBoost) and Multilayer Perceptron were applied as classifier. This model was evaluated on pima dataset.

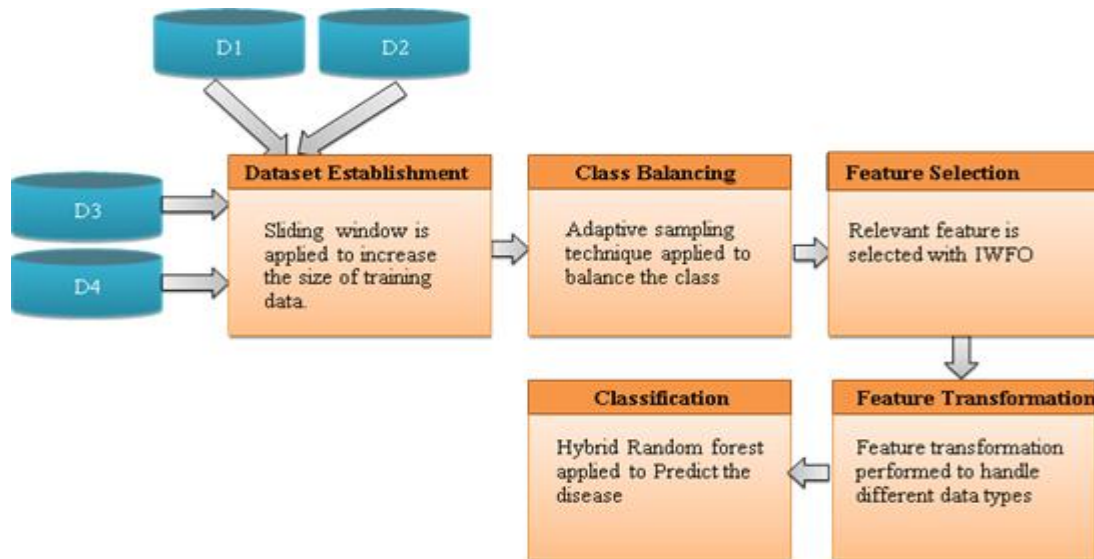
Mane, T. U. (2017) used Hadoop MapReduce platform to big data approach. The classification model used for this model was ID3 decision tree and clustering of the model was done by k- means. The system was helpful in prediction based on the parameters such as cholesterol, chest pain, resting BP, age etc. As the patients could go for a second opinion, the same factor was identified. This would also impact the process of treatment of heart disease.

Norma Latif Fitriyani et al [8] introduced a system for type 2 diabetes detection method. The techniques used in this study are outlier detection, balance data distribution and prediction in isolation forest, synthetic minority oversampling technique to ensemble the approach respectively. Four different dataset is utilized to evaluate the model and predicted that the data balancing step increases accuracy of the model.

The proposed model compared with four different dataset with existing system have the following attributes in common are pregnancies, glucose, bloodpressure, skinthickness, insulin, BMI, diabetespedigreefunction, age, outcome and other attributes are sleep, familydiabetes, urinating, obesity, visual blurring, delayed healing.

### PROPOSED METHODOLOGY

Diabetes is one of the growing health issues among the people; Which happens due to the improper secretion of the insulin in body. The abnormal changes of insulin develops other health problems such as nerve damage, heart disease, kidney failure, high blindness and improper blood pressure. Sometimes, diabetes symptoms are formidable to find in correct manner and it leads to all serious problems. So, the diabetes disease is diagnosed by creating the expert system. The major issues in diabetes prediction are high misclassification rate due to the features in high dimension. These issues are examined by using an optimized learning technique. One more problem is small dataset, which is solved through sliding window concept in the proposed model. The hybrid random forest with IWFO and PCA is utilized to recognizing abnormal diabetes information with the help of the different steps such as selection and classification process. The excellence of system is analyzed using Netbeans IDE.



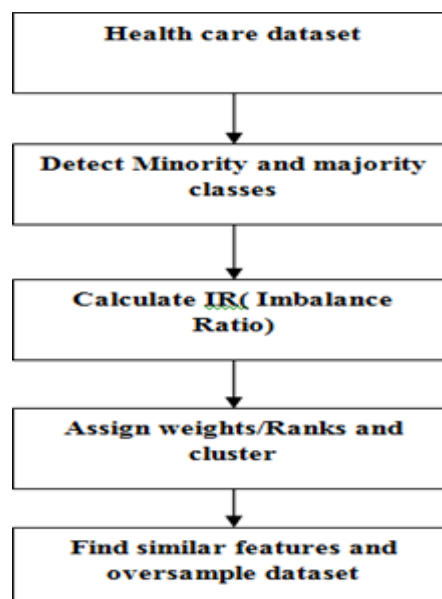
**Figure1: Proposed framework for diabetes prediction sliding Window**

The machine learning algorithms provides the efficient result for large size data. The approach require large amount of data to perfectly train the model. In online repository and other web resources contains small dataset for diabetes prediction which is further improved with some methods.. In this study the sliding window concept is utilized for dataset establishment. Zhang et al [10] applied this sliding window procedure to increase the quality data in their predictive model. As discussed in that study we applied the concept for our diabetes dataset.

The diabetes dataset contains the feature with label values by keeping the data the sliding window increase the instances by forming the high-dimensional features and labels. Through this sliding window concept the dataset can be established size of the data to ten to fifteen thousand therefore the performance of the predictive model is further improved.

#### **RANKED CLUSTER BASED ADAPTIVE SAMPLING**

**RCBAS** technique was used to compare the minority and majority set [11]. The following steps present the flow of the process. It begins with the filtered minority set  $D$  may be identified from the original minority set  $D$ . To do so, Similarity Index  $SI(x)$ , for each data sample  $x \in D$  was calculated. After that, each  $x$  will be removed if its Similarity Index  $SI(x)$  carries only the majority class samples. The minority class sample known as noisy data is eliminated. Hence it is sure that RCBAS removes noises effectively and also prevent the process from the noisy data. For each data sample  $x \in D$ , RCBAS will build a closed majority set called  $N(x)$ . The samples in  $N(x)$  can be the borderline majorities and expected to be placed near the decision boundary while the nearest majority  $k_2$  samples is small. Then, all the  $N(x)$  was combined in order that it forms about the borderline majority set,  $D$ . For every value of  $y \in D$  RCBAS constructs  $N(y)$  and combines all such  $N(y)$  to form  $D$ .



**Figure2: Class balancing model structure Feature selection**

The parameter  $k_3$  used in  $N(y)$  needs to be easily adequate for including minority synthetic class samples needed to generate by using RCBAS sampling approach. The disease classification using RCBAS technique is given in figure 2. The medical data is taken in which the selection of minority class samples is done with RCBAS Technique.

In the second step, diabetes feature selection is done using firefly algorithm based on intensity weight. From the information, the optimized features are selected according to the process of firefly approach. The IWFO is one of the meta heuristic approach which select features according to the natural flashing behavior [12].

The basic firefly algorithm is improvised with applying the intensity weight. The algorithm procedure is given below:

Step 1: load the diabetic dataset

Step 2: initialize the random variables, particles and number of population Step 3: Define the intensity weight with random initialization of feature vector Step 4: Update the observation coefficient

Step 5: compute the fitness value

Step 6: Repeat step 2 to 4 until the stop criteria reached Step 7: Select the feature with best fitness value

The selected feature is taken as input to feature transformation technique which is evaluated using PCA algorithm discussed in the next section.

### FEATURE TRANSFORMATION

Feature transformation is used to generate a set of features. The PCA is a most popular method which is mainly used for feature transformation in the present study [13]. This method is based on mining the axes on data that displays highest variability [14]. PCA provides the great support for supervised learning which spreads out the information's in news format.

A significant problem is to decide whether a PCA-based feature transformation approach is appropriate for a certain problem or not. Meanwhile the major objective of PCA is to mine new uncorrelated features, it is logical to present some correlation-based criterion with a possibility to define a threshold value. One of such criteria is the Kaiser-Meyer-Olkin (KMO) criterion that accounts for both total and partial correlation:

### CLASSIFICATION

Classifiers works on the principle of data classification, it classifies data (constructs a model) based on the training set and the values (class labels) in a classifying attribute and uses it in classifying new data. In classifier training, a classifier is chosen to isolate the samples in the element space. On account of parametric classifiers, the parameters are assessed in view of the samples used for training. In testing phase, the classifier identifies the input pattern by assigning a sample pattern based on the input features. The execution of any example acknowledgment framework  $n$  relies upon the change, highlight extraction, and characterization stages. In this thesis, the disease prediction accuracy is done with hybrid random forest which is discussed in the next section.

### HYBRID RANDOM FOREST

The random forest is an effective classifier for disease prediction. However a single decision tree of RF will degrade the overall performance because it cannot understand a more than one logic rule during the model training. Some decision tree may not analyze the relationship among the input and output. Hence this type of tree has to be found and pruned to improve the performance of the classifier.

In this study the random forest is improved by removing the useless tree by pruning technique. The Back propagation neural network (BPNN) is presented as a pruning method which effectively investigates the relationship of input on output by applying the weight. The training process of the improved RF is illustrated in figure 2.

### EXPERIMENTAL RESULT

The objective of this work is to discover and predict the performance of the proposed algorithm and predict the disease of affecting diabetic patients. In this section, efficiency of the proposed end to end diagnostic model is evaluated. The experiment was performed with NETBEANS IDE. To evaluate the present model four different dataset is used and their performance is showed in below table 5

**Table 5. Performance comparison with respect to different dataset**

Algorithm	Precision	Recall	F-measures	Accuracy
Dataset I	91%	95%	94%	96.8%

Dataset II	93%	97%	96%	97.5%
Dataset III	94.5%	95.9%	94.2%	97.2%
Dataset IV	96.1%	97.5%	97.3%	97.9%

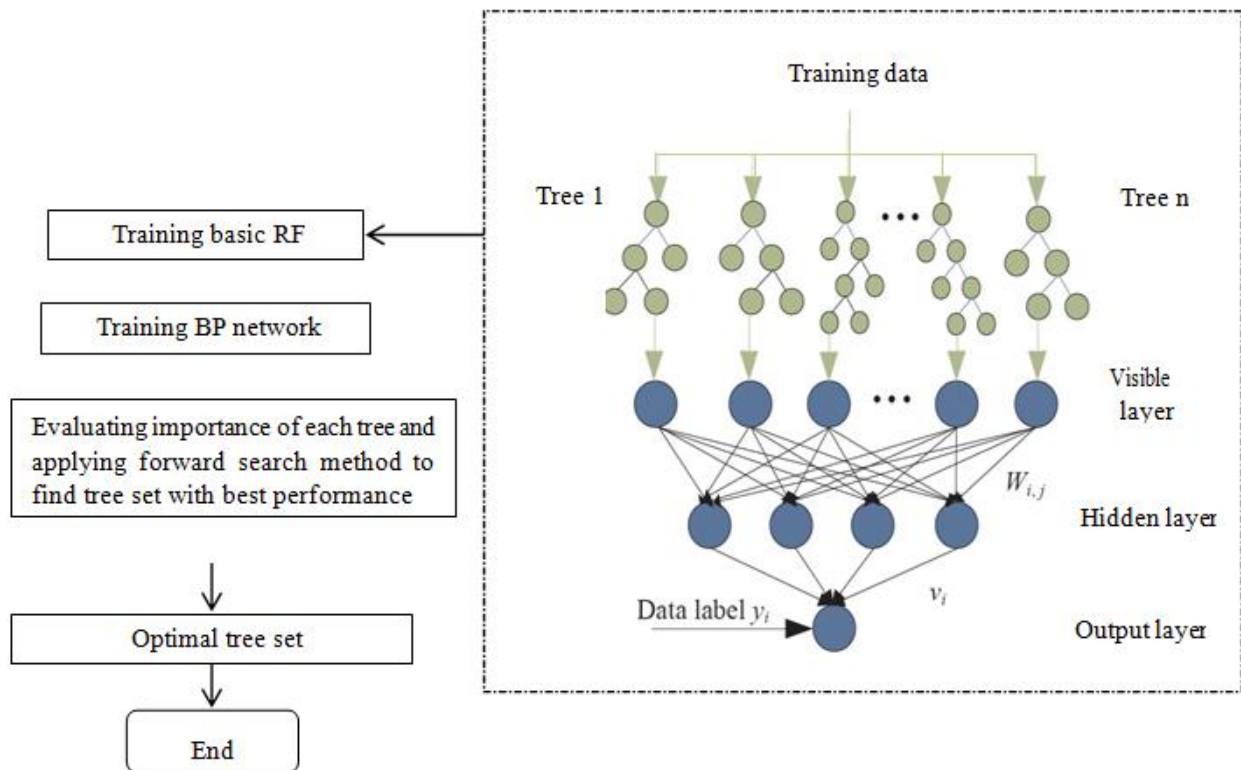


Figure 3. BPNN based Random forest

Table 5 provides the classification performance with necessary performance metrics. In all the Dataset, the proposed HRF approach has produced higher prediction accuracy than any other method

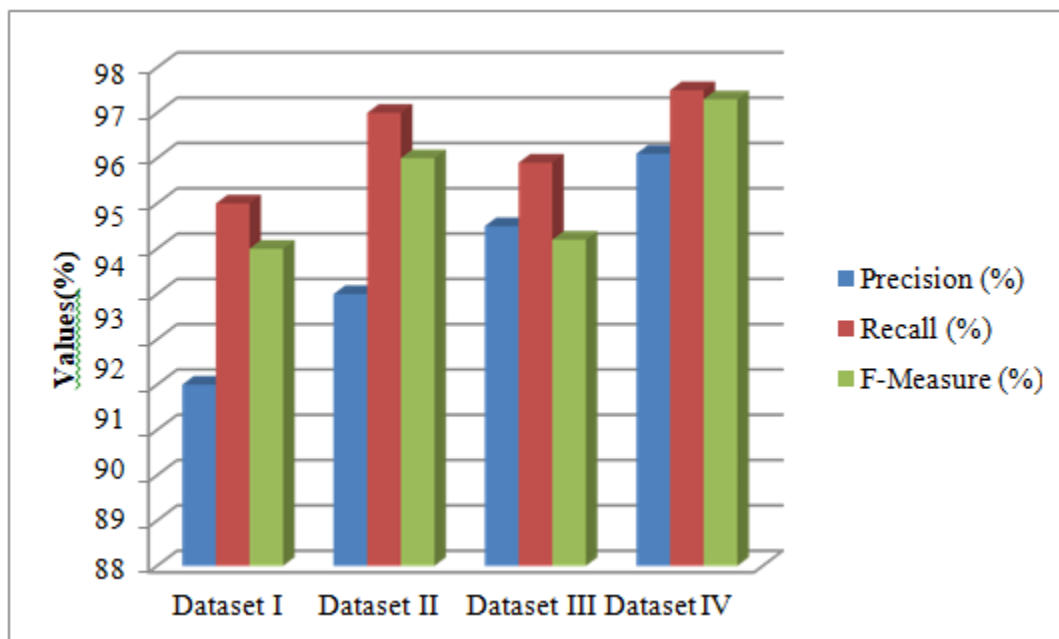
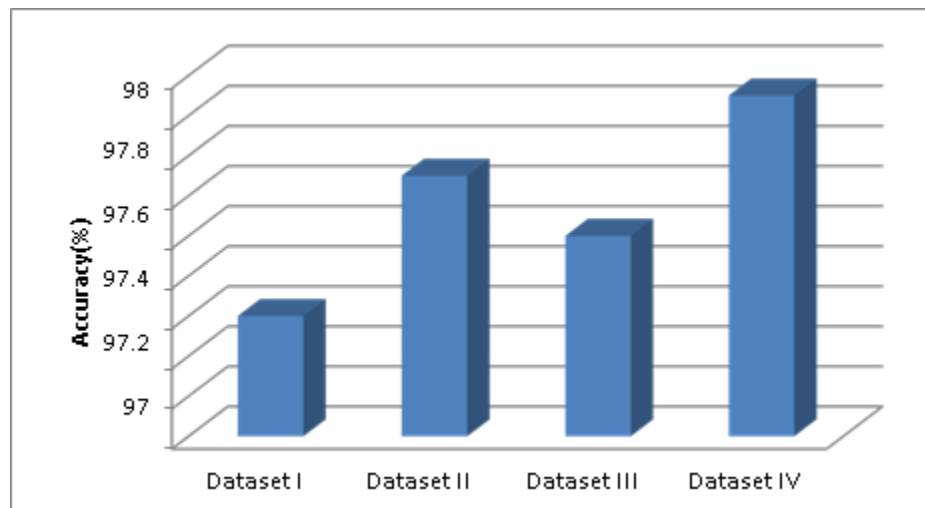


Figure4: Performance result of HRF

In order to compare and validate the findings, the system is tested with the dataset that contains the features from diabetic. The important features of all dataset are considered for the implementation. Prediction accuracy for diabetes measured using hybrid random forest algorithm is shown in Table 4.6 which shows that the performance of the model is increased with increased sample size.



The performance of the proposed system is assessed using pervasive computational tests. Results of the proposed system using Hybrid random forest prediction algorithm produced an overall average accuracy of 96.8% and 97.9%. The results prove that prediction accuracy of HRF is better than any other prediction algorithm used in literature.

## CONCLUSION

The proposed study is used to predict the diabetes in early stage to improve the quality of life of diabetes patients. The diabetes disease data is collected from publicly available dataset and those data are evaluated by proposed methods. The research reviewed on identifying the most essential features for predicting diabetes disease using IWFO algorithm and hybrid Random forest. The optimized technologies detects diabetic disease effective manner. In future, it will have to be improved while utilizing high dimensionality of data.

## REFERENCES

- [1]. Malav, A. and Kadam, K. (2018). A hybrid approach for heart disease prediction using artificial neural network and K-means. *International Journal of Pure and Applied Mathematics.*, 118(8):103-110.
- [2]. N. L. Fitriyani, M. Syafrudin, G. Alfian and J. Rhee, "Development of Disease Prediction Model Based on Ensemble Learning Approach for Diabetes and Hypertension," in *IEEE Access*, vol. 7, pp. 144777-144789, 2019
- [3]. M. K. Hasan, M. A. Alam, D. Das, E. Hossain and M. Hasan, "Diabetes Prediction Using Ensembling of Different Machine Learning Classifiers," in *IEEE Access*, vol. 8, pp. 76516-76531, 2020.
- [4]. Zhang, Ying, Yanhao Wang, Minghe Gao, Qunfei Ma, Jing Zhao, Rongrong Zhang, Qingqing Wang, and Linyan Huang. "A predictive data feature exploration-based air quality prediction approach." *IEEE Access* 7 (2019): 30732-30743.
- [5]. Mane, T. U. (2017, February). Smart heart disease prediction system using Improved K-means and ID3 on big data. In 2017 International Conference on Data Management, Analytics and Innovation (ICDMAI)., (pp. 239-245). IEEE.
- [6]. Alghamdi, M., Al-Mallah, M., Keteyian, S., Brawner, C., Ehrman, J. and Sakr, S. (2017). Predicting diabetes mellitus using SMOTE and ensemble machine learning approach: The Henry Ford Exercise Testing (FIT) project. *PloS one.*, 12(7).
- [7]. Sivarajah, Uthayasankar, Muhammad Mustafa Kamal, Zahir Irani, and Vishanth Weerakkody. "Critical analysis of Big Data challenges and analytical methods." *Journal of Business Research* 70 (2017): 263-286.
- [8]. Davenport, T., & Kalakota, R. (2019). The potential for artificial intelligence in healthcare. *Future healthcare journal*, 6(2), 94.
- [9]. Deshpande, Anjali D., Marcie Harris-Hayes, and Mario Schootman. "Epidemiology of diabetes and diabetes- related complications." *Physical therapy* 88, no. 11 (2008): 1254-1264.
- [10]. Ranganatha, S., Raj, H. P., Anusha, C. and Vinay, S. K. (2013). Medical data mining and analysis for heart disease dataset using classification techniques.

- 
- [11].B. Senthil Kumar 1, Dr. R. Gunavathi, “ Ranked Cluster Based Adaptive Sampling with Gradient Boosting Classifier for Medical Data”, IOSR Journal of Computer Engineering (IOSR-JCE), Volume 20, Issue 3, Ver. III (May. - June. 2018), PP 61-67.
- [12].B. Senthil Kumar, R. Gunavathi, “Early prediction of diabetes using Feature Transformation and hybrid Random Forest Algorithm”, International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-9 Issue-5, June 2020.
- [13].Pechenizkiy, Mykola, Alexey Tsymbal, and Seppo Puuronen. "PCA-based feature transformation for classification: issues in medical diagnostics." In Proceedings. 17th IEEE Symposium on Computer-Based Medical Systems, pp. 535-540. IEEE, 2004.
- [14].B. Senthil Kumar , Dr. R. Gunavathi, “An enhanced model for Diabetes prediction using Improves Firefly Feature selection and hybrid Random Forest Algorithm”, International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-9 Issue-1, October 2019.

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**ENVIRONMENT-ENERGY POLICY OF INDIA: CHALLENGES AND RESPONSES**

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**ABSTRACT**

*This paper makes an endeavour to put forward a methodical viewpoint on the urgent need for achieving Environment Sustainability and Energy Security and in the same array seek to perceive the Challenges and Opportunities. In post-independence period, the gravity of deteriorating Ecology and Environment was realized but no attempts were made till 1972 UN Conference on Human Environment. The huge shift from non-renewable to renewable sources of energy has ushered in a major change in how the nations of the world are making use of this resource.*

*Energy is closely linked with the golden thread that weaves through the very fabric of any nation big or small connecting development, social inclusion and environmental protection. Renewable Energy has been used from time immemorial specially Solar and Wind. However for a country like India the Renewable Energy Revolution/ Action Plan 2022 will make the country Energy Efficient, as India has a target to generate 30 percent of its electricity from Renewable resources by the end of 2030. Energy fuels the economic progress of any country and is a fundamental need of a society. Energy has been called the fuel of economic progress and the ready availability of cheap energy serves to stimulate industrial development. Energy is a critical input for the growth and development of any country. It is the lifeline of the national economy.*

*This paper will conclude by stating that there exists a strong intricate link between Environment and Energy Policies. The crucial role played by the heads of the state will go a long way in reshaping the Energy-Environment status of the country. Concerns about geopolitical instability and fuel supply security, as well as pollution and climate change, are pushing the nation to find alternative sources, of clean energy and to reduce harmful emissions. The introduction of cleaner fuels in the giant sector of transport should be a priority.*

*Keywords: Energy Security, Carbon-constrained-economy, Carbon neutrality, Energy Predicament, Energy Independence, Next generation fuels, Energy Crisis, Energy Revolution, Fuel Policy, Climate Disaster, Green philosophy, Ecological Imperative.*

**INTRODUCTION:-**

In the words of former Indian Prime Minister Manmohan Singh, 'China is ahead of us in planning for its Energy Security- India can no longer be complacent'. These words conveyed the sense of urgency that India holds over meeting its energy needs, India is playing catch-up with other major players in the global energy game. This realization has not come a moment too soon given the advent of rising oil prices, India's unprecedented growth levels, lack of energy-efficient technologies and reliance on energy-heavy industries for its development.

**Environment Scene in India:-** There was absence of Environmental legislation but environmental stability was maintained to its maximum extent during the Vedic period to 18<sup>th</sup> century. With the emergence of British imperialism and colonialism on Indian soil, the eco-balance started deteriorating. British imperialism brought to India its high technology, use of modern machines, factory life and modern life complexities. Gradually Indian environment started getting disturbed. The British government through Penal code (1860), Water pollution and Atmospheric pollution code of criminal code (1898), Police Act (1861), tried to maintain the ecology and environment but their attempts failed as they were only an eyewash.

In post-independence period, the gravity of deteriorating ecology and environment was realized but no attempts were made till 1972, when United Nations Conference on Human Environment was held in Stockholm. In 1972, 42<sup>nd</sup> amendment was done in the Indian Constitution committed to the protection of Environment. Even in the directive Principles of State Policy, Article 48A was included: the state shall endeavour to protect and improve the environment and safeguard the forests and wildlife of the country, (Article 48A) by the same Amendment was created a Fundamental duty of every citizen under Article 51-A (g): 'to protect and improve the natural environment including forests, lakes, rivers and wildlife and have compassion for living creatures'. The Indian parliament has also enacted several statutes especially Water prevention and control of pollution Act, 1974, Air Prevention and Control of pollution) Act 1981, and the Environment (protection) Act 1986.

**Energy Scene in India:-** In India, about one third of the Energy comes from non-commercial sources. The rural population depends heavily on fuel wood, dung and animal waste. India ranks 6<sup>th</sup> in the world in total energy

consumption. Our per capita energy consumption is 290 units (kg of oil equivalent), compared to 8,000 units in the US and 600 units in China. Though we have abundant coal reserves, we have very little oil. More than 25 percent of our primary energy needs is met by import of crude oil and natural gas. Of the commercial energy used in India, 51 percent comes from Coal, 36 percent comes from Oil, 9 percent from Natural Gas, 2 percent from Hydropower and just 2 percent from nuclear plants. India produces about 33 million tons of oil and 32 million tons of natural gas and import more than 90 million tons of oil, that is over 70 percent of our oil needs. The oil import bill is about USD 90 billion.

Energy demand of a country is not independent on its quality of living, as consumption of energy normally increases with the rise in the GNP. Energy comes from both commercial (Petroleum, coal, hydel, nuclear etc) and non-commercial (biomass, animal etc) forms. India, like most of the other developing countries depends heavily on non-commercial sources of energy, though currently, the dependence is on the declining trend. Apart from playing the indispensable role in the energy sector, oil and gas are vital to the industry of petrochemicals and fertilizers and Indian being an agrarian economy greatly needs this in abundance. Any projection of demand of petroleum should take into consideration the growth rate of population, planned improvement in the quality of living, plans for fertilizer and petrochemical industries and integrated energy management plans as rightly pointed out by Radhakrishna in his studies on problems and perspectives of Indian environment.

National security is a holistic concept and Energy Security is one of its important ingredients. Energy security essentially implies ensuring uninterrupted supplies of energy to support the economic and commercial activities necessary for the sustained growth of the economy. The critical relevance of this concept for India emanates from the growing imbalance between the demand for energy and its supply from indigenous sources implying thereby the growing import dependence for essential requirements of the nation.

**Challenges:** - a. Increasing population- When we talk of the energy future for a country like India, with a fast exploding population problem, all the forecasting techniques appear to bite dust. In terms of population, a 'second India' is in the offing within a few years. By the turn of the century it is estimated over 530 million tons of coal and 92 million tons of oil would be required per annum for the nation. It is not the 'exorbitantly a very high cost' of generation that worries the planners now, our environment and of course the human life, is at stake because of the dangerous side effects of our energy system and hazardous wastes of power generating units.

b. India is not self-sufficient in terms of oil energy. It has to depend on imports, which mostly come from the Gulf. Despite this, Energy Security concerns are hardly considered to be important enough to figure in Indian Foreign Policy. Only recently, due attention has been given, when the need of growing demand for energy imports was realized by the Government of India. This issue had become so alarming following the Iraqi invasion of Kuwait (1991), which led to the oil price escalation. As a result, India was forced to take some bold measures in order to meet its Energy requirements.

c. Low per capita consumption- Consumption of energy per head per year in the USSR is equivalent to 17 million tons of coal and in the USA to 16 million tons, whereas per capita consumption of energy in India is only 0.3 million tons. Considering the circumstances, to raise the economy of the country it is imperative to develop India's energy resources as fast as possible. At present about 65 percent of our total commercial energy comes from coal and 30 percent from oil and gas and 5 percent from hydro electric and nuclear energy. Our per capita consumption of energy however is extremely low.

d. Other challenges- A WHO report identified four definite links between poverty and energy supplies. The links are: a rise in mortality, respiratory disorder in children, depression amongst women at home, owing money in low income households. General or specific health problems are directly related with the consumption of energy in households. While excessive waste of energy makes worse social problems, a conservation approach to energy conservation can certainly reduce such problems.

India was the 1<sup>st</sup> country in the non-communist world to begin its post-independence development programme employing comprehensive planning. Its development framework was deeply influenced by a complex set of political, administrative and other factors. Hence Indian development needs to be studied and understood in the light of these factors. When, India came under the British East India Company rule in 1757 which lasted till 1858 until the Government of India Act 1858 was passed which led to the direct control of the Indian subcontinent in the form of the new British Raj and then started exporting products like cotton, silk, indigo dye, salt, spices, saltpetre, tea and opium. India had its own native population to work in the cotton and silk industry. India had 330 million people at the time of Independence in 1947. These 33 crores Indians were led forward by Gandhian ideas and principles of non-violence, khadi industry and handlooms, rural agriculture and the non-commercial use of energy in India. Nothing could be closer to Gandhiji's concept of Gramaswaraja than



creating village ecosystem which was biologically diverse and self-reliant. At that point of time, some of the mind boggling problem Gandhiji mentioned are as follows:-

1. Prevention of environment which is increasingly endangered by ever accelerating degradation and pollution, which might soon reach truly divesting and irreversible dimensions, which was imperative.
2. Another major problem confronting mankind was sustainable exploitation of resources including food, energy and raw materials.
3. Prevention of war, which in the nuclear age would be last war.
4. Promoting human well-being in the widest sense, balancing advances of science and technology with human development and quality of work and life.

Gandhi used the term 'development' in a very broad sense to mean the total development of society. He contended that the aim of all our activities should be the development and enfoldment of the human personality in an atmosphere of freedom. Although Gandhi never wrote on Green Philosophy but, he had a sound understanding of the human-nature relationship. When humans are driven by greed and envy they lose the power of seeing things as they are and Gandhi was well aware of these tendencies. Hence his advice to Indian masses was to use the bounties of nature, but not with greed. He combined social, economic and environmental equity and ethical imperatives for obtaining political independence as well as economic salvation for millions of people in rural India. Four thinkers interpret Mahatma Gandhi's ideology as the Ecological Imperative for survival. A contemporary fable on Gandhi-states that Gandhi's personal lifestyle choices were not what made him crucial to the future of our species. What actually mattered more was to understand why Gandhi anticipated the environmental crisis more than half a century before the term 'sustainable development' was coined. This was primarily because his assessments were based more on core principles with material data merely as an add-on. The beginning of the 20<sup>th</sup> century was marked with the ecological enlightenment across the globe. In India, the Environmental activism, which started with the Chipko Movement, did have a Gandhian angle, and it continued even with the Silent Valley protest in Kerala and the Narmada Bachao Andolan in Madhya Pradesh. Though each movement differed in their political ideologies and activism, the binding forces among all these movements were the adoption of Gandhian non-violence and Satyagraha. Environmental historians like Ramachandra Guha have identified three different ideological trends in Indian Environmental movements- Crusading Gandhians, Ecological Marxists and Alternative Technologists; but whatever stand or trend they represent, all those movements carried the Gandhian legacy of prudent use of nature and natural resources. Environmental protection was not a direct agenda in Gandhian programmes. But most of his ideas can be directly related to Environmental Protection. Green Movements and Ecological Movements have acknowledged their indebtedness to Gandhian philosophy. However, Gandhi would perhaps be the most misinterpreted and misunderstood person in India's recent intellectual history. He was a revolutionary and an orthodox personality at the same time, who thought and wrote widely on freedom and sacrifice, and also a strategist who could shake the entire world with the power of non-violence and Satyagraha. For the last few decades, in academics, particularly in areas related to Ecology and Sustainable Development, one can see a lot of serious studies on the significance of Gandhian ideologies to tackle Ecological issues. He dreamt of a world where there is no poverty, inequality and injustice which he called it as Sarvodaya Society, an egalitarian society - a concept he borrowed from John Ruskin which guarantees to uplift the poorest of the poor. But unfortunately, the objectives of Sarvodaya are still a distant dream for many in our democracy.

**India's Energy Predicament and the need for Energy Security Policy:-** The phrase 'energy independence' had become a mantra since it was first articulated by Richard Nixon in USA four weeks after the 1973 embargo. India is a growing giant like China, and is facing the critical challenge of meeting a rapidly increasing demand for energy. With over a billion people, a fifth of the world population, India ranks 6<sup>th</sup> in the world in terms of energy demand. Its economy is projected to grow at 7-8 percent over the next two decades, and in its wake will be a substantial increase in demand for oil to fuel, land, sea, and air transportation. While India has significant reserves of coal, it is relatively poor in oil and gas resources. Its oil reserves amount to 5.9 billion barrels, (0.5 percent of global reserves) with total proven, probable, and possible reserves of close to 11 billion barrels. The majority of India's oil reserves are located in fields offshore of Bombay and onshore in Assam. In addition to its struggle to secure supply, India is becoming increasingly aware of the fact that its economy is highly vulnerable to supply disruptions. Till recently, India did not have an Energy Security Policy or contingency plans to fall back on in cases of crisis. Nor is it a member of any organization like the (IEA) International Energy Agency, which was born in the aftermath of the 1973 oil crisis to protect members from any further disruptions in the

energy market. To minimize the impact of global fluctuations, India is building a strategic crude oil reserve facility on its southern and eastern coasts.

India has also focused its Biofuel policy on biodiesel, primarily derived from *Jatropha*, which aims to meet 20 percent of all demand from diesel beginning in 2011/12. Diesel is the main energy source for transportation, and India already imports a significant amount of crude oil as domestic production is limited. During 2004/05, the country imported 96 million tones of crude oil valued at US\$26 billion, and an annual growth rate of over 6 percent means that imports are due to rise to 166 million tones by 2019 and 622 million tones by 2047. The risk of limited, or very expensive, access to energy is putting the brakes on India's economic growth and this has prompted the Indian government to launch a National Biodiesel Mission (NBM) in 2003. *Jatropha* is identified as the most appropriate crop given its high yields of oil, its ability to survive on less fertile land (and therefore compete less with food production), and ease of management and harvesting. The first stage of the Biodiesel Mission ran from 2003 to 2007 and sought to establish the viability of key activities within the value chain. 400,000 hectares of land distributed across 8 states were identified. India's highly decentralized bureaucracy means that many national and state institutions play a role in supporting the Biodiesel Mission. In fact, the Indian government has adopted a highly interventionist approach to the promotion of *Jatropha*-based biodiesel production

**Need for Energy Security:-** Energy is the lifeline of modern economies. Simultaneously, the importance of energy security has become essential part of economic growth and national security. The 'developed' world's concept of 'energy security' has evolved in the context of its excessive dependence on imported energy and the localization of supplies in the unstable regions of the world. The growing imbalance between energy demands and supplies coerce India to look for Energy Security and to seek effective Energy Security Strategies. Energy security options available to India are a) deregulation and liberalization, b) strategic intervention, c) fuel substitution, d) oil diplomacy for equity and gas supplies. Oil diplomacy and diversification of petroleum supplies are other options available to India to attain Energy Security. Stakes in overseas exploration and production companies and equity in oil and gas blocks seems an answer to India's susceptibility to volatile international oil prices because of its dependence on foreign oil. In fact, equity oil abroad ensures cheaper and reliable oil supply. India imports about 72 percent of its oil requirements from the Persian Gulf. But this region is volatile compelling India to diversify its oil and gas supplies.

**India's Responses:-** In order to examine the direction of the path that India had traveled in the last two decades after the Rio 1992 Summit, on the road to sustainable development, three different indicators of sustainable development are considered namely,

- Hazardous waste management
- Urban environment
- Air Pollution.

**India and the Stockholm Conference of 1972:-** India's foreign Environmental Policy has been mainly shaped in large measures by two main sources. First, Orthodoxy, established by Mrs. Indira Gandhi, regarding the way in which environmental problems in poor countries need to be viewed and the legacy of India's foreign policy. When Prime minister Indira Gandhi addressed the 1972 UN Conference on Human Environment in Stockholm she established, an orthodoxy that has prevailed ever since in India's foreign Environmental Policy.

**India and the Rio Summit of 1992:-** Post Rio Summit in 1992 witnessed some important multi-lateral environmental agreements (MEAs) that were being negotiated and signed at different stages and at various moments of time. The UNFCCC, which belongs to the extended forum of MEAs, through its instruments of CoPs, under UN comprising of national governments, had given a clarion call for "Climate Summit" in Copenhagen in December 2009 leading to derive climate negotiations beyond Kyoto Protocol that left an enduring impact on Global economy and on all our lives in terms of tackling climate change in favour of climatic injustice.

**India and the Kyoto Protocol of 1997:-** The Kyoto Protocol agreed by negotiators in December 1997, was a treaty intended to implement the objectives and principles agreed in the 1992 UN Framework Convention on Climate Change. The core idea was that stabilizing the atmosphere (the UNFCCC's 'ultimate objective') required governments to agree to quantified limits on their greenhouse gas emissions, through sequential rounds of negotiations for successive 'commitment periods'. As of June 2007, 175 nations were parties to the Kyoto Protocol, representing approximately 60 percent of the global emissions for Annex-I countries. Under the protocol, the developed countries were required to reduce their emissions of Greenhouse gases by an average of

5.2 percent below 1990 levels by 2012. On the Energy facade, directly or indirectly the efforts made by government as well as by people to reduce energy consumption have included,

- a. Emphasis on energy conservation.
- b. Promotion of renewable energy sources.
- c. Abatement of air pollution.
- d. Afforestation and wasteland development.
- e. Economic reforms, subsidy removal and joint ventures in capital goods.
- f. Fuel substitution policies.

**India and the Copenhagen Conference of 2009:-** In the post-Copenhagen, the Indian government is clear that it shall maintain its stand based on the “polluter pays” principle that was the focal point of the 15<sup>th</sup> Conference of Parties (CoP) at Copenhagen in 2009, at which the international community determined the shape of climate change policy post 2012 when the Kyoto Protocol was set to expire. The government of India made it clear that what is being negotiated at CoP 15 is not a new international frame work for climate change or a post-Kyoto treaty. Rather, the government states that what is being negotiated is fresh emissions reduction targets for the developed nations along with a second commitment period under the Kyoto Protocol, and an Action Plan that would enable more effective implementation of the UNFCCC objectives.

**India and the Paris Agreement of 2015:-** By putting Gandhi’s seal on the deal, India has urged the global community to adopt “Gandhian way of life”(shun extravagant lifestyles) to reduce their carbon footprints. “India led from the front to ensure the inclusion of climate justice and sustainable lifestyles in the Paris Agreement. US President Barack Obama too invoked Gandhi while hailing India’s decision, “Gandhiji believed in a world worthy of our children. In joining the Paris Agreement, PM Narendra Modi and the Indian people carry on that legacy”, he said. Environmentalist welcomed India’s move to ratify the Paris Agreement on climate change and urged the country to make the deal ‘effective and equitable’.

In the words of Prime Minister Shri. Narendra Modi- “We, the present generations have the responsibility to act as a trustee of the rich natural wealth for the future generation. The issue is not merely about climate change; it is about climate justice. *Paris or no Paris, India is committed to a cleaner earth, says prime minister Narendra.modi.* Adding that the Atharvaveda-encapsulated dedication to nature five millenniums ago, the PM said India’s growth was based on the use and preservation of nature. He said India was targeting 175gw of renewable energy by 2022, adding that a higher power generation capacity was being built in the renewable energy sector than in thermal.

As per its promised action under the Paris agreement, India is committed to install 175gw of solar, wind and biomass electricity by 2022, reduce its emission intensity (emission per unit of GDP) by 33-35 percent from its 2005 levels by 2030, create an additional carbon sink of 2.5 to 3 billion tonnes of carbon dioxide equivalent by 2030 through additional forest and tree cover and produce 40 percent of electricity from non-fossil fuel based resources by 2030.

Comparing NEP3 with India’s Intended Nationally Determined Contribution(INDC) under the Paris Agreement reached at the 21<sup>st</sup> Conference of Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015 shows a higher level of ambition to reach a low-carbon economy faster. In its INDC, India had said it planned to achieve 40% cumulative installed capacity from non-fossil fuel-based energy resources by 2030.

**Energy Policy of India:-** The Energy Policy of India is characterized by trade-offs between four major drivers:

1. Rapid growing economy, with a need for dependable and reliable supply of electricity, gas and petroleum products.
2. Increasing household incomes, with a need for affordable and adequate supply of electricity and clean cooking fuels.
3. Limited domestic reserves of fossil fuels and the need to import a vast fraction of the gas, crude oil and petroleum product requirements and recently the need to import coal as well and
4. Indoor, urban and regional environmental impacts, necessitating the need for the adoption of cleaner fuels and cleaner technologies.

**Prospects:-** Besides this there are other Environment-Energy Acts such as,

The Energy Conservation Act, 2001 No 52 OF 2001 (29th September 2001)

The Petroleum and Natural Gas Regulatory Board Act of 2006.

The Environment (Protection) Act of 1986.

The Mines and Minerals (Regulation and Development) Act of 1970.

The Environment (Protection) Rules of 1986.

The Electricity Act of 2003 (Act No. XXXVI of 2003).

The Electricity Rules of 1956.

The Atomic Energy Act, 1962.

The CEA Regulations of 1979.

The National Environmental Tribunal Act 1995.

National Energy Efficiency Programme (NEEP).

Introducing CNG as fuel in the capital transport system in the late 1990's has shown the lone initiative taken by India to use renewable energy. The still functioning electric trams in Kolkatta introduced by the then British empire in India indicates the environmental consciousness and the safety concerns the than Government and citizens of India had. Indians till today use the public transport system mainly the railways, the third largest system in the world after USA and Soviet Union. But contrary to this the automobile population is showing an increasing trend in a few states of India with globalization making forages in the Indian markets creating demand for foreign market.

The Green India Mission Draft Document was released and it was followed by a national consultation on 24 May 2010 in New Delhi. The ministry released a draft mission document for the National Mission for a Green India, one of the eight missions under the National Action Plan on Climate change. Among other initiatives, India has started a post-Copenhagen Domestic Action. It has also made a strong case for REDDt (Reducing Emissions from Deforestation and Forest Degradation), to join the Oslo Forestry Partnership.

There are eight 'National Missions' which form the core of the national action plan. They focus on promoting understanding of climate change, adaptation and mitigation, energy, efficiency and natural resource conservation. Their 8 missions aim at,

- National Solar Mission. (NSM)
- National Mission for Enhanced Energy Efficiency. (NMEEE)
- National Mission on Sustainable Habitat.(NMSH)
- National Water Mission. (NWM)
- National Mission for Sustaining the Himalayan Ecosystem. (NMSHE)
- National Mission for a Green India. (NMGI)
- National Mission for Sustainable Agriculture. (NMSA)
- National Mission on Strategic Knowledge for climate change. (NMSKCC)

As part of the SATAT (Sustainable Alternative Towards Affordable Transportation) initiative launched during the year, Indian Oil has issued LOIs for 96 plants to supply 782 tonnes per day of CBG. With similar calorific value and other properties, CBG has the potential to replace CNG as an affordable fuel in automotive, industrial and commercial uses by conversion of biomass, or any kind of organic waste. In fact, the CBG programme has the potential to replace 62 million tonnes per annum of petroleum fuels as a waste-to-wealth measure.

India Leaps Forward In Clean Energy Race. The wind sector led the way, attracting USD 4.6 billion out of a total USD 10.2 billion investment in India and spurring deployment of 2.8 GW during the year, a 38 percent increase in wind generating capacity according to research released Wednesday by the Pew charitable trusts. 'on a number of measures, India has been one of the top performing clean energy economies in the 21<sup>st</sup> century,

registering the 5<sup>th</sup> highest five-year rate of investment growth and 8<sup>th</sup> highest in installed renewable energy capacity', said Phyllis Cuttino, director of pew's clean energy programme.

India's 'National Solar Mission' with a goal of 20 GW of solar power installed by 2020, helped drive the seven-fold jump in solar energy investments to USD 4.2 billion.

On the other hand, according to the Coal v/s Renewables 2018 report on lending to 54 energy projects that reached financial closure in 2018, released by Delhi based think tank Centre for Financial Analysis (CFA), revealed 90% decline in coal power project finance/lending in 2018 as compared to 2017. Figures show that 80% of all energy project finance went to renewable, while coal received merely 20%. At year w total of 49 renewable projects with a combined capacity of 4.7GW obtained loans of Rs. 24,442 crore last year where solar PV attracted 60% of this finance while the remaining 40% went to wind projects. India may be the fastest growing energy market in the world, but its lending to coal power projects saw a massive dip last year as compared to 2017, while renewable (solar and wind) attracted four times more project finance lending than coal-fired plants during the period. Though such a push towards solar and wind may be in sync with India's target to have 175GW of renewable by 2022, majority government and government –owned financial institutions still preferred financing most of the coal-fired projects in 2018. The majority of privately-owned commercial banks on the other hand, contributed three-quarters of all finance towards renewable projects and this trend is consistent with findings from 2017.

The 1,000 MW Kurnool solar park in Andhra Pradesh is fully grid-synchronised after the commissioning and hooking to the grid of the last 20MW, developed by the Adani Group. The three-phase Jawaharlal Nehru National Solar Mission has set up an ambitious roadmap: 22,000 MW of solar power by 2022. The clock is ticking fast for the first phase. Presently 70 percent of the new generation capacities are added to the grid in India in the last three are mainly renewable. India has major programmes for renewable energy. The government is promoting wind farms, solar energy, hydropower, as well as waste-to-energy projects. Several wind farms have been set up in South India. Solar pumps and water-heaters can be found in many parts of the country.

In conclusion, to tide the energy crunch, India can;

a)-**Shift to natural gas and LNG-**.

b)-**Increased domestic production** It is premature to determine how much oil can be generated domestically and for how long, but privatization of the oil sector, removal of bureaucratic obstacles and improved business climate could improve India's energy security.

c)-**Increased utilization of clean coal technology**

d)-**Shift to next generation fuels and increased use of renewable sources of energy-** India is probably the only country with a full-fledged ministry (MNRE) dedicated to the production of energy from renewable energy sources. Additionally, India is emerging as a growing market for solar, wind and hydroelectric power. According to a report by the American Wind Energy Association India currently ranks 5<sup>th</sup> in the global wind energy production.

India for the first time is ranked among the top ten countries in the Climate Change Performance Index (CCPI) which is being released annually after analyzing four parameters-Greenhouse Gas Emissions, Renewable Energy, Climate Policy and Energy use. The CCPI 2020 released by three international NGOs- Germanwatch, New Climate Institute and Climate Action Network- on the sidelines of the ongoing UN climate change conference (COP25). Referring to India, the CCPI report noted that the current levels of per capita emissions and energy use are still comparatively low in the country. The low per capita emissions and energy use along with 'ambitious 2030 targets' result in high ratings of the country in these two parameters. While the country receives an overall medium rating in the renewable energy category, India's 2030 renewable energy target is rated very high for its well-below 2 degree C compatibility.

## REFERENCE

- Radhakishna B.P. and K. k. Ramchandran., 1986, India's Environment- Problems and Perspectives, Bangalore; Geological Society of India. P. 37.
- Kartik .C.Roy., Clement.A.Tisdell and Raj Kumar Sen., 1992, Economic development and environment- A case study of India, Calcutta: Oxford University press.p.1.
- Mosley,Stephen., 2010, The Environment in World History, Oxon, New York: Routledge. P.47.

- 
- Down to Earth, 1-15 October 2019, pg. 26-29.
  - Micheal Grubb and Kristen Hite, “Kyoto Protocol in Encyclopedia of Earths”, in J. Cleveland Cutler, ed., Environmental Information Coalition (Washington, D.C.: National Council for Science and Environment, 2008).
  - Shyam Saran, “Climate Change: From Back To Board Room-What Indian Business Needs to Know About India’s Approach To Multilateral Negotiations On Climate Change”, 21 April 2008.
  - Energy Times, Vo.34, No. 46, June 26- July 2, 2012, Kolkata.p. 1-2.
  - Down To Earth, 1-15 January, 2020, pg. 36-37.
  - The Times of India dated 11th December 2019.

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**FINANCIAL PERFORMANCE ANALYSIS OF PREFERRED PRIVATE SECTOR BANKS IN DINDIGUL**

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**ABSTRACT**

*Modern trade and commerce would almost be impossible without the availability of suitable banking services. The Economic development in our country has not been even planning being accepted as an instrument of economic change. This has been reflected in regional imbalances in economic development. Historically, the private sector banks played a crucial role in the growth of joint stock banking in India. The first half of the 20th century witnessed phenomenal growth of private sector banks. The Industrial Credit and Investment Corporation of India (ICICI) were formed in 1955 at the initiative of the World Bank, the Government of India and representatives of Indian industry. The Karur Vysya Bank Limited was set up in the year 1916 at Karur in Tamil Nadu (India). The Bank started with only Rs. 1 lakh capital. Deposits grew from '40568.37 Cr in FY 2020 to '41952.97 Cr in FY 2019. The growth recorded by your bank was higher than the 3.30% growth in deposits recorded in the banking system during the fiscal under report.*

*Keyword: Private Sector Bank, Financial Performance, Karur Vysya Bank, ICICI Bank*

**INTRODUCTION**

Banking is now an essential part of our economic system. Modern trade and commerce would almost be impossible without the availability of suitable banking services. First of all, banking promotes savings. All manner of people, from the ordinary laborers and workers to the rich land owners and businessmen, can keep their money safely in banks and saving centers.

In India, though the money market is still characterized by the existence of both the organised and unorganised segments, institutions in the organised money market have grown significantly and are playing an increasingly important role. The unorganized sector, comprising the money-lenders and indigenous bankers, cater to the credit needs of a large number of persons existence in the countryside.

After the introduction of social control over Commercial Banks in 1967, the Commercial Banks were not providing adequate credit to rural borrowers. In order to involve the commercial banks in the task of rural development, they were brought under social control in 1967. Banking promotes investments. Banks easily invest the money they get in industry, agriculture and trade. They either invest it directly or advance loans to other investors. It is most through banks that foreign trade is carried on. Whether we export or import, it is through banks that money is transferred from one country to another. For example, bills of exchange and letters of credit are the regular ways banks use to transfer money.

Banking was initially an urban-oriented financial services, its rural orientation began in 1956 after the nationalizations of the Imperial Bank of India and the establishment of State Bank of India which was given a mandate to go rural. The RBI adopted the Branch Licensing Policy in the late sixties to induce the commercial banks to open rural branches. Increase in credit deployment in rural areas. The Economic development in our country has not been even planning being accepted as an instrument of economic change. This has been reflected in regional imbalances in economic development.

**INDIAN PRIVATE SECTOR BANKS**

There are 25 private sector banks in India, which are categorized by the RBI as Old Private Sector Banks and New Private Sector Banks.

The 18 old Private Sector Banks are as follows Bank of Rajasthan (Merger with ICICI going on), Bharat Overseas Bank, Catholic Syrian Bank, City Union Bank, Dhanalaxmi bank, Federal Bank, ING Vysya Bank, Jammu and Kashmir Bank, Karnataka Bank, Karur Vysya Bank, Lakshmi Vilas Bank, Lord Krishna Bank, Nainital Bank, Ratnakar Bank, Sangli Bank, SBI Comm& Intl Bank Ltd, South Indian Bank and Tamilnadu Mercantile Bank Ltd.

The 7 New Private Sector Banks are Development Credit Bank, HDFC Bank, ICICI Bank, IndusInd Bank, Kotak Mahindra Bank, Axis Bank, Yes Bank.

Out of this, the two private sector banks were selected for research that is Karur Vysya Bank and Industrial Credit Investment Corporation of India.

### KARUR VYSYA BANK

The Karur Vysya Bank Limited was set up in the year 1916 at Karur in Tamil Nadu (India). The Bank started with only Rs. 1 lakh capital. The Bank is spread over in 10 States and in 1 Union Territory with 231 branches and 5 extensions counters. The Bank is one of the early banks to adhere the norm of Capital Adequacy Ratio stipulated in Reserve Bank of India and is maintaining over 16% ratio.

Karur Vysya Bank offers services like Saving Account, Current Account, Loans, Debit Cards, Deposits Life Insurance, and General Insurance for individual and also provide services like current account, Deposits, Lending, Trade services Insurance, Multicity Account to corporate.

### DEPOSITS

Deposits grew from `40568.37 Cr in FY 2020 to `41952.97 Cr in FY 2019. The growth recorded by your bank was higher than the 3.30% growth in deposits recorded in the banking system during the fiscal under report. CASA deposits grew at 7.45% and stood at ` 5504.10 Cr as at the end of 31.03.2020 as against ` 5813.59 Cr as on 31.03.2019. Term deposits were at ` 18506.71 Cr as against ` 17914.98 Cr as at the end of the PY 2018-19. Deposit growth in the banking system has slowed in the recent years largely due to households looking at investments in alternate assets such as gold, equities, real estate etc expecting higher and inflation adjusted returns.

### FINANCIAL PERFORMANCE

The financial performance for the year under review is presented below:

<b>Gross Deposits</b>	59075	59868
<b>Gross Advances</b>	48516.30	50616
<b>Total Expenditure</b>	5383.70	5067.81
<b>Operating Profit</b>	1760.85	1711
<b>Net Profit</b>	235	211
<b>Appropriations</b>		
<b>Statutory Reserve</b>	58.76	52.80
<b>Capital Reserve</b>	132.04	22.17
<b>General Reserve</b>	---	22.50
<b>Special Reserve</b>	---	25.00
<b>Investment Reserve</b>	44.23	30.53
<b>Proposed Dividend</b>	---	30

Source: Annual Report 2020

### INVESTMENTS

The gross domestic investments of your Bank stood at ` 16072.60 Cr as at 31.03.2020 as against ` 15136.52 Cr as on 31.03.2019, thus recording an increase of 6.18% during the fiscal 2019-20. Net investments increase during the year to reach ` 1149.67 Cr as at the end of the FY2020 from as against at income on investments stood at ` 1150.59 Cr of PY2019. a strong growth of (38.39%) when compared to the previous fiscal income. Liquidity position of the Bank was comfortable throughout the year.

### FINANCIAL INCLUSION

Your Bank was allotted 117 villages through SLBC for providing basic banking services under the Financial Inclusion Plan. The Bank has covered all the 117 villages by adopting Business Correspondent model. The Bank has opened 26278 basic savings accounts (no frill accounts) with Bio-Metric smartcards under Financial Inclusion Scheme. In order to take it forward further the Bank is in the process of opening Ultra Small Branches/Brick & Mortar branches in the allotted villages wherever feasible.

### TECHNOLOGY INITIATIVES

Information technology continued to be the thrust area for the Bank as in the past. During the fiscal your Bank introduced/developed various IT initiatives that are aimed at enhancing customer convenience and internal efficiency and decision making process through effective Management Information Systems.



State of the art Disaster Recovery Data Centre was built and your Bank deployed all latest technology in the Data Centre complying with robust and best in class technology infrastructure.

The following new initiatives were introduced to add value to the customer convenience:

Installed 88 cash deposit machines to accept cash from customers for directly crediting to their own account or to third party account at select branches. The system can sort the cash, identify suspicious notes, accepts only good notes and provide receipt with denomination.

Implementation of Interbank Mobile Payment System (IMPS) through net banking. This facility will enable the customer to make funds transfers to others (including accounts maintained in other banks) as an alternate channel. It will instantaneously remit the funds like RTGS and works on 24x7 basis.

Karur Vysia Bank has built its own captive Contact Centre at Tidel Park with 50 seater capacity and with Interactive Voice Response System (IVRS) for customers to do phone banking including funds transfer and also can avail customer support from the agents on multi-languages on 24x7 basis using proclaimed application.

Implementation of mobile wallet: It is a pre-paid virtual card available on the mobile. No need for customers to carry cash or cards for purchases.

As the technology landscape is undergoing significant changes your Bank will continue to introduce systems in line with the new trends in the industry which delivers value to our customers.

### **INDUSTRIAL CREDIT AND INVESTMENT CORPORATION OF INDIA**

The Main aim of industrial Credit and Investment Corporation of India is to promote new industries, to assist expansion, modernization of existing ones and to furnish technical and managerial aid so as to increase production and afford employment opportunities in the private sector.

ICICI Bank was originally promoted in 1994 by ICICI Limited, an Indian financial institution, and was its wholly-owned subsidiary. ICICI's shareholding in ICICI Bank was reduced to 46% through a public offering of shares in India in fiscal 1998, an equity offering in the form of ADRs listed on the NYSE in fiscal 2000, ICICI Bank's acquisition of Bank of Madura Limited in an all-stock amalgamation in fiscal 2001, and secondary market sales by ICICI to institutional investors in fiscal 2001 and fiscal 2002.

After consideration of various corporate structuring alternatives in the context of the emerging competitive scenario in the Indian banking industry, and the move towards universal banking, the managements of ICICI and ICICI Bank formed the view that the merger of ICICI with ICICI Bank would be the optimal strategic alternative for both entities, and would create the optimal legal structure for the ICICI group's universal banking strategy. The merger would enhance value for ICICI shareholders through the merged entity's access to low-cost deposits, greater opportunities for earning fee-based income and the ability to participate in the payments system and provide transaction-banking services. The merger would enhance value for ICICI Bank shareholders through a large capital base and scale of operations, seamless access to ICICI's strong corporate relationships built up over five decades, entry into new business segments, higher market share in various business segments, particularly fee-based services, and access to the vast talent pool of ICICI and its subsidiaries.

ICICI Bank disseminates information on its operations and initiatives on a regular basis. The ICICI Bank website serves as a key investor awareness facility, allowing stakeholders to access information on ICICI Bank at their convenience. ICICI Bank's dedicated investor relations personnel play a proactive role in disseminating information to both analysts and investors and respond to specific queries.

ICICI Bank Limited (the Bank) is a banking company. The Bank, together with its subsidiaries, joint ventures and associates, is a diversified financial services group providing a range of banking and financial services, including commercial banking, retail banking, project and corporate finance, working capital finance, insurance, venture capital and private equity, investment banking, broking and treasury products and services. It operates under four segments: retail banking, wholesale banking, treasury and other banking. Retail Banking includes exposures, which satisfy the four criteria of orientation, product, granularity and low value of individual exposures for retail exposures. Wholesale Banking includes all advances to trusts, partnership firms, companies and statutory bodies, which are not included under Retail Banking. Treasury includes the entire investment portfolio of the Bank. Other Banking includes hire purchase and leasing operations and other items

ICICI Bank is India's second-largest bank with total assets of Rs. 4,062.34 billion (\$91 billion) at March 31, 2011 and profit after tax Rs. 51.51 billion (\$1,155 million) for the year ended March 31, 2011. The Bank has a network of 2,535 branches and 6,810 ATMs in India, and has a presence in 19 countries, including India. ICICI

Bank offers a wide range of banking products and financial services to corporate and retail customers through a variety of delivery channels and through its specialised subsidiaries in the areas of investment banking, life and non-life insurance, venture capital and asset management.

The Bank currently has subsidiaries in the United Kingdom, Russia and Canada, branches in United States, Singapore, Bahrain, Hong Kong, Sri Lanka, Qatar and Dubai International Finance Centre and representative offices in United Arab Emirates, China, South Africa, Bangladesh, Thailand, Malaysia and Indonesia. Their UK subsidiary has established branches in Belgium and Germany.

ICICI Bank's equity shares are listed in India on Bombay Stock Exchange and the National Stock Exchange of India Limited and its American Depositary Receipts (ADRs) are listed on the New York Stock Exchange (NYSE).

It was the first development bank to provide foreign currency loan to corporate sector.

### Deposits

<b>I. Demand deposits</b>		
From banks	65,212,698	74,379,016
From others	957,063,014	888,315,153
<b>II. Savings bank deposits</b>	2,455,908,874	2,276,709,040
<b>III. Term deposits</b>		
From banks	202,585,695	165,000,050
From others	4,028,919,665	3,124,792,552
<b>Total Deposits</b>	7,709,689,946	6,529,196,711
<b>Deposits of branches in India</b>	7,637,416,010	6,474,983,663
<b>Deposits of branches/subsidiaries outside India</b>	72,273,936	54,213,048
<b>Total Deposits</b>	7,709,689,946	6,529,196,711

Source: Annual Report 2020

### Investments

<b>Investments in India (net of provisions)</b>		
Government securities	1,883,318,796	1,479,23,542
Other approved securities	---	---
Shares (includes equity and preference shares)	24,622,430	18,840,258
Debentures and Bonds	119,852,513	142,328,392
Subsidiaries and/or joint venture	61,201,686	61,201,686
Others (commercial paper, mutual fund units, pass through certificates, security receipts, certificate of deposits, Rural Infrastructure Development Fund deposits and other related investments)	326,595,257	312,175,395
	2,415,590,682	2,013,776,273
<b>II. Investments outside India (net of provisions)</b>		
Government securities	28,909,637	20,026,853

<b>Others (equity shares, bonds and certificate of deposits)</b>	36,826,862	36,826,862
	13,987,624	6,696,812
<b>Total Investments</b>	2,495,314,805	2,077,326,800

Source: Annual Report 2020

**Other income**

<b>Commission, exchange and brokerage</b>	116,450,747	102,318,773
<b>Profit/(Loss) on sale of investments (net)</b>	19,010,897	13,006,602
<b>Profit/(Loss) on revaluation of investments (net)</b>	(2,619,008)	(387,624)
<b>Profit/(Loss) on sale of land, buildings and other assets (net)</b>	14,216	1,919
<b>Profit/(Loss) on exchange transactions (net)</b>	18,065,638	17,711,181
<b>Premium and other operating income from insurance business</b>	12,730,298	10,779,490
<b>Miscellaneous income (including lease income)</b>	833,432	916,047
<b>Total Other Income</b>	164,486,220	145,121,636

Source: Annual Report 2020

**Operating expenses**

<b>Payments to and provisions for employees</b>	82,712,407	68,082,380
<b>Rent, taxes and lighting</b>	12,714,278	11,988,705
<b>Printing and stationery</b>	2,300,408	2,056,233
<b>Advertisement and publicity</b>	8,886,382	7,290,475
<b>Depreciation on property</b>	9,471,163	7,769,089
<b>Depreciation (including lease equalisation) on leased assets</b>	14,238	13
<b>Directors' fees, allowances and expenses</b>	37,188	36,766
<b>Auditors' fees and expenses</b>	87,884	89,675
<b>Law charges</b>	1,103,906	1,007,091
<b>Postages, telegrams, telephones, etc</b>	4,229,716	4,068,143
<b>Repairs and maintenance</b>	17,682,686	15,971,240
<b>Insurance</b>	7,823,295	6,504,334
<b>Direct marketing agency expenses</b>	17,875,865	15,971,240
<b>Other expenditure</b>	51,204,693	40,571,609
<b>Total Operating Expenses</b>	216,144,109	180,890,620

Source: Annual Report 2020

**CONCLUSION**

It may conclude that comparison of two private sector banks KVB and ICICI for the financial year 2018-2019 and 2019-2020. It increased compare to previous year Deposit wise, investment wise, income wise and

expenses wise. It proves that public gives more attention to open a savings account through private sector. Large number of public sector banks available in india, but may not provide modern technology banking system. Now a days private sector banks give more facilities than public sector banks. So the people prefer to modern technology banking system of private sector banks. Performance of Private sector banks is very well now and ever.

**REFERENCE**

1. Annual Report of Karur Vysya Bank 2019-20.
2. Annual Report of ICICI Bank 2019-20.
3. RBI Report of the All India Rural Credit Review Committee, RBI, Mumbai, p335-336.
4. Chakrabarti Rajesh & Chawla Gaurav (2005)“Money and Finance-Banking Efficiency in India since the Reforms- An Assessment”, Money and Finance, Vol. 2, Issue, 22-23, 2005.
5. Gupts R.K, Sumeet Kaur Siabal (2007)“A CAMEL Model Analysis Of Private Sector Banks In India”, Punjab University, Chandigarh.
6. Agarwal Pankaj K et al (2011), “Performance of Public Sector Banks in the New Economy: A Comparison with Private Sector Banks”, Bank Quest, Vol 82, No 4, pp 43 – 51.
7. Chaudhry,Sahila and Singh, Sultan (2012): “Impact of Reforms on the Asset Quality in Indian Banking”, International Journal of Multidisciplinary Vol. 5(2): pg. 17-24 .
8. MadhurimaLall and Ravi Agarwal (2017) “A CAMEL Model Analysis of Select Public Sector Banks in India” EPRA International Journal of Economic and Business Review, Vol-5, Issue-4, pg 153-162.
9. [www.rbi.org.in](http://www.rbi.org.in).

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**FUNDAMENTAL RIGHT TO HEALTH AND ACCESSIBILITY TO COMMON MAN**

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**ABSTRACT**

*The right to health is an inclusive right, extending not only to timely and appropriate health care, but also to the underlying determinants of health, such as access to safe and potable water and adequate sanitation, healthy occupational and environmental conditions, and access to health-related education and environment. Health generally understood with reference to medical scientific discipline and medicine, confined to the medical professionals and scientists, however, it includes socio-economic and political determinants as well, as right to health is a social and political right. This article aims at highlighting the recognition of right to health at international arena, duly acknowledged by various international conventions from where it has gone beyond natural right to become legal as well as fundamental right and in India has been endorsed by the Indian Constitution, though not explicitly but through Article 21, Right to life is considered as encompassing the Right to Health. The paper focusing to the jurisprudential evolution of health rights and its duly incorporation into Indian Judicial approach, as Indian courts have recognised the fundamental right to health and health care. Various decisions of the Hon'ble Supreme Court and High Courts in India, especially during the current pandemic situation, has given wide interpretation to right to health as equivalent to the right to life under Article 21 of the Constitution of India and made it obligatory upon State to provide health care facilities to all citizens of India, extended to providing free, cheap or subsidized medical care and also considered the obligations of the private health care sector.*

*Keywords: Health, Health Rights, Indian Judiciary, International Covenants, Indian Constitution, Fundamental Rights, Obligation of State and private sector.*

**1. INTRODUCTION**

The right to health for all people means that everyone should have access to the health services they need, when and where they need them, without suffering financial hardship. The endeavours should be made to ensure that anyone, who fall sick, do not die just because they are poor, or because they cannot access the health services they need. Good health is also clearly determined by other basic human rights including access to safe drinking water and sanitation, nutritious foods, adequate housing, education, safe environment and working conditions.

The Constitution of the World Health Organization (1946) have adopted the words "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition". Almost 70 years these words are appearing more powerful and relevant than ever. Since day one, the right to health has been central to WHO's identity and mandate. Universal health coverage is the top priority of WHO with the co-operation of the countries around the world.

In India, Government has started to respect and protect human rights in health, in its laws, its health policies and programmes, so that everyone can enjoy the benefits of good health, irrespective of their age, sex, race, religion, health status, disability, sexual orientation, gender identity or migration status.

Though Constitution of India does not provide explicit right to health however, under Part III, Supreme Court has interpreted Article 21 of the Constitution and provided the right to health as a fundamental right. The Preamble itself gives core ideas to give any possible reliefs to people at large.

**2. International covenants and health rights-** Under International Laws, health rights are taken as basic human rights. All International Agreements, Human Right Declarations, and various International Instruments have accepted health rights a social, economic as well as the political rights.<sup>2</sup> This is now accepted globally that right to health is a basic human right that needs to be guaranteed to the people for their overall development and enjoyment of quality life with dignity and States are under obligation to provide universal healthcare as a basic fundamental right. Right to health encompasses remedies to address the issues related with inequality, inaccessibility and discrimination getting medical facilities, healthy and hygienic working environment, smooth functioning of the Government hospitals etc.<sup>3</sup> The Human Rights components includes not only the medical well-being its citizens but also to take care of the reproductive rights, women health, children rights for health, which in turn empower the society, by making each individual healthy and strong<sup>4</sup>. For the effective realisation of the Right to Health, countries have to adopt

numerous measures like formulation of health policies, or the implementation of health programmes developed by the World Health Organization (WHO) by legal instrument, making laws, or specific health oriented programs. The international covenants, treaties and agreements made it aptly clear that Human Rights and the health violation or neglect would result in gross violation of the other. The International Agreements, treaties and covenants have acknowledged health as basic human rights and affirmed its commitment to improve standard of living.

- I. WHO – World Health Organization - The Constitution defines health as the enjoyment of highest attainable standard of health. As per the preamble of WHO, health is a state of complete physical, mental and social wellbeing and not mere absence of disease or infirmity. WHO ensures to seek “health security” for all human beings by incorporating human right components of Universal Declaration of Human Rights. It necessitates universal access to health care facilities, right to information, education and employment and above all food security within its ambit. All these have duly been incorporated in the Millennium Development Goals.
- II. UDHR – United Nation's Universal Declaration of Human Rights - Article 25 endorses that "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services livelihood in circumstances beyond his control. Also declares that motherhood and childhood are entitled to special care and assistance. UDHR insisted protection rights for all the children irrespective of the fact whether they have been born out of legal wedlock or not by stating that all children, whether born in or out of wedlock, shall enjoy the same social protection. UDHR attempted to guarantee health as a fundamental human right encompassing economic, political, social and cultural rights that are inseparable and interdependent.
- III. ICESCR- International Covenant on Economic, Social & Cultural Rights - Vide its article 12, has duly incorporated the definition of health given by WHO, for the enjoyment of highest attainable standard of physical and mental health by reducing birth rate, infant mortality rate, prevention, treatment and control of epidemic, endemic, occupational and other diseases, improvement of all aspects of environmental and industrial hygiene and to ensure appropriate medical services for disease management.
- IV. United Nation issued General comment Number 14 ( 2000) has given strength to Article 12 of the International Covenant on Economic, Social and Cultural Rights, by acknowledging the requirement for the implementation of the same globally. It has been asserted that Health is a fundamental human right indispensable for the exercise of other human rights. Every human being is entitled to the enjoyment of the highest attainable standard of health conducive to living a life in dignity.
- V. International Bill of Human Rights - UDHR along with ICCPR<sup>5</sup> and ICESCR constituted “International Bill of Human Rights” that serve as guidelines for the nations to maintain human right conditions in their respective countries. UDHR is not legally binding but since right to health includes certain components which are legally enforceable, and therefore, UDHR is often cited by most international conferences and nations in the cases related to violation of human rights. The UDHR covenant is binding on the member countries. The interpretation of the UDHR covenants leads to the inference that the Health Rights and the Human Rights are interdependent and violation of human rights have serious implication on the Health Rights of the individual.
- VI. Alma Atta Declaration for primary healthcare accords to secure to all individuals justice and equality and implying for guarantying the availability, accessibility and affordability of healthcare
- VII. UN Secretary-General's call for Global Solidarity<sup>6</sup> – During pandemic, amidst COVID 19 situation, UN secretary General aligned with the nations globally to for protection of right to health and called for international assistance and cooperation as central to the COVID-19 response. This international obligation requires that all states in a position to assist, share research, medical equipment, supplies, and best practices; coordinate to reduce the economic and social impacts of the pandemic; limit economic sanctions, debt obligations, and intellectual property regimes that impede access to needed resources; and, in all this, focus on vulnerable and disadvantaged groups, fragile countries, and conflict and post-conflict situations.<sup>7</sup>
- VIII. On Fiftieth Anniversary of the Universal Declaration of Human Rights<sup>8</sup> - The President and Fellows of Harvard College, on behalf of Harvard School of Public Health/François-Xavier Bagnoud Centre for Health, has emphasised for rebuilding the health systems that are more inclusive in nature making ample space for the human right component of health rights and pointed out for ascertaining a contributory and participatory approach by assimilating the role of intergovernmental agencies, civil societies and other

private stakeholders in realising this goal. The task to reorient the health sector reform in the era of dwindling public sector spending on health to accommodate the need and aspirations of the most vulnerable target groups considered as a challenge before WHO and various Government Agencies.

3. **Indian Constitution and Right to Health-** The Constitution of India does not provide explicit right to health, however, certain Article recognise Right to Health as integral part of human life. The Preamble gives core ideas to give any possible reliefs to people at large. The main provisions of the Indian constitution that incorporates the right to health can be summarised as follows:

#### **I. Part III - The Fundamental Rights.**

This Chapter does not anywhere categorically state that the right to health or healthcare is a fundamental right. However, it does prescribe right to life as a fundamental right under Article 21, that reads “No person shall be deprived of his life or personal liberty except through procedure established by law.” The Supreme Court has interpreted Article 21 of the Constitution and provided the right to health as a fundamental right.

Till the 1970s the courts, by and large, had interpreted ‘life’ literally i.e. right to exist- right not to be killed. In late 1970s, the Supreme Court began to give an expanded meaning to the term ‘life’ appearing in Article 21. Over the years it has come to be accepted that life does not only mean animal existence but the life of a dignified human being with all its concomitant attributes. This would include a healthy environment and effective health care facilities. Today, the Fundamental Right to Life is seen in a broad context and expanded in its meaning that right to health and health care is a fundamental right and the ‘Right to Medical Facilities’ as a concomitant of ‘Right to Health’ is also part and parcel of Right to Life.

#### **II. Part 4 - Directive Principles of State Policy.**

Directive Principles lay down that the State shall strive to promote the welfare of people by securing and protecting as effectively as it may, a social order, in which justice-social, economic and political-shall form in all institutions of national life.

These are the principles consists of all the ideals which the State should follow and keep in mind while formulating policies and enacting laws for the country. These are the affirmative directions to the States. Though they are not enforceable by law, being non-justiciable but they go hand in hand with Fundamental Rights, but again they are not subordinate to Fundamental Rights.

The obligation of the State to provide health care facilities is set out in the ‘Directive Principles of State Policy’. The relevant provisions of the Directive Principles which cast a duty on State to ensure good health for its citizens are:

- i. Article 38. State to secure a social order for the promotion of welfare of people by securing and protecting as effectively as it may a social order in which justice, social, economic and political, shall inform all the institutions of the national life. State shall, in particular, strive to minimize the inequalities in income, and endeavour to eliminate inequalities in status, facilities and opportunities, not only amongst individuals but also amongst groups of people residing in different areas or engaged in different vocations. In other words, no person will be deprived of a healthy life because he cannot afford it. The State must provide facilities that an economically better off person can afford out of his own pocket.
- ii. Article 39- Certain principles of policy to be followed by State- The State shall, in particular, direct its policy towards securing- 39 (e) - that health and strength of workers, men and women, and the tender age of children are not abused and that citizens are not forced by economic necessity to enter avocations unsuited to their age or strength; and 39 (f) That children are given opportunities and facilities to develop in a healthy manner and in conditions of freedom and dignity and that childhood and youth are protected against exploitation and against moral and material abandonment.
- iii. Article 41 - To secure the right to work, to education and to public assistance in cases of unemployment, old age, sickness and disability.
- iv. Article 42 - The State shall make provisions for securing just and humane conditions of work and for maternity relief.
- v. Article 45 - To provide early childhood care and education for all children until they complete the age of six years.

- vi. Article 47 - Duty of State to raise the level of nutrition and the standard of living and to improve public health- The State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties and, in particular, the State shall endeavour to bring about prohibition of the consumption except for medical purposes of intoxicating drinks and of drugs which are injurious to health.
- III. Government Schemes - Central Government sponsored schemes like Pradhan Mantri Gram Swasthya Yojana (PMGSY) and National Rural Health Mission (NRHM) are being implemented to fulfil the social sector responsibility of the Indian State.
- IV. VII Schedule - Entry 6 of List II (State List) refers to public health and sanitation; hospital and dispensaries. Further, Entry 29 of List III (Concurrent List) empowers the State as well as the centre to frame laws for Prevention of the extension from one State to another of infectious or contagious diseases or pests affecting men, animals or plants.
4. **Judicial Intervention, interpretation and Evolving Understanding of Right to Health-** The right to health as a fundamental right grew as an offshoot of environmental litigation initiated by environmental activists regarding the environment issues and the right to unpolluted environment was recognized as a right in the first instance and from that followed the right to public health, health and health care. The Supreme Court of India in catena of judgments has given dynamic interpretation to Article 21 of the Constitution of India thereby expanding the meaning of right to life to also include the right to health. The right to health forms an integral component of right to life enshrined under Article 21 of the Constitution of India. Preservation of one's life is the necessary concomitant of the right to life enshrined under Article 21, fundamental in nature, secured, precious and inviolable and health is a fundamental right and is not restricted to merely absence of diseases or sickness. The medical and health facilities are sort of incentive for the workers' to work with best productivity both in physical and mental terms. Conclusively, medical facilities are also part of the social security. *Minerva Mills v. Union of India*<sup>9</sup> The interpretation of article 21 was first done and reiterated in *Maneka Gandhi Judgement*<sup>10</sup> to read Articles 14, 9 & 21 together for purposive construction. *Re: distribution of essential supplies and services during pandemic*<sup>11</sup> is the glaring example of the activist role of Supreme Court of India to protect the right to health of the citizens. Supreme Court took serious note of the unprecedented humanitarian crisis in the country, following the outbreak of the COVID-19 pandemic, and considered various issues relating to supply of oxygen, essential drugs; method and manner of vaccination etc, while observing that many states have been facing difficulties in ensuring the availability and accessibility of COVID-19-related health coverage, leading to shortages in essential medical care, including diagnostic tests, ventilators, and oxygen, and in personal protective equipment for health-care workers and other front-line staff. Supreme Court undertook immediate and progressive steps to prevent the rising public health threat of COVID-19, or at least to mitigate the impact of the disease, to the best available mode and working between Centre and States to protect public health as reflected in the guidance from WHO. Even as states limit individual freedoms to address this public health emergency, assuring that such limitations are reasonable, proportionate, non-discriminatory, and grounded in law, Supreme Court of India considered the population-level impacts of the disease and give special attention to the disproportionate risks faced by marginalised and disadvantaged populations. Human rights provide the necessary principles for effective COVID-19 responses. The bounded-deliberative approach<sup>12</sup> was exercised by Supreme Court in order to make UOI and States to justify the rationale behind their policy approach which must be bound by the human rights framework which presently implicates the right to life under Article 21 and right to equality under Article 14 of the Constitution. The court has passed the direction considering that the protection of the lives of citizens is paramount in times of a national crisis and the responsibility falls on both the Central Government and the State Government to cooperate with each other to ensure that all possible measures are taken to resolve the situation and ensured the availability of vaccines, by taking into account that 2001 Doha Declaration, TRIPS, stating that the same should be interpreted in a manner supportive of the right of members to protect public health and to promote access to medicines.<sup>13</sup> The World Health Organisation, while discussing the rapid spread of COVID-19 has not only labelled it an epidemic but also an "infodemic", due to the overabundance of information on the internet, which was riddled with misinformation and disinformation.<sup>14</sup> *Sushil Kumar Patel vs Union Of India*<sup>15</sup>, on 19 April, 2021, Madhya Pradesh High Court held that Article 38, Article 39(e), Article 41 and Article 47 in Part-IV of the Constitution of India as well



as the fundamental right guaranteed vide Article 21 of the Constitution of India deal with potent and substantive contents of the right to life which in its broad sweep also includes right to good health, while relying upon the various judgments of Hon'ble Supreme Court of India wherein Supreme Court has recognised the right to health as integral part of right to life under Article 21 of constitution of India. Navtej Singh Johar vs Union Of India Ministry Of Law and Ors<sup>16</sup>... on 6 September, 2018 Supreme Court of India held that Article 21 does not impose upon the State only negative obligations not to act in such a way as to interfere with the right to health. Court has the power to impose positive obligations upon the State to take measures to provide adequate resources or access to treatment facilities to secure effective enjoyment of the right to health. Further, the court has held that financial difficulties cannot come in the way of making medical facilities available to the people. Since this is the state's constitutional obligation, whatever is necessary in this regard needs to be done. The Supreme Court urged the government to consider a representation to make more testing labs and quarantine centres available to deal with COVID-19 cases. If the government does not respond to the representation in a robust fashion, there appears to be a constitutionally sound basis for the court to draw on the right to health to demand a more vigorous response. Mohd. Ahmed (Minor) vs Union Of India & Ors<sup>17</sup>. on 17 April, 2014 - Where Delhi High Court held that just because someone is poor, the State cannot allow him to die. In fact, Government is bound to ensure that poor and vulnerable sections of society have access to treatment for rare and chronic diseases. Court said that health is not a luxury and should not be the sole possession of a privileged few. When a breach of a Constitutional right has taken place, the Court is under a duty to ensure that effective relief is granted. Health being a State subject, they owe duty to discharge its constitutional obligation. High Court of Delhi further held that there is a breach of constitutional obligation of the Government to provide medical aid on fair, reasonable, equitable and affordable basis. By their inaction, the Central and the State Governments have violated Articles 14 and 21 of the Constitution. Gurcharan Singh vs Ministry Of Finance (Department of Revenue)<sup>18</sup> on 21 May, 2021- Delhi High Court has taken a bold step during corona pandemic by holding that imposition of IGST on oxygen concentrators which are imported by individuals and are received by them as gifts [i.e. free of cost] for personal use, unconstitutional. Court also took note of the fact that oxygen cylinder could be misused, therefore, to obviate misuse of the oxygen concentrators, further directed to furnish a letter of undertaking to the officer designated by the State that the same would not be put to commercial use. Bandhua Mukti Morcha v. Union of India & Others<sup>19</sup> - the court held that although the Directive Principles of State Policy hold persuasive value, yet they should be duly implemented by the state; and it was in this case also that the court had interpreted the dignity and health within the ambit of life and liberty under Article 21 of the Constitution of India. Parmanand Katara v. Union of India<sup>20</sup>, held that those who are indulged into the profession of medical are in charge of public health and have an inherent obligation to protect the same so that those who are innocent can be protected and the guilty be punished. Here the victim of a road accident was denied medical treatment by a private Hospital, held that the right to emergency medical care is a fundamental right in the light of Article 21 that cannot be denied by any Hospital and Medical Care facilities. Paschim Banga Khet Mazdoor Samiti v. State of West Bengal<sup>21</sup> The Supreme Court reiterated the need and essence of access to primary healthcare facility. The victim of a train accident was denied medical treatment due to lack of facility and was treated in a private hospital, however, he died due to delay in treatment. The Supreme Court held that it is obligatory on the part of the state to provide necessary primary healthcare and the excuse for insufficiency of fund cannot absolve the state from performing its duty. The scope of Article 21 was further widened; herein the court held that it is the responsibility of the government to provide adequate medical aid to every person and to work in the welfare of the general public. Moreover, Article 21 imposes obligation on the state, the state is required to protect and safeguard right of every person. Consumer Education & Research Centre v. Union of India and others<sup>22</sup> - Supreme Court of India held that the right to life does not mean mere animal existence or continued drudgery through life. Right to life includes right to clean & healthy environment, and expressly opined that right to health was also an integral factor to lead a meaningful life and for the right to life under Part III. And the court also stated that health includes the access to medical care for the highest attainment of living standards. Centre for Public Interest Litigation v. Union of India<sup>23</sup>, filed for the constitution of separate committee to evaluate the harmful effects of cold drinks on the human health particularly the health of the children and to direct the government for regulatory body to check the harmful chemical contents of the foods including soft drinks. The Supreme Court held that the State shall strive to attain an appropriate level of human health, safeguarding the right to life guaranteed under Article 21 of the Constitution. Further under Article 47 of the Directive Principle of State Policy, the State shall endeavour

to raise the level of nutrition, standard of living and to improve public health. Indian Medical Association v. V.P. Shantha<sup>24</sup>, it was held that providing medical services whether therapeutic or diagnostic for monetary consideration amounted to service within the meaning of service as per the Consumer Protection Act, 1986 and hence any medical practitioner or hospital found guilty of negligence or deficiency in services shall be held liable as per the Consumer Protection Act. Spring Meadows Hospital v. Harjot Ahluwalia<sup>25</sup>—held that there is need for sensitization of relevant law pertaining to the content of the right to health. An act to deal with legal prohibition of commercialized transplantation has further animated the right to health. Therefore, the recognition of dignity and fundamental right to life led to recognizing of the importance of health. It was brought that the medical services procured for the beneficiary makes him/her entitled for protection under Consumer Protection Act. Rakesh Chandra Narayan v. State Of Bihar<sup>26</sup> wherein, Supreme Court held that the Government has an obligation to ensure that medical attention is provided to every citizen in the country. This was one of the first instances where the Supreme Court went on to merge the non-justiciable Directive Principles of State Policy with justiciable Fundamental Rights. The case adjudicated on the deplorable condition in a mental hospital in Ranchi and was filed in the form of a letter petition under Article 32 of the Indian Constitution. In an unprecedented move, the court constituted a Committee of Management and laid down guidelines regarding the functioning and management of the hospital. M. Vijaya v. Chairman And Managing Director, SCCL<sup>27</sup>, Supreme Court of India recognised the doctrine of constitutional tort should be brought in and the liability shall be affixed as per the guidelines laid down by the Supreme Court in Indian Medical Association v. V.P. Shantha<sup>28</sup>. In letter petition, written by the victim, suffering from HIV/AIDS, intimating about the negligence by the hospital for gross negligence in blood transfusion during her surgery and prayed for inquiry in the matter, to take action against the defaulters and to give compensation. Holding that there should be compensatory mechanism to deal with the cases of AIDS for negligence on the part of state funded health institutions/blood banks where free treatments are being rendered, the Court directed to remedy that may be granted by Civil Court under tortious liability for medical negligence. Municipal Council, Ratlam v. Shri Vardhichand<sup>29</sup> holding the local bodies responsible for maintenance of hygiene and sanitation, the Supreme Court directed the Municipality to build proper drainage and filling of the cesspool to make the people free from over flow of drainage which was causing public nuisance. The Court held that it was mandatory duty on the part of the local bodies to maintain and promote a level of public health in accordance with the provisions of Article 47 read along with Cr.P.C section 133 to ensure the living conditions of the people are healthy and enforce this duty against any governmental body or authority who defaults in doing so irrespective of the financial resources it has. Vellore Welfare Association vs UOI and Ors<sup>30</sup> under Article 32, Supreme Court endorsing the right to fresh air and clean water against pollution caused by the effluents discharged by the tanneries across the state of Tamil Nadu and the pollution of water of river Palar that is the main source of water supply to that area. The Court held that it is statutory as well as constitutional duty to protect person's right to fresh air, clean water and pollution free environment as enshrined in Article 21 of the Constitution. The Court therefore interpreting “polluter pay principle” held that it is obligatory to compensate for the environmental degradation as well as to pay for restoration of degradation for sustainable development and hence the polluter is liable to pay for the loss to individuals as well as for restoration of environmental degradation. Burrabazar Fire Works Dealers vs The Commissioner Of Police and Ors<sup>31</sup> According to Article 19 (1) (g) of the Indian Constitution, the fundamental right of all citizens to practice any profession, or carry on any occupation, trade or business is subject to restrictions imposed in the interest of the general public under Article 19(6). The Hon'ble Supreme Court held that Article 19 (1) (g) does not guarantee any freedom which is at the cost of the community's safety, health and peace. State of Punjab v. Ram Lubhaya Bagga<sup>32</sup>, while examining the revolving around the issue of right to health under Article 21, 41 and 47 of the Constitution of India, the Supreme Court of India observed that right of one correlates with the duty of another. Hence, the right entrusted under Article 21 imposes a parallel duty on the state which is further reinforced as under Article 47. Even though several schools and hospitals are set up by the government but the duty is not fulfilled until they can be in reach of the general public. It is pertinent to note that the Hon'ble Court in this case regarded health to be a sacrosanct, sacred and valuable right. T. Ramakrishna Rao vs Chairman, Hyderabad Urban Development Authority<sup>33</sup> -, the Hon'ble High Court gave the observation that protecting environment is duty of both citizens and the state. Article 21 also embraces the protection and preservation of the environment for the reason that the environmental pollution is a slow death and therefore, it is violation of Article 21 of the Constitution of India. 2019 NITI Aayog report A 2019 NITI Aayog report highlighted that states

in India had unequal public health systems. This imbalance was primarily due to restricted technical expertise and fiscal constraints. While fiscal dependence of states on the centre continues to be a major challenge, if the subject of health was moved to the Concurrent List, it would lead to excessive bureaucracy, red tape and institutional constraints. Even as the policy decision of states would continue to remain subjective to the political orientation of the federal executive, this centralisation would rip states of their constitutional rights. Furthermore, a uniform strategy would not provide the specialised attention that states across India need.

5. **Obligations of Private Sector-** With increasing privatization of the health care sector and gradual withdrawal of the State from it, it becomes important to understand what are the rights of citizens vis a vis the private sector. A crucial issue concerning the obligation of the private sector to provide free and subsidized treatment to a certain quota of patients. The overwhelming majority of large hospitals and some of the Nursing Homes are registered as public trusts. Such registration entitles them to income tax exemption as well as certain other benefits. These hospitals have traditionally been given certain other relaxations including duty exemptions while importing drugs and medical equipment as also certain building construction relaxations such as additional floor space index, cheap land, etc. It is well known that these hospitals charge exorbitant fees and charges and are virtually unaffordable even to large sections of the middle class. Court held through various judgments that when these hospitals are registered as charities, get tax exemption, get subsidized land from the government and get various other relaxations, should they not be obliged to render at least some amount of cheap and subsidized services?

## CONCLUSION

Beyond the health system, social determinants of health, including adequate housing, safe drinking water and sanitation, food, social security, and protection from violence, are central elements of the right to health and protected under international law as interconnected rights. Though this is a major leap, there are number of limitations, like fundamental rights are available only against the State and not against private individuals or organizations, the State is required to enforce this fundamental right which is, however, subject to financial availability. However, the positive outcomes are that citizens have been using the fundamental right to get better facilities from State hospitals, cast obligations on State doctors and on custodial institutions. Prisoners and mentally ill have been held to be equally endowed with this right. The growth of environmental litigation in India is premised on the recognition of the right to health as a fundamental right. Courts have been acting in recent times acknowledging the right to health and giving it a prime status. A negative fundamental right casts an obligation on the State not to act in a manner that would deprive a citizen of her fundamental right. On the other hand, a positive fundamental right would mandate the State to take proactive measures to fulfil its obligation. Time has come for the Courts to recognize that the right to health and health care is a positive fundamental right that cannot be contingent upon the financial capacity of the State. Using the Right to Life as the broader framework, the Court rulings would be useful tools for all those who join hands to pursue a vision 'Health for All, Now'.

## REFERENCES

1. Rashmi Bansal is an advocate on record at Supreme Court of India, New Delhi, India;
2. Dianne Otto, "Linking Health & Human Rights: A Critical Legal Perspective", Health and Human Rights, Vol. 1, No. 3 (1995), pp. 272-281.
3. P. Freedman, "Reflections on Emerging Frameworks of Health and Human Rights" Vol. 1, No. 4,
4. Reflections on Emerging Frameworks of Health and Human Rights", Health and Human Rights, Vol. 1, No. 4, Women's Health and Human Rights (1995), pp. 314-348.
5. International Convention on Civil and Political Rights
6. UN Secretary-General Opening Remarks on "COVID-19 Pandemic Calls for Coordinated Action, Solidarity, and Hope". United Nations University News, New York 2020
7. UN Committee on Economic, Social, and Cultural Rights. Statement on the Coronavirus Disease (COVID-19) Pandemic and Economic, Social, and Cultural Rights. April 17, 2020,
8. Gro Harlem Brundtland, Fifty Years of Synergy between Health and Rights, Health and Human Rights, Vol. 3, No. 2, (1998), pp. 21-25,
9. 1980 AIR 1789

- 
10. 1978 AIR 597
  11. Suo Motu Writ Petition (Civil) No.3 of 2021
  12. Sandra Fredman, “Adjudication as Accountability: A Deliberative Approach” in Nicholas Bamforth and Peter Leyland (eds), *Accountability in the Contemporary Constitution* (Oxford University Press, 2013)
  13. World Trade Organization, 'Ministerial Declaration of 14 November 2001' (November 2001) WT/MIN(01)/DEC/1, 41 ILM 746, para 4.
  14. “Managing the COVID-19 infodemic: Promoting healthy behaviours and mitigating the harm from misinformation and disinformation - Joint statement by WHO, UN, UNICEF, UNDP, UNESCO, UNAIDS, ITU, UN Global Pulse, and IFRC” (WHO, 23 September 2020) available at <https://www.who.int/news/item/23-09-2020-managing-the-covid-19-infodemic-promoting-healthy-behaviours-and-mitigating-the-harm-from-misinformation-and-disinformation>
  15. <https://indiankanoon.org/doc/26801899/>
  16. AIR 2018 SC 4321; W. P. (Crl.) No. 76 of 2016 D. No. 14961/2016
  17. 2014 SCC On Line Del 1508.
  18. 2021 (376) ELT 689 (Del.) 2021 [49] G.S.T.L. 113,
  19. 1984 AIR 802, 1984 SCR (2) 67
  20. AIR 1989 SC 2039
  21. AIR 1996 SC 2426
  22. AIR 1995 SC 922
  23. 2013(13)SCALE210
  24. AIR 1996 SC 550
  25. AIR 1998 Supreme Court of India 1801
  26. 1989 AIR 348, 1988 SCR Supl. (3) 306
  27. 2002 ACJ 32, 2001 (5) ALD 522A
  28. Supra 24
  29. AIR 1980 SC 1622
  30. AIR 1996 SC 2715: (1996) 5 SCC 647
  31. AIR 1998 Cal 121
  32. (1998) 1 SCR 1120
  33. 2001 SCC OnLine AP 613

**GENDER ROLE PREFERENCES AND PERCEPTIONS OF WOMEN IN HIGHER EDUCATION****K. C. Jagadeesha, M.Sc., M.Ed., M.Phil., Pgdhe.**

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**ABSTARCT:**

*The gender stereotyping is an obstacle to women's rights to meaningful progress in implementing human rights obligations to address harmful stereotypes and wrongful stereotyping will require all of us – treaty bodies, special procedures, and many others – Gender stereotyping is wrongful when it results in a violations of human rights and fundamental freedoms. This group which is marginalized is a female gender. To define Gender Stereotype are over generalization about the characteristics of an entire group based on the gender, Hence we find that, making a decision based on once gender always creates Gender Stereotype*

**INDEX TERMS :** Race, , Gender, Higher Education**INTRODUCTION ;**

A rural group which is marginalized, mainly focusing on female gender. To define Gender Stereotype are over generalization about the characteristics of an entire group based on the gender “, and to understand this two examples are provided both positive and negative like, “men do nothing but watch sports (negative)” and the notion that “women are better care givers than men (positive)” but we are acknowledged that both the cases are not necessarily be correct in all the situations. Hence we find that, making a decision based on once gender creates Gender Stereotype.

**WOMEN GENDER AND MARGINALIZATION:**

This argument is about whether women and their marginalization were always hand in hand or were women enthralled with the captivity of marginalization by men. We take it for granted that vocations like office administrators, bureaucrats, teachers, journalists, doctors, bankers, diplomats, marketing professionals, judges, lawyers and law enforcement officers were open to women, even 100 years back. The truth is: Not at all. You would not have found even isolated examples of women in these vocations. This merely illustrates how in a very short span of 7 decades, women have asserted themselves and broken free of the yoke of 13000 years. The fact that even after 13000 years of institutionalized blackout, women have not lost their hunger to learn, develop and build ability is remarkable.

The testimony to this is the remarkable achievements of women in politics, industry, diplomacy, bureaucracy, science, sports, literature and law. An ideal illustration of this is “Marie Curie” who pioneered research on radioactivity in the early 1900's. We have also found that women because they voluntarily exclude themselves from many roles in society, have over the years become prisoners of the stereotyping which men have imposed on them. We are told that women are not suitable for technical shop-floor work in factories. It is laughable because women broke free off the chains by entering factories during the Second World War; we are also told that most women are reluctant to travel, so men want to help them by excluding them from jobs which require travelling. This is a repeat of keeping the vocations of artisans and traders away from the women. Consequently, as women are relegated to the household, men are able to maintain their power and economic dominance over women, because it contributes to the powerless status of women relative to men, as well as limits opportunities for contact outside the home, economic resources, and social support. Hence it shall not be wrong for one to say that though the marginalization walked hand in hand with female gender but the walking support for marginalization was provided by the men.

**TOOLS OF MARGINALIZATION WITH RESPECT TO RELIGION, RACISM AND PATRIARCHY:**

Another cause for the easy widespread of the Gender Stereotypes is those tools that are either respected or enforced by humans across the globe and the best examples for these tools and which are widely famous are RACE, RELIGION, and PATRIARCHY, to examine all these aspects as tools of Marginalization of women well have to starts its study from the scratch, but now we are just vindicating the reasons that we chose these 3 topics as tools of marginalization:

**RACE:**

The term gendered racism was originally coined by sociologist Philomena Essed. Racism is defined as the belief that all members of each race possess on characteristics or abilities specific to that race. Racism functions as a way to distinguish races as inferior or superior to one another. It is prejudice, stereotyping, or discrimination on the basis of sex.

Most of the times, the race of a human is already before his or her birth, based on their parents. In these days in India we might not be seeing this tool used for the discrimination, but it's still in use in the western sides.

The race is something known as double oppression in the case of women because if a woman is discriminated due to colour then she is oppressed first due to her colour and then because she will be a woman (an example for this are the African women who were/are under this discrimination). This aspect could only be accessed by the dominating groups when the dominated groups accept that they are in fact lesser humans and when this had a beginning it also had a tendency of propagating it to the upcoming generations of the dominated ones, and when a new generation is taught about that they need to accept the dominance then the oppression continues, till someone intellectually rebels back.

### **PATRIARCHY:**

The word 'patriarchy' literally means the rule of the father or the 'Patriarch', and originally it was used to describe a specific type of 'male-dominated family' - the large household of the patriarch which included women, junior men, children, slaves and domestic servants all under the rule of this dominant male. Now it is used more generally "to refer to male domination, to the power relationships by which men dominate women, and to characterize a system where women are kept subordinate in a number of ways" (Bhasin 2006:3)

The theory of patriarchy as a system of power that organizes society into a complex of relationships based on the assertion of male supremacy (in simple words i.e. the dominance of men in social or cultural system). Gender stratification occurs when gender differences give men greater power over women transgender, and gender-non-conforming people. In patriarchal societies, the male's perspective and contributions are considered more valuable, resulting in the silencing and marginalization of the women.

Patriarchy has been an issue since the women had started questioning the social structures of the society, it is a problem for those patriarchal men because they have got no answer and it is also a problem for the women who had questioned against the patriarchy and have got no answers but the patriarchy still stimulates further (mainly seen in India). Regarding the origin of patriarchy, traditionalists do believe that men are born to dominate and women to be subordinate. They believe that this hierarchy has always existed and will continue, and like other rules of nature this one too cannot be changed. There are others who challenge these beliefs and that patriarchy is not natural it is man-made and, therefore, it can be changed.

### **RELIGION:**

Religion is a belief which teaches seeking the truth, but unfortunately even this came under the turmoil of over wanting of dominance (patriarchy), though it is agreed that not every religion in the world teaches the patriarchal social construction but it would be our wrong hypothesis to assume that not any religion teaches patriarchy. The usage of this tool would have been the easiest for the men sector in dominating a group and to marginalize it.

Religion is a personal and institutional reality in the lives of the majority of the population in the World, so it is no surprise that religious teaching and affiliation provide a significant context for many women as they address experiences of victimization. And this context of controlling women could be called as "Spiritual Politics"

As humans we are bound to be afraid of things those are not visible to eyes, and this thing was used in very artistic way to oppress one group, because the patriarchy had its plan ready, to be imposed by bringing up the name of god as a shield to help support their statement not to be opposed by women, though the intellectual in these modern days are not ready to be quite and to quit.

### **INFORMATION LITERACY:**

An information literate woman in Higher Education is one who is able to recognise when information is needed and has the ability to effectively locate, evaluate and employ the needed information. Teachers who are information literate, who have learned how to learn, they know how to learn because they know how knowledge is organised, how to find information, how to information in such a way that others can learn from them.

A broader view of information literacy is advocated by Shapiro and Hughes, They argued that information literacy is liberal art that includes many factors beyond the technical skills promoted by computers and listed seven types of literacy which are very relevant to present context., they are

1. Tool literacy ( Traditional computer literacy)
2. Resource literacy (a major aspect of bibliographic instruction)
3. Socio-structural literacy ( recognising the contextual nature information in group/ institutional setting)

4. Research literacy ( methods and tools)
5. Publishing literacy (writing, producing the content)
6. Emerging technology literacy (adaptability and life long learning)
7. Critical literacy(evaluate information and information technologies)

**Literacy Information standards:**

1. Access information efficiently and effectively
2. Evaluate information critically and completely
3. Use information accurately and creatively.
4. Pursue information related to personal interests
5. Appreciate literature and other creative expression of information
6. Strive for excellence in information seeking and knowledge generation
7. Recognise the importance of information to a classroom in particular and democratic society in general
8. Practice ethical behaviour in regard to information and information technology
9. Participate effectively in groups to pursue and generate information

A women must know that information literacy can be promoted in any class, at higher education level. The key information literacy elements are ACCESS, UNDERSTAND, EVALUATE, APPLY, COMMUNICATE, CREAT and VALUE.

**Types of Stereotypes:**

There are four basic examples of gender stereotypes which affects higher education now a days.

- Personality Traits
- Domestic Behaviours
- Occupations
- Physical Appearance
- Gender stereotyping basically discards the concept of gender identity

**Defensive Shields of Marginalized:**

- Use of Article 15: Prohibition of Discrimination on Grounds of Religion, Race, Caste, Sex or Place of Birth.
- The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, and place of birth or any of them.
- No citizen shall, on grounds only of religion, race, caste, sex, place of birth or any of them, be subject to any disability, liability, restriction or condition with regard to-
  - a. Access to shops, public restaurants, hotels and places of public entertainment; or
  - b. The use of wells, tanks, bathing Ghats, roads and places of public resort maintained wholly or partly out of State funds or dedicated to the use of the general public.
- Nothing in this article shall prevent the State from making any special provision for women and children.
- Nothing in this article or in clause (2) of article 29 shall prevent the State from making any special provision for the advancement of any socially and educationally back ward classes of citizens or for the Scheduled Castes and the Scheduled Tribes.

**INTERPRETATIONS AND CONCLUSION:**

Universities can be highly competitive environments, encouraging behaviours more closely related to agented, stereotypically male, characteristics. In research studies clearly explains the choices of male and female students in a competitive higher educational environment. Undergraduate students at a selective French university compete for spots in foreign universities where they will fulfil their mandatory international exchange program requirements. It was found that female students tend to request universities that are worse than their academic

standing, and this is especially true for the top performing students. Women may underestimate their chances of getting into highly selective universities. We also find some evidence that the female students with high academic ability shy away from asking for top universities because of the competitive nature of the assignment process. Male students, however, do not shy away, and therefore tend to get a majority of the spots available in the better universities, despite academic levels similar to female students. Structural issues faced by these societies centre around the way we treat our girl child. Women of these days have started questioning though with a slim voice and I think that they have to question far more loudly because if they fail to question the patriarchy when they face it shall continue and that'll make some else to be dominated and then the same process of asking "why" would begin and if even that person fails to point the problem then, of course patriarchy is contagious. It is observable that the female is, so far as strength is concerned, inferior to male. This is a law of nature; and that doesn't seem to be suspended or repealed in favour of women. This physical superiority can't be denied- and it is noble privilege! But men, not content with this natural pre- eminence, try to sink us lower still.

**REFERENCES:**

- Aron, E., & Smollan, D. (1992). Inclusion of the Other in the Self Scale and the Structure of Interpersonal Closeness. *Journal of Personality and Social Psychology*, 63, 596-612.
- Berdahl, J. L. (2007). The sexual harassment of uppity women. *Journal of Applied Psychology*, 92, 2007, 425-437.
- Cuddy, A. J. C., Fiske, S. T., & Glick, P. (2008). Warmth and competence as universal dimensions of social perception: The Stereotype Content Model and the BIAS Map. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (vol. 40, pp. 61–149). New York,



**GOA: CLIMATIC EMERGENCIES WITH SPECIAL REFERENCE TO CYCLONE AND FLOODS****Saili Harmalkar and Baptist Rebelo**

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**ABSTRACT**

*Goa's climate has certainly changed – it is experiencing huge man-made impacts. It has become extremely built-over and greatly urbanized, with massive road building works. The amount of concrete on Goa's surface has escalated exponentially. This has created heat islands which are ecologically harmful. Another major change is the emergence of extreme climatic events and this too has a fallout in Goa in terms of the loss of ecology. Environmental changes are based on factors like urbanization, population and economic growth, increase in energy consumption and agricultural intensification. The degradation has adverse impacts on humans, plants, animals and micro-organisms. To cope up with the critical situation, we need to make optimum use and management of resources, sustainable development, adoption of green concept and above all community participation in all developmental activities. Because of climate change and the rapid warming of the Arabian Sea, there are now more and more cyclones impacting the western coast. Cyclone Tauktae has been the most direct hit so far- it is perfectly predictable that there will be more. This is very important point – those of us who have been following climate change a while knew that major impacts were coming, but we didn't expect these would happen so soon and with such massive effect. With the ongoing development, the developed countries as well as developing nations neglected the global climate change. A developed nation like Germany faced one of the worst floods, China has experienced floods after 1000 years. Many of the Indian states are facing worst flood situations, in fact the state of Goa never faced such floods until 1982.*

*Keywords: Climatic Emergencies, Environmental Governance, Environmental Degradation, Desiltation, Environmental Encroachment, Incessant Rain, Tropical Cyclones.*

**INTRODUCTION**

Climate change is a leading cause for the increase in the intensity and frequency of climatic emergencies, such as heat waves, floods, droughts and tropical cyclones. A tropical cyclone is an intense circular storm that originates over warm tropical oceans and is characterized by low atmospheric pressure, high winds and heavy rain. A characteristic feature of tropical cyclones is the eye, a central region of clear skies, warm temperatures and low atmospheric pressure. It is anticipated that as climate change accelerates, the frequency and intensity of natural disasters will increase. Rising sea temperatures are said to impact on the direction, strength, development and impacts of cyclones. Climate change has also resulted in the major floods in India. Many of the Indian states are facing worst flood situations, in fact the state of Goa never faced such floods until 1982.

**STUDY REGION**

The land which we call Goa is a narrow strip of Earth 105 kms long and 65 kms wide that is 3701 sq.kms. Goa is situated in coastal belt surrounded by Western Ghats in the East. The catchment areas of the rain are stacked by nature with forests which includes various Wildlife Sanctuaries and Reserved Forests.

**DISCUSSION**

A low pressure area that formed over southeast Arabian Sea on 13<sup>th</sup> May 2021 intensified into a deep depression as western states braced for a severe cyclonic storm. Meteorologists at India Meteorological department (IMD), Panaji had continued in a special bulletin about the impact of very heavy rainfall and gusty cyclonic winds on human life and property. A state of Goa never witnessed a severe cyclonic conditions until 1980's.

While the extreme weather system intensified severe cyclonic storm crossing into the Arabian Sea parallel Goa further reaching to Gujarat. Rain storms had lashed south Kerala on 14<sup>th</sup> May and was expected to become more powerful until it reach Gujarat.

Goa received thunderstorms as cyclone Tauktae over east central and adjoining south east Arabian sea moved northwestwards on 15<sup>th</sup> May. Squally winds and rough seas were also experienced while the cyclone was moving 330km from the Goa coast.

Goa is facing some of the major extreme weather events. The entire western coast is undergoing major ecological changes. Because of climate change and the rapid warming of the Arabian sea, there are more and more cyclones impacting the western coast. Cyclone Tauktae has been the most direct hit so far.

Following Tauktae, people in Goa never experienced such wind speeds or seen such an extreme climate phenomenon. This is the third year in a row that cyclones in the Arabian sea have menaced the west coast, A

record eight cyclones- five in the quieter Arabian sea and three in the usually ranging Bay of Bengal worshipped up storms in the sub-continent during 2019 and the trend continued in 2020 with devastating wind-driven phenomena ripped through sea and land.

“More and more number of severe cyclonic storms are forming in the Arabian Sea due to unusual warming of the western Equatorial Indian Ocean and southern Arabian Sea”, said MR Ramesh kumar a Meteorologist at NIO. A recent study by NIO scientists has clearly indicated that this region will heat up in the near future as indicated by Pre cautions of several ocean atmospheric coupled models. According to Indian ocean Dipole (IOD) like warming pattern could yield more cyclones in the Arabian sea. The warming of the Arabian Sea will be more than the Bay of Bengal in 80% of the model.

### **EFFECTS OF CYCLONE TAUKTAE**

A ferocious cyclone Tauktae hit Goa with an intensity barely seen in the tiny state's recent history, bringing down power supply in many parts of the beleaguered state, with several pockets going powerless for over 24 hours. It lead to uprootment of electricity poles and trees, slowed down the work of power restoration in many parts.

Cyclone Tauktae left behind a trail of destruction in almost all parts of Goa. Stormy winds and incessant rains threw normal life out of gear. Huge trees that got uprooted blocked the free flow of traffic along major as well as arterial roads of Goa. Fire personnel were kept on their toes throughout the day clearing the roads of fallen trees and branches.

The tin sheets of house roofs wave also blown away at many places in Margao and the occupants had a hard time sheltering themselves from the incessant rains. Water logging was witnesses at many places making it different even for pedestrians to use the roads.

Mobile phone services were down as was the internet, including the state service provider, BSNL. Those working from home had a hard time on account of failed internet connectivity. In Quepem 80% of essential shops were closed due to power cut. Major damage has been reported in Bardez followed by Marmugao.

As an effect of cyclone Tauktae, rough sea contitions prevailed on Saturday (15<sup>th</sup> May 2021) with waves pounding the coastline at Palolem, Colomb, Galgibaga and Agonda, causing minor damages to several seaside properties including restaurants. In places like Galgibaga the beach stretch was almost entirely submerged in water. Fisherman were seen running helter skelter, abandoning their fishing gear. Seawater also entered some residential areas along the coastline. Heavy sand erosion was also witnesses.

Due to the swelling of the sea, rough waves were seen hitting the shore, where even retaining walls in some of the areas could not offer any resistance to the rampaging waves. Owners of seaside properties could only watch helplessly as the waves left their properties damaged. The retaining walls were washed away into sea. The sea level when this damage occurred, rose to a height of over three to four meters.

Due to cyclone Tauktae the railways have cancelled and other transport system had to face serious problems. Various roads were blocked one to uprooting of electric poles and huge trees. The state fire and emergency services control room was flooded with hundreds of calls from locals about falling of trees and blocked roads. 34 succumbed to injuries in the beach village of Anjuna. All airlines have cancelled their flight operations to and from Goa. Hundreds of houses were damaged in coastal belts across the state as sea water seeped in following high waves. Hundreds of families living in coastal areas and low lying areas of the state have been shifted to relief camps. Two people were killed, scores injured and over 200 houses destroyed as tropical cyclone tauktae. A 32 years old women died in the cyclone after a coconut tree fell on her in Bardez taluka.

The extreme heavy rainfall in 2018-2019 which caused floods in Kerala created havoc in the state. With these ongoing extreme climatic emergency events due to environmental degradation and global climate change which were already predicted by the Scientists that Goa might face similar floods as Goa too have similar physiography and climatic conditions.

With climate change triggering extreme weather events in quicker succession than ever before, scientists view the very severe Tauktae cyclonic storm a fallout of ocean warming and also an indication of future calamitous events. No one must have imagined a floods in Goa after the powerful cyclone that took place in Arabian Sea creating a havoc in Goa.

In the name of development, environmental destruction is taken to another level. The encroachment of Madhei river basin for mega project of double tracking of railway, extension of National Highways and implementation

of cable line has created drastic change in the forest cover in the Molem National Park, Madhei Wildlife Sanctuary.

Also the mining activities in this eco-sensitive zone has resulted in siltation of soil into the river basin. The top soil in absence of trees has washed off and got deposited in the rivers, catchment area and the dams which resulted in the rise of water levels in the major rivers of Goa.

The rainfall patterns have also changed over the years. Goa is receiving rainfall from above normal, 2020 being the wettest year after Liberation (1961). The frequency of dry spells have decreased. Goa's mean annual temperature has increased by over 1c since the beginning of the 20<sup>th</sup> century till date (1901-2018) and is projected to increase by 2c by the 2030s. (According to the study conducted by NABCONS). The study further states that the mean annual rainfall in Goa has increased by 68% over the period of 1901-2015.

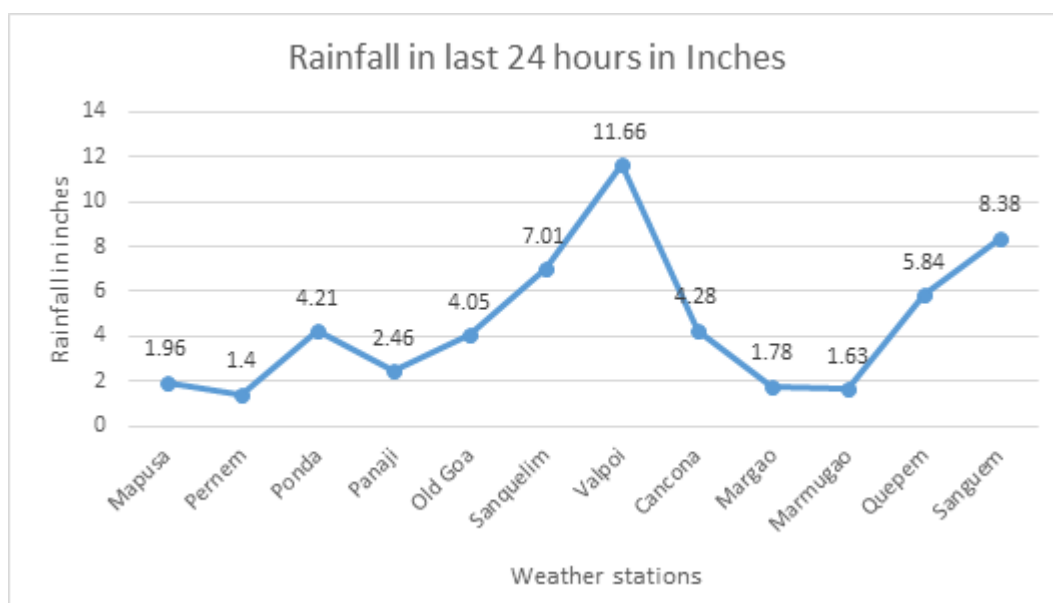
**Table No 1.1: Goa: Annual rainfall (in mm)**

Year	Rainfall (mm)
2011	3832.4
2012	2938.0
2013	3395.8
2014	3062.6
2015	2388.6
2016	2957.6
2017	2555.2
2018	2410.5
2019	3943.8
2020	4203.2
2021	2270.9 w.e.f 01/06/2021

**Source:** OHeraldO dated: 1<sup>st</sup> October 2019

Goa has witnessed its worst and most widespread floods in 4 decades i.e. 40 years the last being in 1982. (TOI: July 24, 2021) which destroyed the rural Goa. Around 1000 houses are damaged, 2 minor bridges were washed away and leading to evacuation of people to safer areas.

The average rainfall for the past two weeks was 1047.3 mm which is 122% from normal. Continuous rains led to rising waters inundating villages in the Eastern parts of Goa. (23<sup>rd</sup> July 2021)



**Figure 1.2: Rainfall on 23<sup>rd</sup> and 24<sup>th</sup> July 2021 in Inches**

Goa received heavy to very heavy rainfall which is above normal. The Talukas which are lying around the Western Ghats- Sattari, Sanguem, Bicholim, Quepem received more than 5 inches of rainfall and were the severely affected Talukas. The regions which were lying near the coast were also affected due to inundation of rivers and lack of drainage facilities.

Environmentalists have said that the failure to protect tree cover in the watershed tributaries of the Mandovi and Tillari rivers have exposed Bicholim and Sattari to flooding during monsoons. Locals have also encroached on the floodplains of the rivers to raise horticultural and agriculture crops. Massive deforestation has been taking place for a quarter of the century in various basins of the Mandovi and Tillari and this has resulted in increasing the sediment load in the river. In the absence of trees the siltation took place and with the surface runoff it carried along the silt and clay, which has deposited in the rivers.

The encroachment carried in the floodplains of the rivers, heavy runoff from mining dumps and stone quarries have worsened the situation. Mining of sand, pebbles and stones have resulted in changing the hydrodynamics of rivers.

In many villages of Sattari and Bicholim, locals have reclaimed land from the floodplains for cultivation. In the remote regions of Sattari taluka slash and burn agriculture also worsened the situation. In the watershed of Madhei in the rivulets of Kotrachi, Ragada, Zarne, velus, Nanoda forest cover has been cleared illegally to carry out cashew plantation. In the watershed of the Tillari, large scale Rubber plantations have been undertaken and this has caused soil erosion leading to rapid siltation and affecting the water storage capacity of the river.

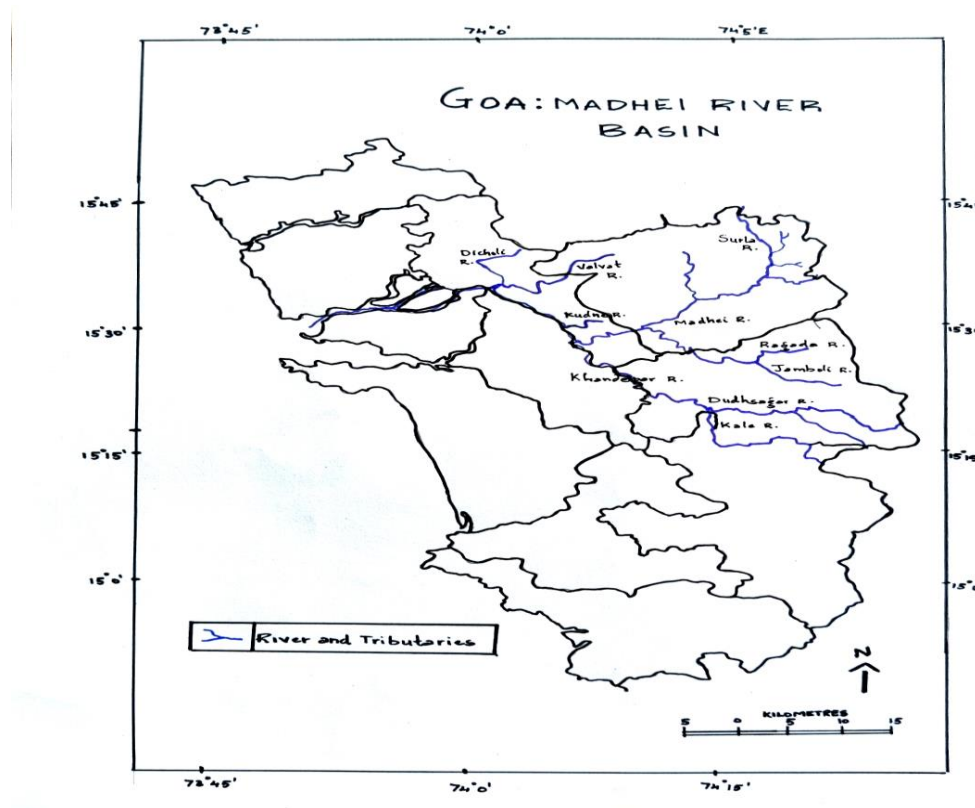


Figure 1.2: Madhei River basin

Source: Map Digitised by Authors

In Viridi in Dodamarg taluka of Maharashtra, across the border, deforestation have been carried out to set up plantations and to accommodate farm houses, leading to soil erosion and siltation in the Valvonti River. Stone quarries in Talekhol and Dodamarg have led to increased siltation of Bicholim River.

The water resource department has undertaken work of anti-flooding embankments without understanding vulnerability and ecology of the rivers. These have increased the erosion. The work of desiltation have been done through unscientific dredging that has been posing threat to the natural vegetation inside the river. During the dredging and desiltation, the species of Sherni plant that protect the riverine course as well as beds have been dredged. Sherni plays an important role of the floods and in enriching freshwater ecosystem says Assavari Kulkarni a Botanist from Honda Sattari.

One of the more significant reasons behind the flooding witnessed in the state in recent years following concentrated spells of heavy showers is the failure of the Water Resource Department (WRD) to desilt the dams. Deforestation taking place in catchment areas of dams in the upstream reaches is leading to siltation of the reservoirs, increasing the occurrence of flooding during monsoons in the state.

Siltation reduces a dam's storage capacity which causes a heavy flow of water to gush downstream during the monsoon. Anjunem in Sattari, Amthane in Bicholim, Selaulim in Sanguem and Tillari in Maharashtra have not been desilted ever since their completion. Other contributing factors are reduced width of rivers and non-maintenance of Bandharas. Due to encroachment, the width of rivers has reduced at many places and such bottlenecks reduce free flow of water. With the overflowing of dams due to excessive rainfall exceeded the level of water which as a result was discharge into the rivers which suddenly increased the water level in low lying areas in the river basins.

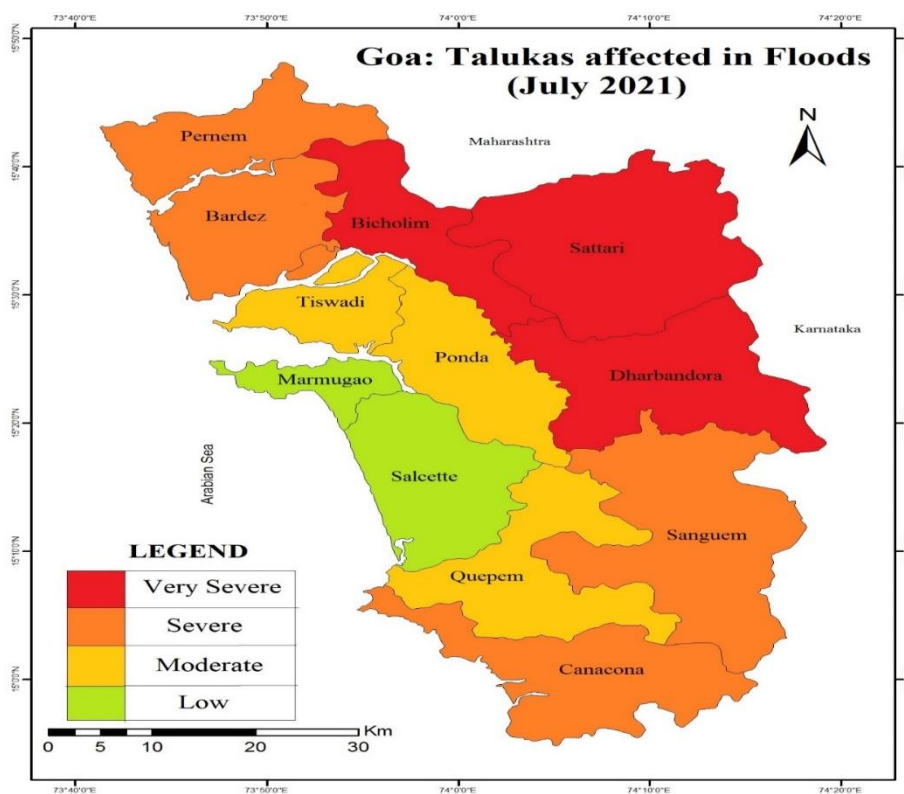
### EFFECTS OF FLOODS

The floods of Goa that occurred on 23<sup>rd</sup> and 24<sup>th</sup> July 2021 is believed to be the worst. The uncertain rainfall had created havoc in Eastern part of Goa which resulted in destruction of not only human beings but also plants and animals. Many houses collapsed, more than one minor bridge was washed and barely the roofs of the houses were visible in most parts of Sattari. Several houses were submerged in the taluka and locals got stuck in their houses and were rescued using ropes by Disaster Management personnel. The bridge at Paikul was washed away, cutting the access of several villagers. Sonal village in Sattari was completely under the water. The traffic movement was disturbed. In order to rescue the people the authorities had to make use of ropes as some of the regions were inaccessible due to complete submergence. Some of the bridges like Savorshe-Khadki, Paroda were submerged. A lot of mud houses were damaged.

**Table 1.2: Talukas affected in the floods (July 2021)**

Talukas affected	People Evacuated	Houses affected
Darbandora	136	135
Sanguem	84	18
Sattari	65	130
Bicholim	40	164
Pernem	9	88
Canacona	7	-
Bardez	9	67

Source: O'HeraldO and TOI, dated: 24 July 2021



**Figure 1.3: Flood affected Talukas of Goa (July 2021)**

Source: Map digitized by Authors

Many areas which were affected had no electricity. Gusty winds and heavy rains lashed several parts of Goa, resulting in uprooting of electric poles and affecting power supply in Goa. Many people claimed that the water entered into their vehicles' engines which sums up the loss of lakhs. Three workers engaged by an electricity department contractors were electrocuted and other one was battling for his life. There was a huge loss of property, the water entered the houses of the people damaging the floor, walls, various valuable items and things were swept away. The incessant rainfall brought down a 25m long retaining wall at Khadpandh Ponda. Wall of 16<sup>th</sup> century Safa Masjid between the tank and the Masjid collapsed.

The floods have left nearly 832 hectares of agricultural area severely damaged and the preliminary losses are pegged at Rs 2.55 crores. Soil erosion is threatening to wash away the top soil, further destroying the fertile land. It is been that hectares of agricultural land has been affected thereby destroying agriculture produce by the locals. Arecanut plantation, paddy fields has been washed away, coconut trees and other important trees are severely affected. Freshly planted paddy seeds were washed out with the soil due to torrential rain. Around 6000 Banana plants and Arecanut plants each were fully submerged in Sattari and its fruit have been washed away. In the floods of Paroda people claimed heavy loss to the agriculture.

It was not just humans who needed rescuing during and after the worst floods to hit the state in 40 years. Animal Rescue Squad (ARS) was kept on its toes with calls to rescue all kinds of animals- snakes to turtles, a mother Civet with her 4 babies. Within 2 days of the flood hitting, its teams had rescued 32 animals, said the animal welfare organisation.

The worst affected were livestock. Almost 150 cattle died due to a sudden rise in water level at a Nanus gaushala. It also altered the habitat and demography of some marine animals. Vaghurme village in Sattari rescued 5 crocodiles. Lack of resources was a big challenge as roads were submerged and the rescue teams didn't have canoes to reach those in need.

Goa Dairy Chairman Durgesh Shirodkar said that the dairy farmers have suffered huge losses to the tune of several lakhs of rupees on account of the recent floods. Farmers also complained of facing shortage of cattle feed post flood as the plant at Usgao shut down its operations for carrying out maintenance work. Due to the flood situation in neighbouring states, the transportation has been affected and the supply of raw materials has stopped as roads are damaged at some places.

## **CONCLUSION**

Environmental degradation is one of the most urgent environmental issues. Depending upon the damage, some environmental problems may never recover. The plants and animals that inhabited these places are lost forever. The primary cause of environmental degradation in India are attributed to the rapid growth of the population in combination with economic development and the overuse of natural resource. Climate change can have a far reaching effect by impacting just about every aspect of human life. Over the years, Goa has been witnessing a change in its weather too. In Goa, there has been a change in the number of rainy days. This coupled with high rates of urbanization, could lead to water logging and flood like situations. The floods have battered the state, the incessant rains filled the houses with water. The houses in many parts of Goa were submerged under water, their property got devastated, agriculture faced heavy losses, and similarly vehicles owned by the locals got damaged. The floods not only affected the human beings it also shattered the life of animals and plants. The mangrove species and other plants in river bank as well as the plants grown in the rivers were severely affected. The animals were widely affected, the cattle's being the worst hit as their rescue wasn't possible due to minimum facilities. The Cyclone Tauktae and the Floods was a lesson for us to understand about environmental degradation and global climate change. We cannot stop such disasters from happening. But we can dramatically reduce their impact. Mitigation measures taken prior to the impact of a disaster to minimize its effects. The appropriate measures has to be taken in order to avoid future devastation. Mitigation measures. Mitigation activities can be achieved with the support from government and other civil society organizations. Hazard mapping, Land use planning, engineered structures, Cyclone shelters, Flood management, Improving vegetation cover, Mangrove plantation, Saline embankments, etc can be done in order to safeguard Goa from upcoming Cyclones so that the impact will be minimal. The desiltation process has to be carried out scientifically so that it doesn't affect the plant species. Government should look upon stabilising the hill slopes. Agricultural activities in the remote regions needs to be checked, as there has been forest exploitation in Sattari Taluka. Envisage Master plans for development and management of water resources for all river basins. The mining dumps for which the siltation process increases has to be checked. Proper planning and cleaning of sewerage, nallas has to be made so that cities don't flood. There is also a need to have a look on Coastal Zone Management Plan.

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**REFERENCES**

- OHeraldO, Dated: 5<sup>th</sup> August 2021, Page No: 1 and 3
- The Times Of India, Dated: 23<sup>rd</sup> July 2021, Page No: 1 and 2
- The Times Of India, Dated: 28<sup>th</sup> July 2021, Page No: 4
- The Times Of India, Dated: 25<sup>th</sup> July 2021, Page No: 1 and 3
- OHeraldO, Dated: 24<sup>th</sup> July 2021, Page No: 1 and 2
- The Times Of India, Dated: 24<sup>th</sup> July 2021, Page No: 3 and 5
- The Times Of India, Dated: 26<sup>th</sup> July 2021, Page No 4
- The Times of India, Dated: 27<sup>th</sup> July 2021 Page No: 4
- The Times Of India, Dated: 19<sup>th</sup> May 2021, Page No: 2
- The Times of India, Dated: 19<sup>th</sup> May 2021, Page No: 1
- The Times of India, Dated: 17<sup>th</sup> May 2021, Page No: 1 and 2
- OHeraldO, Dated: 17<sup>th</sup> May 2021, Page No: 1 and 2
- OHeraldO, Dated: 1<sup>st</sup> November 2020, Page No: 2
- Times of India, Dated: 15<sup>th</sup> May 2021, Page No: 1 and 2
- Times of India, Dated: 16<sup>th</sup> May 2021, Page No: 1 and 2
- OHeraldO, Dated: 16<sup>th</sup> May 2021, Page No: 1 and 5
- OHeraldO, Dated: 17<sup>th</sup> May 2021, Page No: 1
- The Times of India, Dated: 17<sup>th</sup> May 2021, Page No: 2
- The Times of India, Dated: 18<sup>th</sup> May 2021, Page No: 1 and 2
- The Times of India, Dated: 19<sup>th</sup> May 2021, Page No: 4
- The Times of India, Dated: 22<sup>nd</sup> May 2021, Page No: 5

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**GREEN FINANCE**

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**ABSTRACT**

*The COVID-19 pandemic has emerged as a significant, one-of-a-kind element affecting air quality in 2020. Some have dubbed the global lockdowns as the "largest-scale experiment ever" in air quality since the temporary reduction in fossil fuel consumption linked with significant reductions in air pollution. Air quality improved in 65 percent of worldwide cities in 2020 compared to 2019, while 84 percent of countries saw overall improvements. Pollutant concentrations are expected to rebound due to the circumstances of these advances. Hence the need for Green Finance is more now than ever. Green finance is about investing in the companies that promote healthy environment and release less carbon emissions.*

*Keywords: Green finance, Sustainability, Environment, Climate*

**INTRODUCTION**

Green finance refers to any organized financial activity that aims to improve the environment. It consists of a variety of loans, financing instruments, and investments that are used to support the development of green projects or to reduce the climate effect of more conventional initiatives.

The following are some examples of projects that fit within the green financing umbrella:

- energy efficiency and renewable energy
- pollution prevention and management
- biodiversity protection
- circular economy initiatives and
- sustainable use of natural resources and land.

Green finance is on the rise. By 2023, the global green bond market might be valued \$2.36 trillion. Green finance is seen as a solution to address the needs of both environmentalism and capitalism at the same time, but what exactly is it and how does it work?

**IMPORTANCE OF GREEN FINANCING**

Green finance is significant because it encourages and supports the flow of financial instruments and related services toward the creation and implementation of sustainable business models, investments, trade, economic, environmental, and social projects and regulations. The goal by the end of these two sectors is critical because the financial sector plays a major role in driving sustainable economic development while channeling investment to the real economy through its intermediary functions and risk management.

**Objectives of the Study:**

1. To understand what is green financing.
2. To understand the importance of preserving environment.
3. To study how sustainable financing of Industries can protect the environment.

**CONTENT ANALYSIS:**

The goal of green financing is to enhance the amount of money flowing into sustainable development goals from the governmental, private, and non-profit sectors (via banking, microcredit, insurance, and investment). A key aspect of strategy is to effectively manage environmental and social risks, seize opportunities that provide a good return while also benefiting the environment, and increase accountability.

Through its regular reports and other communications, the Reserve Bank educates the public, investors, and banks about the importance, opportunities, and challenges of green finance. For example, the Reserve Bank of India has underlined the findings of the G20 Green Finance Study Group (GFSG14) in its Annual Report (2015-16) on the need for the establishment of local green bond markets and the facilitation of cross-border green bond trading. knowledge sharing on environmental risks, and improving overall green finance activities. The annual report also discusses the broader concerns surrounding green financing that need to be addressed in the future. Definitions of green activities, elements of intellectual property rights in development, and technology transfer from developed countries are among them.



Jayathilake, Sajeewani (2019) The term sustainability does not only refer to environmental sustainability; green finance is a new concept in the financial industry that combines environmental and economic sustainability. Environmental damage caused by economic activities has become a worldwide problem. Many issues, such as increased carbon emissions, global warming, acid rain, and other negative environmental effects, were recognized. The banking industry, as the economic sector's backbone, can make a significant contribution to sustainability. As a result, the research was conducted primarily to gain a thorough understanding of the concept of green finance and its application to the banking industry.

Dorry, S., & Schulz, C. (2018) Its goal is to find existing and potential (but undiscovered) ties between the banking industry and local firms who want to pursue more sustainable economic practices While proponents of Luxembourg's rising green finance image acknowledge that it has a good impact on the small country's national branding when combined with economic stimulation, critics point to pure "green washing" effects. Author state that Microfinance is relevant example of green finance development. This conversation alluded to the larger issue we discussed at the outset, namely the debate over what constitutes "green financing."

Wang, Y., & Zhi, Q. (2016) Green Finance is new financial innovation to protect the environment and utilizations of the resources to the maximum extent. Author wants to state solutions that can be proposed by revealing the point of conflict among environmental protection and green finance. Green finance will help in funds low and achieve effective management of environmental risk and optimal allocation of environmental resources and social resources. The information asymmetry phenomenon will be avoided, and the moral hazard problem will be solved, if regulations are properly regulated.

This paper presents an overview of green banking as an emerging area for private sector banks to gain competitive advantages and new business prospects while also expanding central banks' and supervisors' mandates to protect the financial system and manage individual financial institution risks. Climate change is predicted to increase, and it is no longer regarded solely as a threat to the environment because it affects all economic sectors. Furthermore, climate-related concerns for the financial sector pose physical and transitional dangers. To counteract the negative effects, central banks, supervisors, and policymakers have begun to implement a variety of green banking programs, however the approaches used thus far range slightly across industrialized and developing countries.

Sustainable financing gained traction in 2020, and authorities across Asia have increased their efforts to support the growth of green finance for a more sustainable future. In comparison to 2019, fund flows into ESG investments in Asia and around the world increased dramatically in 2020.

In 2020, yearly sales of sustainable finance bonds reached an all-time high of \$544.3 billion, while assets under management for ESG funds in Asia surpassed \$60 billion in One of the world's largest corporations and the world's wealthiest investors are pooling trillions of dollars to fund a transition away from fossil fuels.

There is a plethora of early to mid-stage firms with an emphasis on sustainability. All of these are important examples of large-scale green finance.

Many of the projects that have received the greatest funding are focused on clean energy and renewables. Consider electric vehicles, charging stations, battery upgrades, solar and wind power, and so on.

Advancements in water purification, desalination, and ocean cleanup are other important sectors. Interesting ideas like improved agriculture and minimizing overall dependency on irrigation are also included.

The majority of green financing is tied to a person's home or automobile. There are numerous online loans accessible the same day for items such as energy efficient appliances or autos.

Corporates recognize the critical need of becoming more sustainable, both in terms of unlocking growth and gaining a strategic advantage. According to a recent Arthur D. Little Prism article, meeting this sustainability problem requires three main blocks: technology, scale-up capabilities, and money, all of which must work together to get the flywheel spinning. government subsidies and sophisticated subsidies. Traditional and novel green finance strategies are available for both green asset financing and technology development. Corporates can benefit from strategies developed in the field of sustainable financing to help clean technologies scale up. This Viewpoint delves into the world of green financing and how to choose the best choice for your needs.

Recognizing the importance of involving the financial sector in the transition to green economies, GIZ Financial Systems Development has recently launched new advisory services for policymakers and financial intermediaries, as well as specific products and instruments to help pave the way for green growth and appropriate climate change adaptation. The development of weather and agricultural insurance solutions, as well

as the promotion of green financial sector regulation, the building of capacities in financial institutions, and the introduction of innovative financing concepts to increase the flow of funds into green investments, are among the current activities.

### CONCLUSION:

Green finance is the only way where we can achieve a balance between economy and environment. Green finance is the motivation that is required for preserving the ozone layer by reducing the contamination of carbon emissions. Green Funds should be increased across all the sectors to make sure that the environment is preserved. Many people are unaware of the green financing concept hence mass promotion and marketing of green financing should be done. Exploration of challenges and potential solutions for them should be suggested for implementing this successfully.

### REFERENCES

1. Green financing of corporate breakthroughs. (2021, July 29). Arthur D Little. <https://www.adlittle.com/en/insights/viewpoints/green-financing-corporate-breakthroughs>
2. Madera, S. (2021, June 17). *Future of green finance in Asia*. @business line. <https://www.thehindubusinessline.com/opinion/future-of-green-finance-in-asia/article34843364.ece>
3. What is green finance and why is it important? (2020, November 9). World Economic Forum. <https://www.weforum.org/agenda/2020/11/what-is-green-finance/>
4. Wikipedia contributors. (2021, July 31). *Green economy*. Wikipedia. [https://en.wikipedia.org/wiki/Green\\_economy](https://en.wikipedia.org/wiki/Green_economy)
5. Zafar, S. (2021, July 22). *Green Financing as a Tool for Sustainable Development*. Bioenergy Consult. <https://www.bioenergyconsult.com/green-financing/>
6. Wang, Y., & Zhi, Q. (2016). The Role of Green Finance in Environmental Protection: Two Aspects of Market Mechanism and Policies. *Energy Procedia*, 104, 311–316. <https://doi.org/10.1016/j.egypro.2016.12.053>
7. Dörry, S., & Schulz, C. (2018). Green financing, interrupted. Potential directions for sustainable finance in Luxembourg. *Local Environment*, 23(7), 717–733. <https://doi.org/10.1080/13549839.2018.1428792>
8. Jayathilake, Sajeewani, Impact of Green Financing for the Corporate Governance in the Banking Industry (November 30, 2019). OIDA International Journal of Sustainable Development, Vol. 12, No. 11, pp. 23-30, 2019

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**GROWTH RATE OF CSR SPENDING ON SELECTED NAVARATNA CENTRAL PUBLIC SECTOR COMPANIES IN INDIA**

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**<sup>1</sup>M. Mala and <sup>2</sup>Dr. SP. Mathiraj**<sup>1</sup>Ph.D Scholar and <sup>2</sup>Professor, Department of Corporate Secretaryship, Alagappa University, Karaikudi**ABSTRACT**

*The Companies Act, 1956 is replaced with the companies Act, 2013 and CSR has been made mandatory for a specific class of companies. Corporate Social Responsibility is that the continuing commitment by business to behave ethically and contribute to economic development while improving the standard of lifetime of the local people at large. Companies take resources within the sort of raw materials, human resources etc. from the society. By performing the task of CSR activities, the businesses are giving something back to the society. This study is predicted on the secondary data. During this paper deals with the expansion rate of CSR spending on selected Navaratna Central Public Sector Companies in India from 2014 to 2020.*

*Key words: CSR, Navaratna Central Public Sector Companies, CSR spending, CSR Activities*

**INTRODUCTION**

India has become the first country in the world to make it mandatory from April 2014 for companies with a net worth of over Rs 500 crore or turnover of over Rs 1,000 crore or net profit in excess of Rs 5 crore to allocate at least 2% of the average net profits of the company made during the 3 immediately preceding financial years to Corporate Social Responsibilities (CSR). The Companies Act, 2013. Sec 135 of the Act deals with CSR. Every such company shall constitute a Corporate Social Responsibility Committee of the Board consisting of three or more directors, out of which at least one director shall be an independent director. The Corporate Social Responsibility Committee shall formulate and recommend Corporate Social Responsibility Policy which shall indicate the activities to be undertaken by the company as specified in Schedule VII; recommend the amount of expenditure to be incurred on CSR activities and monitor the Corporate Social Responsibility Policy of the company from time to time. Central Public Sector Enterprises (CPSEs) are those companies in which the direct holding of the Central Government or other CPSEs is 51% or more. The Government of India categorizes Central Public Sector Companies under three different categories – Maharatna, Navaratna, and Miniratna.

**NAVARATNA COMPANIES**

Navaratna companies could invest up to Rs 1,000 crore without explicit government approval. Up to Rs.1,000 crore or 15% of their net worth on a single project or 30% of their net worth in the whole year (not exceeding Rs. 1,000 crores). There are 14 Central Public Sector Companies which have been categorized as Navaratna Companies based on criteria put out by the Government of India. But, this study focusing on only selected ten Navaratna Central Public Sector Companies in India.

**REVIEW OF LITERATURE**

**Garg et al; (2020).** This study based on the instrumental approach of the stakeholder theory, examines the firm performance of public and private sector firms in the mandatory corporate social responsibility (CSR) expenditure regime in India. CSR was legislated in India in the year 2014. The study hypothesizes that firms which fulfill the mandatory CSR expenditure requirement will have a higher firm performance and uses one-way ANOVA and post-hoc test for analysis. Firm performance is examined with respect to firm value and market performance. The instrumental approach of the stakeholder theory is not supported in the mandatory CSR expenditure regime in India. The public sector firms that comply with the mandatory CSR expenditure requirement have a lower firm performance. Further, the private sector firms that meet the mandatory CSR expenditure criterion do not have a significantly different firm performance than the private sector firms that do not fulfill this criterion. The study indicates as to why some firms fail to meet the CSR expenditure compliance. It also gives suggestions on how regulators and government agencies can solicit the participation of the Indian firms to undertake CSR initiatives. The study further suggests how firms may reap maximum benefit from the CSR expenditure. Since CSR expenditure has been made mandatory only in the year 2014 in India, hardly any study has examined firm performance in the mandatory CSR expenditure regime in India.

**Gupta and Arora (2014).** Executed by Public Sector Enterprises in India with considering 5 Maharatna companies and 2 Navaratna companies for the study and concluded that more or less all Maharatna and Navaratna companies do same type of CSR practices and they are doing a very good job regarding CSR. They recommended that collective effort of Government and private players surly achieve the desire level of CSR activities in companies for the better improvement of society.

**STATEMENT OF THE PROBLEM**

Most of them were already performing CSR activities before the Companies Act, 2013, made CSR expenditure mandatory for companies which are less affected as CSR activities were already actively spending but due to compulsion of the provisions it does raise the expenditure for CSR activities of some public sector undertakings. This study will help us understand the factors that motivated many companies to undertake CSR activities voluntarily before the legislation was enacted and changes within the spending pattern of those companies with the introduction of the law. Most of them were already performing CSR activities before the companies Act, 2013, made CSR expenditure mandatory for companies which are less affected as CSR activities were already actively spending but due to compulsion of the provisions it does raise the expenditure for CSR activities of some public sector undertakings. This study will help us understand the factors that motivated many companies to undertake CSR activities voluntarily before the legislation was enacted and changes within the spending pattern of those companies with the introduction of the law.

**OBJECTIVE OF THE STUDY**

➤ To examine CSR spending on selected Navaratna Central Public Sector Companies in India.

**RESEARCH METHODOLOGY**

To examine the objectives, ten Navaratna Central Public Sector Companies have been selected. The study based on secondary data which collected from annual reports of companies, national CSR data portal, various websites and other published documents. The study has taken into six years from 2014-15 to 2019-20. The ten Navaratna Central Public Sector companies for the purpose of the study are following:

1. Bharat Electronics Limited
2. Container Corporation of India Limited
3. Engineers India Limited
4. National Aluminium Company Limited
5. National Buildings Construction Corporation Limited
6. Neyveli Lignite Corporation Limited
7. National Mineral Development Corporation
8. Oil India Limited
9. Power Finance Corporation Limited
10. The Shipping Corporation of India Limited

**DATA ANALYSIS**

This section deals with the CSR spending in India (year-wise) and growth rate in CSR Spending on Selected Navaratna Central Public Sector Companies in Tamil Nadu from 2014-15 to 2019-20.

**TABLE 1 GROWTH RATE OF CSR SPENDING IN INDIA**

Year	India (Rs. in Cr)	Growth Rate (%)
2014-15	10065.93	-
2015-16	14517.21	30.66
2016-17	14344.40	-1.20
2017-18	17079.25	16.01
2018-19	20302.33	15.88
2019-20	24062.75	15.63
Total	<b>100371.87</b>	

**Source:** Ministry of Corporate Affairs, Government of India

From the table 1 it can be interpreted that CSR spending in India is increasing considerably in every year except in 2016-17 it is decrease by 1.20%. The growth rate is 30.66% in India of the financial year 2015-16.

**TABLE 2 GROWTH RATE OF CSR SPENDING IN TAMIL NADU**

Year	Tamil Nadu (Rs. in Cr)	Growth Rate (%)
2014-15	539.63	-

2015-16	633.23	14.78
2016-17	550.93	-14.94
2017-18	627.75	12.24
2018-19	829.27	24.30
2019-20	969.33	14.45
	<b>4150.14</b>	

**Source:** Ministry of Corporate Affairs, Government of India

From the table 1 it can be interpreted that CSR spending in Tamil Nadu is increasing considerably in every year except in 2016-17 it is decrease by 14.94%.The growth rate is 24.30% in India of the financial year 2018-19.

**TABLE 3 GROWTH RATE OF CSR SPENDING ON NAVARATNA CENTRAL PUBLIC SECTOR COMPANIES IN INDIA**

Company Name	2014-15		2015-16		2016-17		2017-18		2018-19		2019-20	
	CSR Spent	Growth Rate (%)	CSR Spent	Growth Rate (%)	CSR Spent	Growth Rate (%)	CSR Spent	Growth Rate (%)	CSR Spent	Growth Rate (%)	CSR Spent	Growth Rate (%)
BEL	23.04	-	25.69	10.32	29.86	13.97	15.73	-89.83	22.48	30.03	29.12	22.80
CONCOR	24.9	-	30.96	19.57	24.45	-26.63	16.21	-50.83	13.51	-19.99	22.89	40.98
EIL	16.61	-	13.63	-21.86	10.99	-24.02	14.74	25.44	10.04	-46.81	11.28	10.99
NACL	19.1	-	27.17	29.70	30.03	9.52	29.01	-3.52	30.35	4.42	39.71	23.57
NBCC	4.35	-	6.84	36.40	7.74	11.63	8.96	13.62	9.79	8.48	5.75	-70.26
NLC	41.6	-	81.93	49.22	37.18	-120.36	43.58	14.69	49.46	11.89	75.66	34.63
NMDC	188.65	-	193.28	2.40	174.18	-10.97	169.37	-2.84	167.24	-1.27	199.99	16.38
OIL	133.31	-	92.21	-44.57	108.37	14.91	100.58	-7.75	133.39	24.60	125.41	-6.36
PFC	51.68	-	195.52	73.57	268.31	27.13	118.18	-127.04	100.5	-17.59	97.15	-3.45
SCI	0	-	4.02	-	3.19	-26.02	1.7	-87.65	2.03	16.26	1.04	95.19

**Source:** Ministry of Corporate Affairs, Government of India

It can be interpreted that CSR spending in BEL is increasing considerably in every year except, in 2017-18 it is decrease 89.83%. The growth rate is 30.03% in BEL of the financial year 2018-19. Container Corporation of India Limited (CONCOR) CSR spending is increasing considerably in every year except, it is decrease by 26.63% in 2016-17, 50.83% in 2017-18 and 19.99% in 2018-19. The growth rate is 40.98% in CONCOR of the financial year 2019-20. Engineers India Limited (EIL) CSR spending is increasing considerably in every year except, it is decrease by 21.86% in 2015-16, 24.02% in 2016-17 and 46.81% in 2018-19. The growth rate is 25.44% in EIL of the financial year 2017-18. National Aluminium Company Limited (NACL) CSR spending is increasing considerably in every year except, in 2017-18 it is decrease by 3.52%. The growth rate is 29.70% in NACL of the financial year 2015-16. National Buildings Construction Corporation Limited (NBCC), CSR spending is increasing considerably in every year except, in 2019-20 it is decrease by 70.26%. The growth rate is 36.40% in NBCC of the financial year 2015-16. Neyveli Lignite Corporation Limited (NLC) CSR spending is increasing considerably in every year except, in 2016-17 it is decrease by 120.36%. The growth rate is 49.22% in NBCC of the financial year 2015-16. National Mineral Development Corporation (NMDC), CSR spending is increasing considerably in every year except, it is decrease by 10.97% in 2016-17, 2.84% in 2017-18 and 1.27% in 2018-19. The growth rate is 16.38% in NMDC of the financial year 2019-20. Oil India Limited (OIL) CSR spending is increasing considerably in every year except, it is decrease by 44.57% in 2015-16, 7.75% in 2017-18 and 6.36% in 2019-20. The growth rate is 24.60% in OIL of the financial year 2018-19. Power Finance

Corporation Limited (PFC) CSR spending is increasing considerably in every year except, it is decrease by 127.04% in 2017-18, 17.59% in 2018-19 and 3.45% in 2019-20. The growth rate is 73.57% in PFC of the financial year 2015-16. The Shipping Corporation of India Limited (SCI) CSR spending is increasing considerably in every year except, it is decrease by 26.02% in 2016-17, 87.65% in 2017-18 and 95.19% in 2019-20. The growth rate is 100% in PFC of the financial year 2015-16.

### **CONCLUSION**

This study shows that growth rate in CSR Spending on Selected Navaratna Central Public Sector Companies in Tamil Nadu is increasing considerably in every year except in 2016-17. Among all the selected Navaratna Central Public Sector Companies in India has fluctuating growth rate from 2014-15 to 2019-20 except National Aluminium Company Limited (NALCO) has constant increase in CSR spending but slightly decrease in 2017-18.

### **REFERENCES**

1. Arevalo, J. A., & Aravind, D. (2015). Corporate Social Responsibility practices in India: Approach, Drivers and barriers. *Corporate Governance: The International Journal of Business in Society*, 11(4), 399-414. Retrieved August 14, 2018, from <https://www.emeraldinsight.com/doi/abs/10.1108/14720701111159244>.
2. Gupta, K. L., & Arora, R. (2014). Corporate social responsibility in public sector Companies in India. (pp. 1-21). Ahmadabad: Post Graduate Research Centre for Governance System, GTU. Retrieved August 12, 2018, from [http://www.academia.edu/6138096/Corporate\\_Social\\_Responsibility\\_in\\_Public\\_Sector\\_Companies\\_in\\_India](http://www.academia.edu/6138096/Corporate_Social_Responsibility_in_Public_Sector_Companies_in_India).
3. <https://byjus.com/free-ias-prep/list-of-navratna-companies-in-india/>
4. <https://www.bel-india.in/ContentPage.aspx?Mid=17&CId=427&LId=1&link=427>
5. [https://concorindia.co.in/annual\\_report.aspx](https://concorindia.co.in/annual_report.aspx)
6. [https://engineersindia.com/storage/2020/09/EIL\\_Annual\\_Report\\_2019-20\\_Shareholder\\_Eng.pdf](https://engineersindia.com/storage/2020/09/EIL_Annual_Report_2019-20_Shareholder_Eng.pdf)
7. <https://nbccindia.com/webEnglish/annualReport>
8. <https://www.nmdc.co.in/>
9. <https://www.pfcindia.com/Home/Vs/72>
10. <https://www.shipindia.com/investors/quarterlyresults/2>
11. <https://www.oil-india.com/>
12. <https://nalcoindia.com/>
13. <https://www.nlcindia.in/>
14. <https://www.csr.gov.in/>

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**IDENTIFICATION OF URBAN PROBLEMS AND SUSTAINABILITY ISSUES IN SMALL VILLAGE OF DUNGRI: A CASE OF MANALI**

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**ABSTRACT**

*Urban form is defined in terms of many urban pattern aspects like compactness, density, sustainable transport systems, diversity all when interwoven into spatial form defined by set of landmarks, edges, paths, nodes, boundaries etc. give recognition to that space. It also establishes the identity of the urban space which can be further gauged on parameters of sustainable development. Today hill towns have seen huge influx of population both permanent and floating. Tourist flock these areas and in order to cash on their recreation many support services which may be temporary sprung up in the area. However, this creates issues like stressed infrastructure facilities, breakdown of ancillary facilities like huge traffic jams on narrow hilly roads, casualties owing to landslide due to haphazard development irrespective of basic slope and topography of the area. A case of Dungri Village of tourist hill town Manali is similar in this context whereby famous Hadimba Mata temple is located and attracts thousands of tourist coming to Manali. Hadimba Mata temple is well known for its centuries old wooden architectural styled layout, relief features and ornamentation. Due to this, it receives large number of tourists especially in peak tourist seasons. This has led to propping of many urban issues creating problems in daily life of the inhabitants Present study aims to study such issues through survey and documents and provides practical solutions for such problems. Adoption of these proposals would enhance the sustainable aspect of the urban pattern that are degrading in present context.*

*Keywords: Sustainability, Dungri village, infrastructure, urban issues*

**1) INTRODUCTION**

Complex relationships exist between urban patterns and different aspects of urban environmental quality and sustainable performance [1]. Urban patterns largely govern and dictate the manner in which a region or a city develops [2]. Continuous monitoring of these spatial urban patterns is very important since they define development and also help to gauge physical, social and economic health of the region or the city [3-4]. Urban elements like nodes, landmarks, edges and boundaries, community spaces, open spaces, materials used and built masses all play a very vital role in determining the overall urbanscape of the city or the region[5]. It also lends an image to the area which further facilitates its growth[6,7]. For example node and landmarks of hilly town would add to the calm and majestically beautiful image of these town which further propagates tourism facility and improves economic scenario of the area. Dungri village; a small hamlet in hilly town of Manali, Himachal Pradesh is known for its age old Hadimba Mata Temple which has legacy of wooden architectural style with beautiful carvings and sculptures of wild animals[8]. Owing to such immense popularity of Hadimba Mata temple, the hamlet has become one of the prominent tourist locations for the tourists coming to Manali. It has created many new supporting facilities and services, many of which are not approved by town planning or regulatory authorities. Mushrooming of such ancillary services has led to stressing up of infrastructure facilities of the area. Present study is an attempt to study these existing conditions, implications, and finding probable solutions for them. The study has been done through extensive visual and physical pilot surveys in order to collect data, photographs and opinion of stakeholders – both inhabitants and tourists in addition to spatial measurements and data collected from town planning authorities like development plan[8].

**2) DUNGRI VILLAGE: RESEARCH OF URBAN PATTERNS**

Existing urban patterns and architectural interventions in the form of built masses and open spaces were studied with the help of surveys and data collected from town planning authorities. Urban spaces were studied in terms of existing urban character and its imaginability in addition to presence of infrastructure facilities. The urban character is defined in terms of urban nodes, public and community space network, materials used for built masses. The infrastructure facilities are broadly categorized under: 1) Social infrastructure, 2) Physical infrastructure, and 3) Economic infrastructure. Landuse map of the area under study of Dungri village is given in Figure 1.



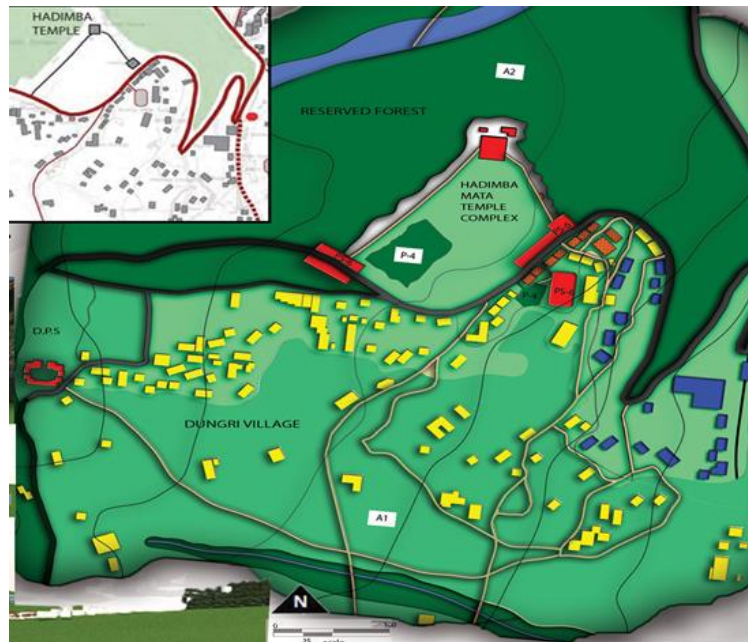


Fig. 1. Existing landuse pattern (reproduced from primary survey and development plan)

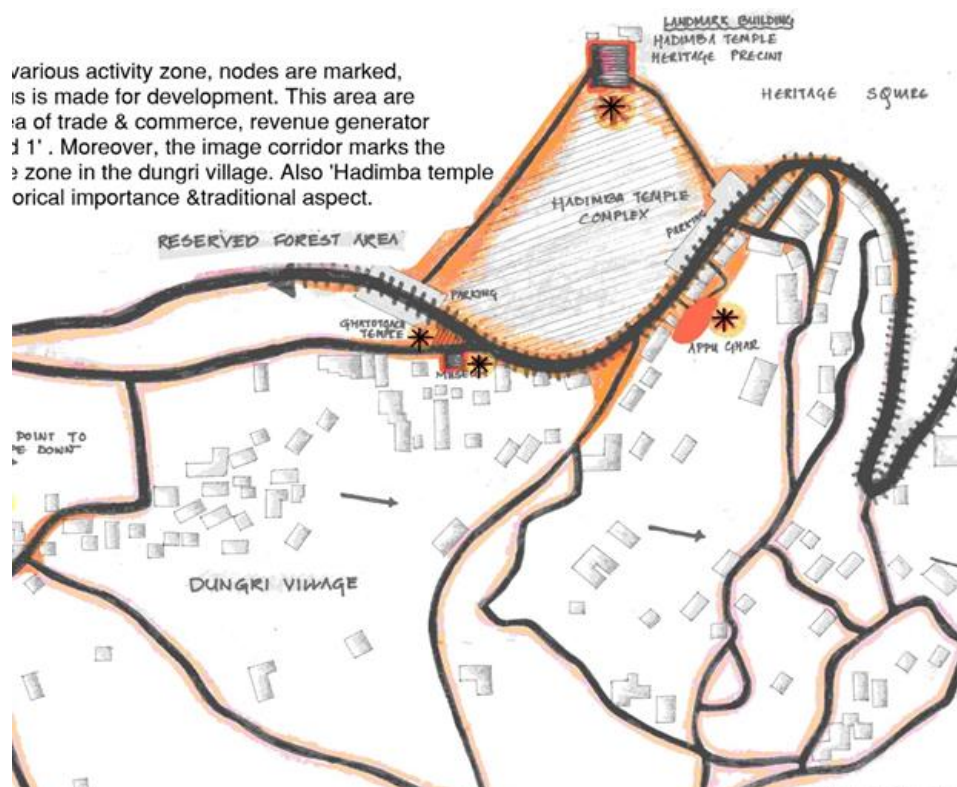
Legend:



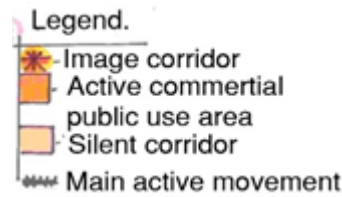
Source: By author (compiled from survey and D.P)

## 2.1 Urban character and image

The survey showed that the area has great historical importance which gives local dwellers a very good opportunity to provide temporary tourism facilities like small informal shops, eating joints, etc. This attracts more visitors to the area especially in case of annual fairs that are organized in Hadimba Devi temple complex. Activity generation pattern of Hadimba Mata complex and Dungri village is given in figure 2.







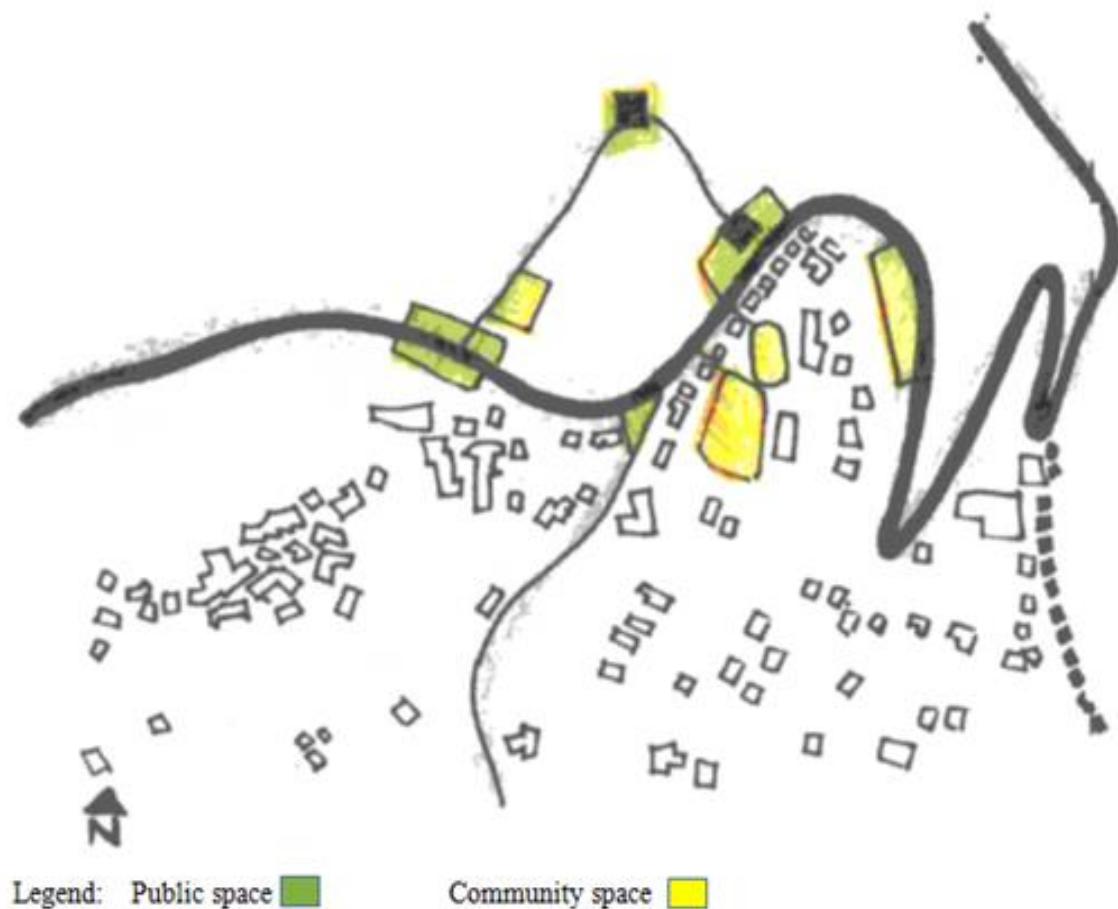
**Fig.2. Urban aspects of Hadimba temple complex and Dungri village**

**Source: By author (compiled from survey and D.P)**

In Figure2 various activity zones are clearly visible. Major node which forms the main focus areas also attracts much of informal development. This area is service area for trade and commerce, revenue generator in Ward 1. The image corridor marks the most active zone in the Dungri village. Also Hadima Mata temple complex has traditional and cultural aspects which further gets high lightened during festivals related with the temple and celebrated within the complex itself. As is evident from the figure that the area has silent zone activity area. The urban spatial patterns related with development are bound to increase due to activity generators and this influences whole urbanscape of the area.

## 2.2 Public and community space network

Elements of imageability were studied through developed civic nodes, orientation maker and character zones which imparts a distinctive urban character, memorable identity and positive association with Manali town and its environment connection to its citizens and visitors. This led to identification of 'image corridor' based on hierarchy of movement and activity as discussed earlier in figure 2 which plays an essential role to promote stronger imageability across the urbanscape.

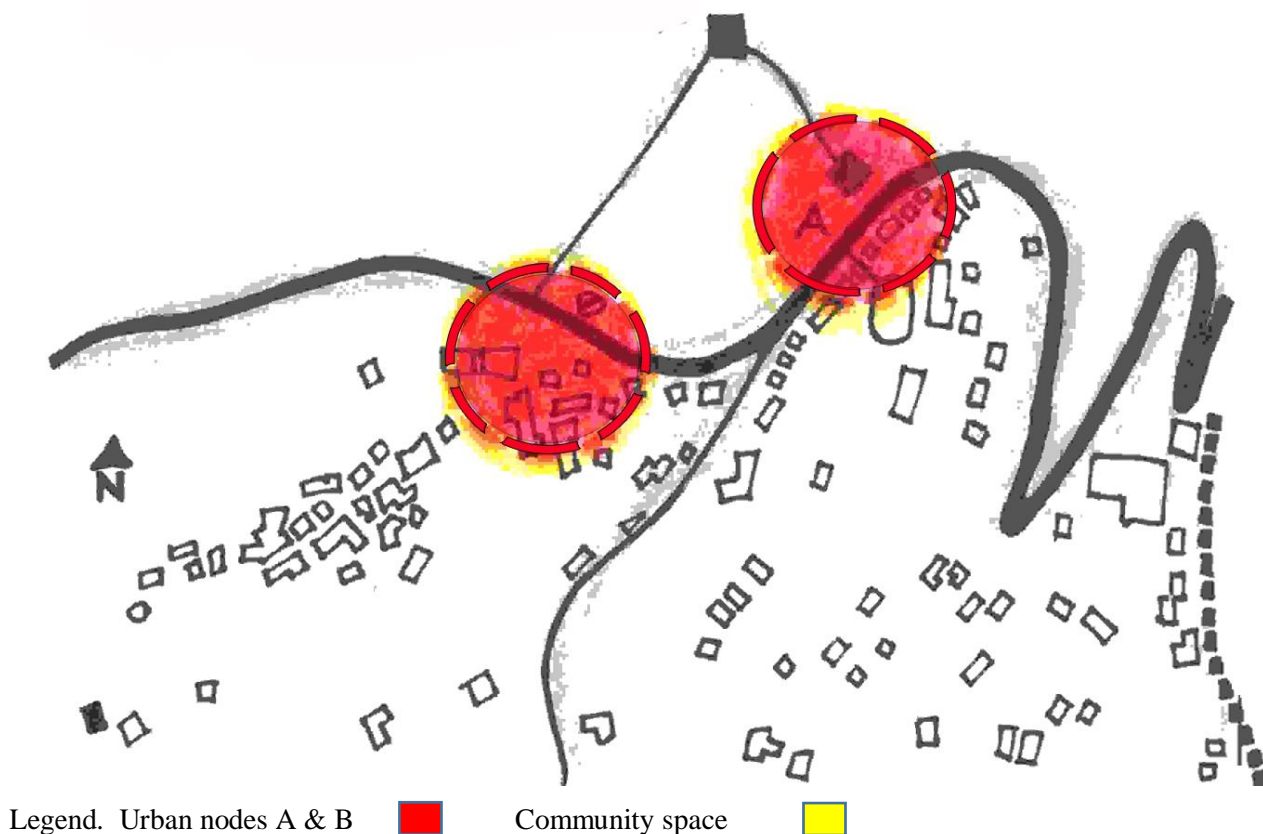


**Fig. 3 Different public and community spaces in study area**

**Source: By author (compiled from survey and D.P)**

## 2.3 Urban Node

Nodes are basic urban design aspect that lends character and image to an area. Survey of the study led to identification of nodal points which also act as activity generator in the area.



**Fig. 3 Different public and community spaces in study area**

**Source:** By author (compiled from survey and D.P)

In Figure 3, it is clearly evident that there are two nodes A & B in which node A is highly active than B for tourism & commerce activities. Here it is important to mention that Node A is more close to temple than Node B which implies that commerce activities and facilities are more closely located near temple and are more easily accessible to the visitors than activities at Node B.

#### 2.4 Materials used

Materials provide a very important identity to the structures and area. Survey of the area shows usage of different types of materials that includes modern materials like bricks, R.C.C and old traditional materials like stone, slates and wood etc. The newly constructed buildings have partial slanted roof. Generally most of the urban development in this area is along the main road.

### 3. RESULTS AND DISCUSSION

#### 3.1 Social infrastructure

It refers to provision of facilities required for social welfare of people like health, education, housing, community spaces, courts, tourism facilities etc.

**Health:** it is defined in terms of hospitals, clinics, medicine shops, and dispensary. At present there is no hospital, no clinic, lack of medicines is there, not well equipped laboratories for testing.

#### Education

**Education:** it is defined in terms of presence of College, Secondary school, Primary school. At present there is only one primary school in the area with no college or secondary school. Only school present here has access problem.

**Housing:** it is defined in terms of slums, residences, migration. As per development plan, nearly 3% of built masses come under category of slums with dilapidated living conditions of slum like areas. In case of residences, nearly 65% of houses are G+1, 25% of houses are G+2, and 10% are

G (G: Ground floor). Old houses are wooden houses with lack of modern facilities and new houses are 4-5 stories high with 28.75% of people framing outsiders and 71.25 % local people. Settlement pattern shows that nearly 32% of village population moved along road and therefore lot of settlement are there near road.

However, there is lack of appropriate sewerage facilities, temporary facilities have been created, new construction techniques have been used but bye laws have not been followed, there are parking problem. With population increase and growing need of accommodating them no open space has been left for constructing buildings and as such there are also no traditional houses.

**Community spaces and facilities:** it is defined as water treatment, waste management, public toilets. At present there is no water treatment plan, no dustbins are there as far as waste management is concerned and in case of provisions of public toilets, lack of management is there.

**Court panchayat Committee:** presently the function is served by main town Panchayat located in main village. However, there are problems in decision making to solve problems associated.

### 3.2 Physical infrastructure

It refers to provision of facilities of road, parking, water supply, electricity and telephone network, traffic and transportation, sewerage and drainage connections, solid waste disposal.

**Road:** It is defined in terms of main road, connecting roads, pathways. Main Road is 5-6 meters wide which is insufficient road width and even the surface is not properly metalled. It can be improved by increasing the road width. Connecting road is only 4 meter wide with accident prone turns with uneven width. It can be improved by provision of footpath along the road. Pathways are 2 meter wide which are basically narrow and unmetalled. In this context new pedestrians and metaling of pedestrians is required.

**Water supply:** It is defined in terms of private water supply which at present is 31% and public water supply which is 65%. However, there is no water supply in few areas like slums. This can be improved by provision of new water supply line for slums.

**Electricity and Telephone Network:** It is defined in terms of electricity connections, telephone network, and street lights. At present both provision of electricity supply and telephone network is 100%. However, there are no street lights in main active nodes. The situation can be improved by providing street lights along the road & in high activity area.

**Traffic and Transportation:** It is defined in terms of goods traffic, passenger traffic, movement and quantum of public & private buses, light motor vehicles. At present there is 20% goods traffic, 55% passenger traffic, 15% public & private buses traffic, 10% light motor vehicles traffic. This leads to congestion during peak season and hours. This can be improved by increase in parking facilities, increase in road width and creation of new road to divert the traffic.

**Sewerage and Drainage Connections:** It is defined in terms of provision of sewerage facility which is 10% only and provision of drainage facility which is at present is 30%. At present there are problems like no proper sewerage connection, open drains, lack of drainage. At many places people have built their own septic tanks. The situation can be improved by redevelopment of drainage line and providing sewerage connection for slums.

**Solid Waste Disposal:** It is defined in terms of provisions of solid waste disposal facilities and dustbins. At present no proper waste disposal methods are there, no facilities are there for solid waste treatment. This has led to unhygienic places. For this proper disposal system has to be devised and dustbins be provided in high activity areas.

### 3.3 Economical Infrastructure

It is defined in terms of trade & commerce, finance and business.

**Trade & Commerce:** It is defined in terms of seasonal shops, retail shops, wholesale market and hawkers. At present in case of seasonal shops no setback are there from road, in case of retail shops there is no quality check, in case of wholesale activity there is no proper area for shopping and hawkers occupy parking area. This can be improved by redevelopment of shops, facade treatment, and new shopping area development.

**Finance:** it is defined in terms of banks and ATM's. At present there are no bank and existing ATM's have access problems. In order to improve the condition there is proposal of ATM in tourist area.

**Business:** it is defined in terms of hotels and eating joints (restaurants). At present in case of hotels there are problems of parking, in case of eating joints there are problems of sewerage problems, congested area and less open space, this can be improved by providing more open spaces.

#### **4. CONCLUSIONS**

Different aspects of urban design were studied with the help of survey and the elements which define the image of the area were identified. Present urban pattern scenario revealed existence of certain problems in infrastructure which also threatens imaginability of the area. Proposals in context with associated problems in different infrastructure facilities have been formulated in the study which would frame guideline for the concerned development authorities of the area.

- Social infrastructure in terms of health, education, housing, community spaces and facilities and functioning of court panchayat committee requires reconsideration in line with given proposal for improvement.
- Physical infrastructure in terms of road, water supply, electricity and telephone network, traffic and transportation, sewerage and drainage connections and solid waste disposal requires reconsideration in line with given proposal for improvement.
- Economic infrastructure in terms of trade & commerce, finance and business needs to be improved in line with given proposals.

#### **REFERENCES:**

1. Alberti, A. 1999. Modeling the urban ecosystem. A conceptual framework. *Environment and Planning B* 26:605-630.
2. Alberti, M. 1996. Measuring urban sustainability. *Environmental Impact Assessment Review* 16(4-6):381-424.
3. Anderson, W.P., P.S. Kanaroglou, and E.J. Miller. 1996. Urban form, energy and the environment: A review of issues, evidence and policy. *Urban Studies* 33(1):7-35.
4. Beatley, T. 1995. Planning and sustainability: The elements of a new (improved?) paradigm. *Journal of Planning Literature* 9(4):383-395.
5. Douglas, I. 1983. *The Urban Environment*. Baltimore, Md: Edward Arnold.
6. Hemmens, G. 1967. Experiments in urban form and structure. *Highway Research Record* 207:32-41
7. Edwards, J.L. and J.L. Schofer. 1975. Relationships between transportation energy consumption and urban structure: Results of simulation studies. Minneapolis, Minn.: Department of Civil and Mineral Engineering.
8. Development Plan, Hamirpur, Accessed at [http://tcp.hp.gov.in/Application/uploadDocuments/devlopmentPlan/PlanDoc020150127\\_174424.pdf](http://tcp.hp.gov.in/Application/uploadDocuments/devlopmentPlan/PlanDoc020150127_174424.pdf) on 26th Sept. 2017.
9. Shalini Singh, Destination development dilemma—Case of Manali in Himachal Himalaya, *Tourism Management*, Volume 29, Issue 6, 2008, Pages 1152-1156.
10. Vandna Sharma, Identification of Urban Design Issues in the Town of Manali, *Journal of Civil Engineering and Environmental Technology*, Volume 5, Issue 1; January-March, 2018, pp. 38-40
11. Vandna Sharma, Aniket Sharma, Sustainable Solutions for Urban Problems of Manali - A Case of Aleo Village, *Journal of Basic and Applied Engineering Research*, p-ISSN: 2350-0077; e-ISSN: 2350-0255; Volume 5, Issue 2; January-March, 2018, pp. 71-73

**IGNITE THE SPIRIT OF NATIONALISM -NEED OF THE HOUR****Dr. E. Girani**

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**ABSTRACT**

*Nationalism is still a major force in world affairs. Nevertheless, there are powerful economic and cultural forces undermining nationalism, usually described as globalization, developing around multi-national corporations, banks, insurance companies, global communications, the dominance of the English language. Globalization creates new identities and new loyalties by its cultural and economic processes, but it also creates a potential backlash of resistance to the threats to national identity that it produces by its international, westernized, homogenized character. Nationalism in some sense of the word can be traced back to pre-Renaissance times. In its modern sense, of having political implications, it is a relatively recent phenomenon. We can distinguish between ethnic nationalism, which links nation with race and language and birth, and civic nationalism, which links nation with citizenship with no ethnic limitation on who is potentially a member of the nation. We can also distinguish between liberal, reactionary and radical nationalism. Furthermore, nationalism can fulfill a number of political functions such as promoting social change, creating social cohesion, or strengthening the hold of the ruling class. Nationalism has had an immense impact in the nineteenth and twentieth centuries, especially in undermining empires and multi-national states. Actually even in the global society of the twenty-first century it remains a powerful force. Negative sense of nationalism leads to aggression and imperialism however on this paper highlighted about the positive sense of nationalism. This paper is mainly focused on Manipur as a parameter of India.*

*Keyword: Globalization, homogenized character, imperialism, national identity, nationalism.*

**INTRODUCTION**

Money cannot buy the spirit of nationalism and loving relation of the world but only igniting together as one creates a peaceful and loving society in the true sense of nationalism in the minds of the youths. Youths are the most important pillar of the nation. They are independent people who can contribute for the nation. Youth people are physically, mentally and economically strong and sound so that the future of the nation lies in the all-round development of the youth. They play a vital role in the constructive process of the nation building, building social cohesion, economic prosperity and political stability in the nation in an inclusive and democratic way of life. Hence youths are ultimately the social actors of change and process to ignite the spirit of nationalism. Today the earth has become a new one. The age-old system has totally transform into a world of science and information technology, innovative invention, political power, economic growth and other developments with cultural exchange and inter dining together for the sake of the state as whole. Nationalism is the integral parts of communal harmony. Nationalism seeks peace and opposes violence in term of universal love and goodness. It is the indicator and principle of peace and harmony for existing amongst various communities free from violence and hatred which means peaceful co-existence without any riots. Generally in the present context Manipur is abode of more than thirty-six tribes, seven schedule castes, Muslim, Nepalese, Biharis, Bengalis, Marwaries, Punjabis, Jains, Meitei respectively. The Meiteis are the majority with a liberal attitude towards every section of society will have to make themselves involved in all social aspect of economic and administrative works and activities, youth camps, Ima-market and opening Mao-market at the different places of the valley area are the means for promoting communal harmony in the spirit of emotional and economic integration among the different sections of the Manipuri society which can bring the idea of nationalism in the mind of the Manipuri in particular. More than half of the fighting occurring in the world is caused due to quarrel between different ethnic groups. Inter-religion and intra-religion differences are not new; but they get aggravated and become inexorable owing to the political differences and advantages. A fight for a natural resource easily turns into a religious rage when there is a mixture of various religions in a particular region. A battle over the right to use a resource in a region is often fought with the existing feud in faith and beliefs of the people. In the recent decades, Islamic world, more particularly in the middle-east Asian countries, various sects of the Muslim people have indulged in battles. The inter-religious differences among the groups rose to the level of destructing each other sending devastating waves to the entire region. A careful study on the conflict on this region would reveal the truth about how incongruent and corrupt political systems kindle the religious feelings of the people. The differences in economic and political structures in these nations have taken toll the true character of the Islamic religion. Such issues and problems can be solved only the true sense of nationalism all over the world in general but Manipur in particular.

Nationalism is the important pillar of any peace process that upholds the human races very livelihood. Peace must be the fruit of nationalism. Nationalism is an intense form of patriotism or royalty to ones country. There are four types of nationalism such as hegemony nationalism, particularistic nationalism, marginal nationalism and nationalism of minorities. Global peace has been hindered by many challenges that include both natural and human-made causes. The rationale behind achieving peace is in the positive understanding of "give and take", humanity, forgiveness and nonviolence. The right understanding will take the world in the right path. Nationalism seeks to preserve and foster a nation's traditional culture and cultural revivals have been associated with nationalist movement. It also encourages pride in national achievements and is closely linked to patriotism. The purpose of nationalism is to develop a sense of belonging for the people in the country towards their nation. Nationalism unites people across different languages, gender, religion, cultures or ethnicity. As an example Indian freedom movement against the British Raj was fought because of strong nationalistic sentiments. In practice nationalism can be seen as positive or negative depending on context and individual outlook. Nationalism has been important drivers in independent movement such as the Greek Revolution, the Irish Revolution, etc. On the other hand negative nationalism created World War I. Now the question of ignite in the mind of youths during the period of globalization are very important and necessary through the process of the spirit of nationalism which is the need of the hour. As an exemplary figure in politics, spirituality and nation building, Gandhian nationalism must also be understood in this regards.

### **IMPORTANCE AND RELEVANCE OF NATIONALISM**

Nowadays nationalism has become important and relevant due to its some merits reasons like: -

- i. Nationalism provides good governance because their decision is made in the interest of the nation.
- ii. The government has to compromise with all the principles to accommodate the others, government will be more consensuses based, and resulting policies will be broadly approved for the benefit of the state.
- iii. Some political philosophers viewed that government should be more responsible, accountable, transparent under the policy of nationalism.
- iv. The government provides better quality of policy, enhanced scrutiny and increased attention paid to each policy of the nationalism.
- v. This type of government has been effective in enhancing democratic legitimacy, representativeness and national unity under the policy of nationalism. It brings communal harmony.
- vi. Whenever nationalism is being established, responsible governance may be entertained because man is a social animal by nature.
- vii. Man is weak as a single being.
- viii. First there is a unit of family, families turn into tribes, tribes into more bigger tribes and this organization goes on .The strength of a civilization lies in how much well organized it is as a society.
- ix. In pre modern times the biggest organized entity of a society was nothing more than an advanced form of a tribe. The monarchies and empires consisted of a number of tribes from few to hundreds in case of huge empires. The monarchs and emperors whole politics was around managing and harnessing this power of the tribes.
- x. Feudalism was an advanced form of it. Although people did not belong to same family tree or race area etc but they were basically loyal to their lords and Barons. These lords and Barons were then under the king. This form of government was inefficient as a whole because it lead to revolts and disorder in a long run. It was difficult for a king to manage the lords in an effective way for common interest.
- xi. The idea of nationalism in the modern era solved this problem vary effectively. This idea to make people loyal to the central government with their whole heart on the basis of race created a nation. Nations were more organized and more efficient in action because they used the physical power as well as the soul of the people to drive the wheels of a united country. No ancient form of monarchy could stand in their way.
- xii. Now 21<sup>st</sup> century is the age of globalization which is the extension of the capitalism so that the question of igniting the spirit of nationalism in the minds of the youths is so necessary and essential.

### **BACKGROUND OF IGNITING NATIONALISM**

Manipuri Students Federation (MSF) observed every year on the death anniversary of Pebam Chittaranjan Mangang in memory of his supreme sacrifice against the AFSPA in the true sense of nationalism. Under this

black law, the Indian Army has killed many innocent people and occurred numerous incidents of rape, molestation, fake encounter, torture in custody, missing person cases. As cited two examples one incident that spark quite uproar in Manipur was the incident of 2004, when 17 Assam Rifles personnel picked up Thangjam Manorama Chanu from her residence at Bamon Kampu, Imphal East, Manipur and killed her in a fake encounter case after mercilessly torturing and raping her. The people of Manipur were heartbroken by the incident and started a strong protest movement. One more example Chittaranjan, who was a student leader, in order to encourage the people to fight against the injustice, immolated himself on August 15, 2004, on the day of India's Independence Day. He died the following day. To honour the "Athouba," MSF has been observing the day every year on the question of honour of his supreme sacrifice in the true spirit of nationalism.

### **SPIRIT OF NATIONALISM:**

Pebam Chittaranjan died of self-immolation in protest against prolonged imposition of Armed Forces Special Powers Act (AFSPA), 1958 in Manipur on the occasion of 58th Independence Day. On account of such supreme sacrifice made by Chittaranjan, Manipur Students Federation (MSF) organized the Martyrdom Day on the theme "To Excel Rights to Life". The Government is showing the country is to follow non-violence, a weapon once introduced by Mahatma Gandhi, but it has been unleashing violence against its people. Manipur was an independent kingdom until defeated by Britain in 1891. It remained a princely state under British suzerainty until the end of colonial rule. The Maharajah (king) of Manipur then signed an Instrument of Accession, placing Manipur within the dominion of India and granting it exclusive power over Manipur's defense, foreign relations, and communications. However, a movement demanding an end to the old feudal system had already begun in Manipur, in 1948, led to the establishment of an elected legislature with the king becoming only a constitutional head of state. But King Bodhchandra signed a Merger Agreement with the Indian state on September 21, 1949 and Manipur formally merged with India on October 15, 1949. It was directly governed by New Delhi until January 21, 1972, when it became a state with the right to elect its own legislative assembly. Many Manipuris believed that their right to self-determination was violated in 1949 when the Manipuri king who apparently went to Shillong to meet the Governor of Assam and other Indian officials to discuss the law and order situation in the region was instead allegedly forced to sign the Merger Agreement. Such an agreement had not been discussed by the newly formed legislature and was not ratified by it. Instead the assembly was dissolved and Manipur placed under the direct administration of New Delhi. Many Manipuris believed that Indian government actions in 1949 justified an armed response. Such real history is the main question of the inspiration to ignite the spirit of nationalism in the mind of the youths of Manipur.

### **OBJECTIVES OF THE STUDY**

The major objectives of the study are:

- To study the historical background of nationalism and its trend of Manipur.
- To investigate problems and prospects of nationalism of Manipur.
- To study the development of nationalism of Manipur.

### **METHODOLOGY**

The study is based on both primary and secondary data. The secondary data are collected from the printed books, magazines, and newspapers, etc. The collected data are analyzed by using experimental, historical and analytical method.

### **IGNITE THE SPIRIT OF NATIONALISM OF MANIPURI YOUTHS**

Nationalism means that feeling of love or pride for their nation which is better than any other nations so that the question of nationalism will be avoided all kind of riots and goes toward the people of different religions, caste, creeds, sex and different background live together in the society with love and peace amongst them in the true sense of nationalism. Manipur is a land of unity in diversity. It strives to create goodwill and harmony among various communities. As regard Manipur has a great diversity of culture, religion, language, tradition, community as like mini-India. People live and think in terms of their selfish ends without thinking of the state interest. Such thinking is dangerous and bound to lead to the disintegration of the state building process in the long run. The need of the hour, therefore, is to fight the faces of disunity and disharmony in order to the achievement of harmony and peace throughout the state of Manipur in the true sense of nationalism. The question of nationalism is the coming together of all the communities of the state and living with a true sense of brotherhood and equality, irrespective of their caste, creed, religion etc. We should sink our personal differences in the larger interest of our common goal and adopt a common approach to our problems and

issues if we want to achieve the lendable goal of our integration and nationalism. Atrocities are being committed in our state, day in and day out, in the real term of caste, sect, and community social and economic differences with divergent political viewpoints. Extremists and terrorists who have let loose the reign of terror in some parts of our state and have killed hundreds of innocent and peace-loving citizens are being lionized as martyrs. It is our bounden duty as patriotic citizens of our state to fight tooth and nail against these anti-social elements who are bent upon destroying the unity and integration of the state. Likewise our state interest is very clean and valid, to put a stop to the process of disintegration that has lately started raising its ugly head and to accelerate the process of nationalism, solidarity and oneness that has received a setback. Peace and harmony can bring a peaceful and stable order to the state and they are the necessary conditions for survival and development of mankind. Among those thoughts which have been handed down to the present and continuing to have important influence, peace and harmony occupy the most dominating position of the state. So nationalism is a prerequisite element for a state like Manipur with its diverse population and nationalism ensures that every religion gets equal treatment and tolerance builds amongst citizens. To promote religious harmony we need to guard against religious extremism. All religions seek peace and oppose violence, champion of universal love and spread goodness. However, when people were away from the right part, they might become susceptible to bigotry and fanaticism and eventually fall into the traps of extremism. Religious harmony is of prime importance. People of different religious faiths co-exist in pluralistic society; if any clash of ideas occurs this may lead to serious disharmony which can hamper the progress of a society and state. Taking an example, the significance of communal harmony is formed in Singapore consciousness in order to respect of all regions equally. They have a strong legislative framework that underpins our communal harmony. From this perspective the state government also takes a firm stance against racial and religious chauvinists and extremists because we know all kind of damage that will be done to our society if such conflicts were to erupt.

The question of nationalism is very much important to avoid all kind of riots that found such as, Kuki-Naga riots of the 13<sup>th</sup> September, 1993, Meitei-Muslim riot of the 3<sup>rd</sup> May, 1993. As per record there are thirty-six recognized tribes which either fall under the Nagas or the Kukis, such two tribes are the different conglomerates of Manipuri tribals. During the seventy-three years of Indian Independence the development works are confirmed mostly in urban valley areas rather than the hill areas of Manipur. Road communication and other medical health care facilities are found not good as campaign with the urban valley areas of Manipur cited an example, pregnant woman facing a lot of problem in the remote hill areas even occurring death. Such dissatisfaction of the rural and hill areas is the hurdle towards the promotion of nationalism. Hence, the overall development process for improving the living standard of the poor rural and hill people would be affected to a great extent on such situation, CSOs, local clubs, Meirapaibis and other organizations of different communities have to be considered to take part in the development work programmes of the state. In our long history had the communal riot never flared up between the Meiteis and Muslims who are dwelling in the valley areas of Manipur except the cited above. Such two communities are living together in the sense of brotherhood and fraternity in the valley areas as a Manipuri on the other side, the communal tension between the two major tribes, the Nagas and the Kukis caused mainly by the Utopian concept of greater Nagaland at the aegis of NSCN-IM and Kuki homeland which was mainly confined into the hill areas of Manipur. Such utopian thought and ideas would be removed as soon as possible by the means of the true sense of nationalism in Manipur. The majority Meitei with a liberal and kind attitude towards every section of community would have to make involved in all socio-political and economic aspects and administrative treatments as an example of opening the Mao-Market to the different places at the heart of the Imphal city organizing by the CSOs based on the valley areas of Manipur. Youth campus, sports friendly match and other events of gathering are the best means for promoting nationalism in the good sense of emotional integration and organizing camps in various places where many communities led down can give ample opportunity for associating together among themselves in the spirit of nationalism in the mind of youths of Manipur. Besides economic integration also takes part for the promotion of social integration which is the historical social development, over view of inter community marriage is also a good step toward the sharing of common bondage of brotherhood and fraternity, constant contact and joint sharing of manifold complex issues would purely minimize callous misunderstanding.

Every Manipuri must acknowledge the good idea of state building process, maintaining tranquility, an atmosphere of tolerance, integration etc. which give access to all area of community life and eliminates segregation in between Naga-Kuki and Meitei-Muslim in particular imaginary partition politics hill and plain in general. In short Nationalism is a dynamic social process to achieve peaceful social relation on the ground of



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mutual understanding and co-existence for the mankind to defend the external force of the enemies in order to igniting the unity and strength of the nation.

**CONCLUSION**

Autonomy, national identity, patriotism, self-determination and solidarity are the integral parts of nationalism which are very important elements of nature for reducing the tension and friction of the state. For every individual concerned in the state should intervene proactively in this area so as the society will give justice and to provide human value for living together in the sense of nationalism. In the present context of Manipur, the role of CSOs, local clubs and Meira Paibis take part very important step for making the process of nationalism in the state. As regard the Manipur government takes very much concerned and not only aware about this but also extra initiative administrative responsibility. Twenty first century is the age of globalization which is the extension of capitalism so that the question of nationalism is very much important in the mind and heart of the youths of the nation otherwise our nation theory will be in the hands of the Multi National Corporations (MNCs).

**REFERENCES:**

- <http://kanglaonline.com/2017/09/tete-a-tete-with-the-education-minister/>
- <http://kanglaonline.com/2017/05/right-venue-for-seminar-on-bridging-the-gap-nearly-two-years-down-the-line/>
- <http://kanglaonline.com/2016/11/old-age-rendezvous-cementing-the-bond-of-love-among-hills-and-valley-communities-through-interaction/ss>

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**IMPACT OF COVID-19 WAVES ON CUSTOMERS ONLINE SHOPPING IN RANCHI: A CASE STUDY**

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**Mr. Pratik Biswas<sup>1</sup> and Dr. Dilip Kumar<sup>2</sup>**Sr. Lecturer<sup>1</sup> and Assistant Professor<sup>2</sup>, ICAI University Jharkhand**ABSTRACT**

*E-commerce or electronic commerce is not that new in context of Indian scenario. For last one decade E – commerce became more popular among common people for marketing purpose. Specially after launching of 4G in India, common people too are taking interest in E- Commerce. But during Covid-19 period, a drastic change came in customer' online buying behavior. Where first wave of Covid-19 developed the habit of online shopping, the second wave forced people to go for online shopping because of it's fear factors. Lots and lots of people lost their family members, relatives and friends during this period. Thus the two waves of Covid-19 had different impact on customer's choice of on line shopping. There are certain factors which mainly govern the buying behavior of the common people of our country. In this paper the authors have tried to find, these factors and the impact of these two waves in the life of people of Ranchi.*

*Key word: E-commerce, Covid -19, customer buying behavior.*

**1. INTRODUCTION**

It is a common practice to address, E-commerce means electronic commerce. Which means dealing in goods and services using internet and the electronic media. E-commerce involves carrying on a business with the help of the internet and by using the information technology like Electronic Data Interchange (EDI)[1]. Due to exponentially rising business opportunities, there are a number of services being offered on the internet. Online shopping has emerged as one of the most prominent services available through internet. It has enormous advantages for the consumers as well as business houses [2] The COVID-19 pandemic has fundamentally changed the mindset of entire world, people are buying differently, thinking differently and living differently in many ways, while supply chains have changed, and retailers are closing their doors, common people too have changed their attitude towards consumer product. Customers across the world are looking at products and brands through a new lens. Both the waves have their own impact on the people of the entire world. People of Ranchi too are on the same boat. Here authors tried to find what are the motivating factors that governed the people of Ranchi for their purchasing behaviors.

**2. REVIEW OF LITERATURE**

Rajasekar et.al (2016) Explains that-commerce is a paradigm shift. It is a ``disruptive” Innovation that is radically changing the traditional way of doing business. Electronic commerce is a type of business model, or segment of a larger business model, that enables a firm or individual to conduct business over an electronic network [4]. Mahipal.D (2018) et.al explain that E-commerce is the subset of e-business, which means that the e-commerce is an influential selling instrument and a straight distribution system. Where the straight distribution system is an alternative method for distributing products to consumers, differing from the traditional distribution process that uses the middlemen such as jobbers, wholesalers and retailers [5](Susmitha.K. 2021)Explains that E-Commerce is most considered and chosen way of purchasing different types of products and services. Nowadays E-commerce has to be replaced with traditional purchasing [6]. (Koch Julia et al, 2020) explained that, the investigation of established drivers of online purchase behavior is of great relevance during the COVID-19 pandemic, as companies must anticipate consumer behavior during this global crisis to maintain a competitive edge. Their results showed that normative determinants like media reports on the economic situation are related to consumers' purchase intentions, whereas the normative influence of close social networks is not [7].Tyagi.P et al(2021) explained that In the 75-years of history, global health crisis is faced by humanity with COVID-19 pandemic. At extreme levels, this pandemic is killing, making human suffer and upsetting lives of people. COVID-19 pandemic is more than a simple health crisis. It is considered as the human crisis. Societies are attacked by this crisis at core level. Mortality rate is extremely high[8] in this COVID-19 disease, people are extremely afraid of COVID, which has great impact on buying behavior of Ranchi people too.

**3. STATEMENT OF THE PROBLEM**

In country like India, the trend of online shopping is not that old as comparison to offline shopping. Computer literacy, availability of Internet and the adequate speed are basic requirement for this. At the same time, uninterrupted power service, in both urban and rural area is another major requirement. But Covid -19 pandemic create an entirely different situation. Those people who never think of online shopping, start learning about this.

And in case of second wave the choice of use of on line shopping never be an optional but it becomes only way remain for many people.

This study try to find what are the important factors that create difference in mind-set of the people of Ranchi in case of two waves of Covid-19.

#### 4. RESEARCH METHODOLOGY

The Ranchi city has been purposively selected for the present study. The 75 consumers of online shopping have been selected for the present study by adopting random sampling technique and the data and information pertain to the year 2020-2021. In order to examine the socio-economic status of the people chosen for this purpose, the frequency and percentage analysis have been worked out. In order to study the impact of the factors due to Covid-19 Pandemic on online shopping behavior of people of Ranchi, the exploratory factor analysis has been employed.

##### 4.1 Sample Size

The research was conducted on customer's online shopping experiences, belonging to the age group of 21 years or more. In this survey, 75 respondents included students, business persons, employees of private and public organization and homemakers are considered.

##### 4.2 Sampling Method

Convenience sampling technique is used here for survey purpose.

##### 4.3 Data Collection

The primary data was collected using a well-structured questionnaire. The questionnaire was develop for this purpose on the basis of literature survey and telephonic conversations. It included closed, direct and indirect questions. The demographic data was given more importance, in order to know the socio economic status of the customer. The responses to qualitative questions were recorded on a five point Likert scale ranging from strongly disagree (SD) to strongly agree (SA). Latter on statistical tools are used to interpret the data.

##### 4.4 Problem definition

The e-commerce industry is highly fragmented with respect to varied product lines. The present study is an attempt to compare the online buying behavior of the Ranchi people during the first and second wave of Covid - 19

##### 4.5 Objectives:

1. To understand the trend in the e-commerce over the last two years in Ranchi
2. To understand the impact of first wave of Covid -19 on buying behavior of people of Ranchi.
3. To understand the impact of second wave of Covid -19 on buying behavior of people of Ranchi.

##### 4.6 Hypothesis

H1 : There is no difference in the customer's buying behavior in last two years in Ranchi.

H2: The impact of first wave and second wave of covid-19 has same impact on buying behavior of people of Ranchi.

#### 5. RESULTS AND DISCUSSION

The socio-economic status of people of Ranchi, considered here for our work, was presented and analyzed in the Table 1. The descriptive statistics depicted that (Table -1) 64% were male and 36% were female and the average age group of the customer is in between (41 – 50) i.e 33.33% followed by (31 - 40) i.e 25.33%. While 33.33% of customer fall in the income group less than Rs 1000000/- per annum, the majority of them belong to private service class- 38.66%. It seems that married people are more health conscious – 52% while most of them are graduate 30.66%.

**Table-1: Respondents Demographic Profile**

Demographic Factor	Particulars	Frequency	percentage
Gender	Male	48	64
	Female	27	36
Age( in years)	21 to 30	15	20
	31 to 40	19	25.33
	41 to 50	28	37.33
	more than 50	13	17.33

Educational Qualification	Secondary	15	20
	Higher secondary	13	17.33
	Graduation	23	30.66
	Post-graduation	13	17.33
	Professional	11	14.66
Occupation	Professional	11	14.66
	Business	18	24
	Private Service	29	38.66
	Government service	17	22.66
Yearly Income	<300000	15	20
	<500000	18	24
	<1000000	25	33.33
	More than 1000000	17	22.66
Marital Status	Single	15	20
	Married	39	52
	Widow	13	17.33
	Widower	04	5.33
	Separated	04	5.33

The data was analyzed through frequencies such as age, gender, marital status, income designation, etc for understanding the respondent's profiles. The reasons for inclined towards online shopping due to Covid- 19 pandemic, and the factors motivating them for doing so, it is also analyzed. For the relationship identification, factors analysis and regression analysis is used.

**Table 2:Reliability Statistics**

Cronbach's Alpha	N of Items
.827	8

**Table3:KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.787
Bartlett's Test of Sphericity	Approx. Chi-Square	288.202
	df	28
	Sig.	.000

Before the application of factor analysis the reliability of scale items were tested by applying Cronbach's alpha. Further to test the sampling, Kaiser-Meyer-Oklin measure of sampling adequacy is computed which is found to be 0.787. It indicates that sample is good enough for sampling. Moreover the overall significance of correlation matrices has been tested with Bartlett Test (approx. Chi-square = 288.202 and significant at 0.000) at 28 degree of freedom which provided as well a support for the validity of data for factor analysis. All these provided that we can proceed with factor analysis and the result of factor analysis over 08 factors showed that there were 2 key factors, which were determined by clubbing the similar variables & ignoring the rest, which majorly consider being most influencing factors identified having impact of first wave of Covid -19 on Ranchi Table- 4, shows the respective percentage of variance of all these factors derived from factor analysis.

**Table4: Total Variance Explained**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.639	45.491	45.491	3.639	45.491	45.491	2.962	37.024	37.024
2	2.018	25.230	70.722	2.018	25.230	70.722	2.696	33.697	70.722
3	.634	7.927	78.648						
4	.528	6.599	85.248						
5	.380	4.749	89.997						
6	.326	4.080	94.077						
7	.271	3.383	97.460						

8	.203	2.540	100.000						
Extraction Method: Principal Component Analysis.									

The identified factors were analyzed for a common thread and accordingly the naming of the factors was performed.

Table No5: Rotated Component Matrix <sup>a</sup>		
	Component	
	1	2
SA1	.870	.101
SA2	.805	.221
SA3	.882	.021
SA4	.841	.166
PC1	.079	.832
PC2	.100	.760
PC3	.223	.744
PC4	.077	.886
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

**Table- 6: Factor identified having impact of first wave of Covid -19 on Ranchi**

Factor Name	Item
<b>Situation Awareness (SA)</b>	I prefer to buy the products online because I need not to go outside.
	I prefer to buy the products online because of lock down.
	I prefer to buy the products online because of my healthcare issues.
	I prefer to buy the products online because this will break the chain and social distance
<b>People Convenience (PP)</b>	I prefer to buy the products online because wide choice is available here
	I prefer to buy the products online because It is easy to choose and make compare
	I prefer to buy the products online because I get on-time delivery
	I prefer to buy the products online because availability of digital information.

The first factor comprises items: I prefer to buy the products online because I need not to go outside, I prefer to buy the products online because of lock down, I prefer to buy the products online because of my healthcare issues, I prefer to buy the products online because this will break the chain and social distance with loading 45.491% towards Covid-19 first wave in Ranchi. Where factor together named as **Situation Awareness**. The second factor comprises items: I prefer to buy the products online because wide choice is available here, I prefer to buy the products online because It is easy to choose and make compare, I prefer to buy the products online because I get on-time delivery, I prefer to buy the products online because availability of digital information. With loading 45.491% towards Covid-19 first wave in Ranchi. Where factor together named as **People Convenience**, with loading 25.23%.

Table7: Reliability Statistics	
Cronbach's Alpha	N of Items
.885	9

Table8: KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.849
Bartlett's Test of Sphericity	Approx. Chi-Square	375.913
	df	36
	Sig.	.000

Here, the reliability of scale items were tested by applying Cronbach's alpha. Further to test the sampling, Kaiser-Meyer-Oklin measure of sampling adequacy is computed which is found to be 0.849. It indicates that sample is good enough for sampling. Moreover the overall significance of correlation matrices has been tested

with Bartlett Test (approx. Chi-square = 375.913 and significant at 0.000) at 36 degree of freedom which provided as well a support for the validity of data for factor analysis. All these provided that we can proceed with factor analysis and the result of factor analysis over 09 factors showed that there were 2 key factors, which were determined by clubbing the similar variables & ignoring the rest, which majorly consider being most influencing factors identified having impact of second wave of Covid -19 on Ranchi Table- 9, shows the respective percentage of variance of all these factors derived from factor analysis.

<b>Table9: Total Variance Explained</b>									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.736	52.627	52.627	4.736	52.627	52.627	3.415	37.945	37.945
2	1.613	17.925	70.552	1.613	17.925	70.552	2.935	32.607	70.552
3	.663	7.372	77.924						
4	.464	5.157	83.081						
5	.435	4.838	87.919						
6	.367	4.077	91.996						
7	.303	3.368	95.364						
8	.255	2.834	98.199						
9	.162	1.801	100.000						
Extraction Method: Principal Component Analysis.									

The identified factors were analyzed for a common thread and accordingly the naming of the factors was performed.

<b>Table10:Rotated Component Matrix<sup>a</sup></b>		
	Component	
	1	2
FD1	.888	.138
FD 2	.718	.144
FD 3	.770	.267
FD 4	.845	.240
FD 5	.775	.269
PP 1	.217	.823
PP 2	.284	.760
PP 3	.111	.885
PP 4	.255	.809
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

**Table- 11: Factor identified having impact of second wave of Covid -19 on Ranchi**

Factor Name	Item
<b>Fear of death</b>  (FD)	I prefer to stay at home because, during second wave fatality rate was so height, that I could not take the life risk
	I prefer to stay at home because, scarcity of life saving drug and medicine
	I prefer to stay at home because, less number of beds in the hospitals were available
	I prefer to stay at home because, In adequate number oxygen cylinder were available
	I prefer to stay at home because, bitter experience from the first wave.
People Preference(PP)	I prefer on line purchase because, I have learned it from first wave.
	I prefer on line purchase because, advantage of online purchase attract me
	I prefer on line purchase because, Purchasing without life risk
	I prefer on line purchase because, Purchasing for friend and relatives without moving to their places

The first factor comprises items: I prefer to stay at home because, during second wave fatality rate was so height, that I could not take the life risk, I prefer to stay at home because, scarcity of life saving drug and

medicine, I prefer to stay at home because, less number of beds in the hospitals were available, I prefer to stay at home because, In adequate number oxygen cylinder were available, I prefer to stay at home because, bitter experience from the first wave, with loading 52.627% towards Covid-19 second wave in Ranchi. The factors together was named as **Fear of death**. The second factor comprises items: I prefer on line purchase because, I have learned it from first wave, I prefer on line purchase because, advantage of online purchase attract me, I prefer on line purchase because, Purchasing without life risk, I prefer on line purchase because, Purchasing for friend and relatives without moving to their places, with loading 17.925% towards Covid-19 second wave in Ranchi. The factors together was named as **People Preference**.

### CONCLUSION:

While we've seen in case of first wave of Covid-19 Pandemic, people opted for online purchase of the items due to their awareness of the pandemic situation. Here people have a choice. It is true that a lot people learned about on line transaction, net banking etc, but at the same time quite a large number of people were still preferring offline shopping. Hence we find a mixed approach towards online/offline shopping. During the second wave of Covid-19 Pandemic, more number of people were forced to opt for online shopping due to high fatality rate during this period. Here people had no other choice other than online shopping. Thus we can conclude that the fear of death is the most powerful factor which motivated people towards online purchase.

### REFERENCE

1. S. A. Bhat, K. Kansana and J.M. Khan, A review paper on e-commerce, Asian Journal of Technology & Management Research. Vol. 6 – Issue: 1, PP- 16 -21.
2. Ganapathi.R, A study on factors affecting online shopping behavior of consumers in Chennai, Journal of Management Research and Analysis, vol 2(2), PP.123-126.2015.
3. Neger,M and Uddin.B(2000), Factors Affecting Consumers' Internet Shopping Behavior During the COVID-19 Pandemic: Evidence From Bangladesh, Chinese Business Review, Vol. 19, No. 3, PP.91-104.
4. Rajasekar.S and Agarwal.S(2016), A study on impact of e-commerce on india's commerce International Journal of Development Research, Vol. 6, Issue, 03, pp. 7253-7256.
5. Mahipal,D and Shankaraiah.K(2018), E-commerce growth in India: a study of segments contribution, Academy of Marketing Studies Journal Volume 22, Issue 2 PP.
6. Susmitha.K(2021) Impact of COVID 19 on E-Commerce, Journal of Interdisciplinary Cycle Research, vol.12, issue.9, PP.1161-165.
7. Koch.J, Frommeyer.B, Schewe.G(2020), Online Shopping Motives during the COVID-19 Pandemic—Lessons from the Crisis, Sustainability, PP1-20.
8. Tyagi.P and Pabalkar.V(2021), Impact of covid-19 over purchasing behavior of the consumers, European Journal of Molecular & Clinical Medicine, Vol. 08, Issue 02, PP-561 -570.

## IMPACT OF E-BOOKS ON THE BUSINESS PROGRESS OF LOCAL BOOKSTORES IN DELHI BEFORE AND AFTER COVID-19

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### ABSTRACT

*With the increase in readership books retailing market have also been growing at a stagnant rate. But with the advent of E-Books and COVID-19 pandemic, it became hard for the retailers to keep up with the market, some adapted this change whereas major population of the retailers have resisted to change. This study provides an insight on how E-Books have affected the local book stores in Delhi before and after COVID-19.*

**INTRODUCTION:** *In a world where everything is done online, physical books have also been supplemented by e-books. These soft copies of books have received appraisals from critics for being more convenient and eco-friendly but most of the nerdy readers avoided switching to these books for the longest of time advocating their the old affection, need, and charisma of physical books, but with the changing perceptions, they have been trying to adapt these books wholeheartedly.*

*In this debate over e-books, Independent bookstores are on the suffering end, all around the world. There have been reports showing slow declines in the sales of local bookstores after the popularization of e-books among readers. Some stores have adopted this change and acknowledged it adding various services and offers, like author signed copies, meet and greets with authors, book cafes and have tried to increase their product range but most of the stores, in Delhi have resisted adding anything to their product range.*

*But as the world has changed with the advent of covid-19 things have changed for the bookstores and pandemic hit them hard as it has been a major factor devoted towards attracting readers to e-books. Many bookstores have to be shut down due to a shortage of revenue during the lockdown and continuous trouble adjusting with the values of social distancing post lockdown. This study focuses on how the business progress of local bookstores in Delhi has been affected by the popularization of e-books.*

**KEYWORDS:** Books, E-Books, Physical Books, Bookstores, Readers, Delhi, Covid-19

### LITERATURE REVIEW:

**Creating Competitive Advantage: The Growth of Independent Bookstores in the U.S. 2009–2018,**( Samaher Baidis, Albert N. Greco, Michael D. Kontolios, Molly McCullen, Nan Rittenhouse, Robert M. Wharton) (Springer Nature,2019)

Independent bookstores (often called “indies” or “independents”) sustained threats to their basic business model because of the growth of national bookstore chains and the proliferation of book sales online, in price clubs, supermarkets, convenience stores, mass merchants, and specialty stores, the emergence of digital e-books and eReaders, and the U.S. recession of 2007–2009. These events triggered the closing of hundreds of independent bookstores. In spite of stiff online and brick-and-mortar competition and the recession, many independents were able to grow in size and importance. This article outlines the competitive advantages utilized by many independent bookstores between 2009 and 2018, resulting in an increase in the number of independent bookstores between 2009 (1651) and 2018 (2470).

**The Impact of e-Book Technology on Book Retailing( Yabing Jiang, Evangelos Katsamakos) (Proceedings of the 43rd Hawaii International Conference on System Sciences - 2010)**

In 2008, Amazon the dominant online book retailer unveiled Kindle, an e-book reader called by many observers the “iPod of books” as it is likely to transform how people read books. E-book technology offers a third important channel for delivering books to consumers and possibly transforming the book industry. Two other major channels of delivering books to consumers have been available so far: purchasing physical books from physical bookstores, predominantly book-chains like Barnes-and-Noble, or purchasing physical books online, from online book retailers like Amazon. The main objective of this article is to analyze how e-book technology affects strategic interaction in the book markets and ultimately impact book sellers, publishers and consumers. Developing a stylized game-theoretic model based on product differentiation literature and information goods literature, we examine how entry of an e-book seller affects competitive interaction in the book market. Factors explored include the differentiation of sellers in the physical book market, consumers’ preferences for e-books, and ownership of the e-book seller. Implications for managing in the book industry are discussed.



**A Survey on Reading Habit of Library on Reading Habit of Library Users during COVID-19 Lockdown (Kshama Parikh, Priyanki Vyas, Saurin Sharad Parikh) (Library Philosophy and Practice (e-journal), 2020)**

E-Libraries has become more relevant in present situation of COVID-19 pandemic as it has caused an international lockdown in the world and India. Causing majority of the citizens to stay at home. The survey was conducted to study the reading habits of various library users (volunteers) during this situation. Besides the reading habit, the survey also collected the data for the various activities carried out by users at home. Main finding of the survey is that the users had taken keen interest to switch over to reading eBooks and 70% of student users and 53% of faculty users are reading more e-content especially books/magazines/research papers. Besides the extensive reading habit, the survey also discloses the greater involvement of users for learning/leisure/hobby activities at home. Student users have also reported spending more quality life with family members at home. Above all, the survey disclosed the reading of books as the main activity of the users during lockdown. This finding will inspire the organizations for establishing scalable and secure eLibrary Infrastructure and for focusing on acquiring more eBooks for the eLibrary and provide better services to their users during situations like that of COVID-19.

**METHODOLOGY:****Objectives of the Study**

- To analyse the impact of e-books on the business progress of local bookstores.
- To study the impact of e-books on the sales of physical books pre and post covid pandemic.

**Research Design:** Descriptive & Exploratory

**Method of Data Collection :** Survey Technique

**Sample Design :**

- (1) Sample Unit : Booksellers operating in Delhi
- (2) Sample Size : 210
- (3) Sampling Method : Non-Probability Sampling Technique

**Designing Questionnaire:** The Questionnaire included Multiple Choice Question and three points Likert Scale. Questionnaire was circulated through Google Forms and Telephonic Interviews were conducted with the same questions.

**Data Analysis and Interpretation :**

Out of total responses **88.4% operate solely through physical mode, 10.1% operate through both online and physical mode, whereas remaining operate through online mode.**

Out of total responses **79.2% are 0-30 years old, 20.3% bookstores are 30-60 years old and remaining are 60-90 years old.** It has been noted that the bookstores which are older than the other have higher goodwill.

Out of total responses **9.7% are located in South Delhi, 9.7% in North Delhi, 10.6% in East Delhi, 9.7% in West Delhi, 10.6% in Central Delhi, 10.1% in South West Delhi, 9.7% in South East Delhi, 9.7% in North East Delhi, 10.6% in North West Delhi and 9.7% in Shahdara.** Location on bookstore plays a significant role in the sales of a bookstores as it shows the clientele of that particular area and their adaptability towards different technologies.

Out of total responses **94.2% deals in Physical Books and 5.8% deals in both Physical and Special Author Signed Books.** It also affects the sales of the bookstores as there are readers who prefer Author signed books and special edition books over normal physical books.

Out of total responses **95.6% do not deal in Author Signed and Special Edition Books during covid-19 whereas remaining provides the same through home delivery option.**

Out of total responses **98.1% sellers said physical books are preferred over e-books by their customers before covid-19 whereas remaining said both have same demand.** This clearly depicts that E-Books had negligible effect on the preference of customers before covid-19.

Out of total responses **37.2% sellers said physical books are preferred by their customers, 31.9% said e-books are preferred after covid-19 and remaining said both have same demand.** Hence, a major shift from E-Books to Physical Books in the preference of consumers can be noted after covid-19.

Out of total responses **88.4% sellers disagrees that their sales have been declined with the advent of E-Books before covid-19, 10.1% are neutral on the statement whereas mere 3% agrees that E-Books have declined their sales before covid-19.** Hence, it can be concluded that E-Books have not declined the sales of physical books before covid-19.

Out of total responses **68.1% sellers agrees that their sales have declined due of E-Books after covid-19, 24.2% are neutral on the statement whereas mere 7.7% disagrees that E-Books have declined their sales after covid-19.** Hence, it can be concluded that E-Books have declined the sales of physical books after covid-19.

Out of total responses **40.1% sellers disagrees that high prices of Physical Books make the readers switch to E-Books, 27.5% are neutral on the statement whereas mere 32.4% agrees that E-Books have declined their sales after covid-19.** Hence, it can be concluded that price of the book does not much affect the buying decision of the consumer.

Out of total responses **42.7% sellers agrees that E-Books are preferred as the are more easy to carry, 29.6% are neutral on the statement whereas mere 27.7% agrees that E-Books are preferred as they are easy to carry.** Hence, it can be concluded that convenience is an important factor that attracts the consumers towards E-Books.

Out of total responses **39.6% sellers disagrees that E-Books are preferred by the will of consumer, 28% are neutral on the statement whereas mere 27.7% agrees that E-Books are preferred at the will of consumer.** Hence, it can be concluded that will of the consumer is not an important factor in this case.

Out of total responses **58.5% sellers agrees that consumers are switching to E-Books because of Covid-19, 31.4% are neutral on the statement whereas mere 21% disagrees that E-Books are preferred because of Covid-19.** Hence, it can be concluded that Covid-19 is an important factor in this case.

Out of total responses **42.7% sellers agrees that their consumers feels emotionally attached with physical books, 35% are neutral on the statement whereas mere 22.3% disagrees that consumer fees emotionally attached with Physical Books.** Hence, it can be concluded that consumer feels emotionally attached to physical books.

Out of total responses **67.1% sellers agrees that there was no effect of E-Books on the sale of physical books before Covid-19, 24.6% are neutral on the statement whereas mere 8.2% disagrees that there was no effect of E-Books on the sales of Physical Books before Covid-19.** Hence, it can be concluded that there was no effect of E-Books on the sales of Physical Books before Covid-19.

Out of total responses **68.6% sellers disagrees that there was no effect of E-Books on the sale of physical books after Covid-19, 22.7% are neutral on the statement whereas mere 8.7% agrees that there was no effect of E-Books on the sales of Physical Books after Covid-19.** Hence, it can be concluded that E-Books have affected the sales of Physical Books after Covid-19.

Out of total responses **46.9% sellers agrees that people use to like visiting bookstores before Covid-19, 43.5% are neutral on the statement whereas mere 9.7% disagrees that people liked visiting before Covid-19.** Hence, it can be concluded that people liked visiting bookstores before Covid-19.

Out of total responses **64.3% sellers disagrees that people use to like visiting bookstores after Covid-19, 33.8% are neutral on the statement whereas mere 1.9% agrees that people liked visiting after Covid-19.** Hence, it can be concluded that people do not like visiting bookstores after Covid-19.

Out of total responses **47.3% sellers neutral that bookstores will survive the competition of e-books after COVID-19, 43.5% are neutral on the statement whereas mere 9.7% disagrees that bookstores will survive the competition of e-books after COVID-19.** Hence, it can be concluded that it is still doubted whether the bookstores will survive the competition of e-books after COVID-19 or not.

Out of total responses **94.2% sellers have not added author signed or limited edition books in their product range, 5.8% have added author signed or limited edition books in their product range.** Hence, it can be concluded that very few sellers provide author signed or limited edition books in their product range.

Out of the sellers selling author signed and special edition books **92.3% sellers have agreed that their sales have increased after adding author signed or limited edition books in their product range (before Covid-19), 7.7% are neutral on this statement while non of the sellers have disagreed to this statement.** Hence, it

can be concluded that sellers have experienced an increase in sales after adding author signed or limited edition books in the product range (before Covid-19).

Out of the sellers selling author signed and special edition books **46.2% sellers have agreed that their sales have increased after adding author signed or limited edition books in their product range (after Covid-19), 30.8% are neutral on this statement while 23.1% of the sellers have disagreed to this statement.** Hence, it can be concluded that sellers have experienced increase in sales at a low rate after adding author signed or limited edition books in the product range (after Covid-19).

Out of the sellers selling author signed and special edition books **46.2% sellers have agreed that readers prefer author signed or limited edition books in their product range, after Covid-19, 23.1% are neutral on this statement while 30.8% of the sellers have disagreed to this statement.** Hence, it can be concluded that there is a low decline in the demand of author signed and special edition book after Covid-19.

Out of total responses **60.4% sellers have made sales by providing home delivery option during Covid-19, while 39.6% of the sellers have not made any sales during that period as they were not providing home delivery option to the customer.** Hence, it can be concluded that sales have been made during covid-19 by providing home delivery option.

#### CONCLUSION :

Mode of Operation (i.e., whether the bookstore is operating online, physically or through both), Goodwill of the Bookstore (age of bookstore, behavior of booksellers), Location of Bookstore (in which region of Delhi they are available in) and Types of books booksellers are offering these factors plays vital role in the sales of Bookstores.

Before COVID-19 e-books had negligible effect on the preference of customers but with the advent of COVID-19 a major shift in the preference of consumers can be noted from E-Books to Physical Books.

The sales of Physical Books have not declined due to E-Books before COVID-19 but a sudden decline can be noted in the sales of Physical Books due to E-Books after COVID-19.

No effect of E-Books can be noted on Physical Books before COVID-19 but it can be concluded that E-Books have affected the sales of Physical Books after COVID-19.

Major portion of consumers are switching to E-Books unwillingly (i.e., they are forced to switch to E-Books due to COVID-19), Prices of Books does not contribute in the buying decision of the consumer whereas the attachment of consumer towards Physical Books and Bookstores is an important factor retaining the consumers for Physical Books .

Apart from COVID-19 , convenience in handling E-Books attracts the consumers towards E-Books.

Sellers have experienced an increase in sales after adding author signed or limited edition books in the product range before COVID-19 but after COVID-19 the sales of such Books have been stagnant.(the sales for these Bookstores have not declined as they have resumed their services through home delivery option only after two or three months from the starting of Lockdown.). Apart from these booksellers many other booksellers have also resumed their services from different times during Lockdown by providing home delivery option.

People liked visiting bookstores before Covid-19 but with the advent of COVID-19 people do not prefer visiting Bookstores and inability of major of booksellers to keep up with the guidelines of Government of India issued to tackle COVID-19 , this created a doubtful question that whether the bookstores will survive the competition of e-books after COVID-19 or not.

that sellers have experienced increase in sales at a low rate after adding author signed or limited edition books in the product range (after Covid-19).

It has been observed that the readers in Delhi still, have a positive attitude towards physical books but they do not intend to make a purchase at bookstores. Hence, the booksellers are needed to offer them offers them home delivery option and other options to facilitate their purchase.

Those bookstores which are offering both author signed books/limited edition books and home delivery options are the ones, who are least affected either e-books or covid-19 pandemic.

For the survival of bookstores it is the need of the hour for booksellers to come at the front and to take innovative changes through which their sales could be hyped and need to transform the bookstores with the view to avoid the spread of COVID-19, so that people could visit these bookstores again safely.

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**BIBLIOGRAPHY**

- “BOOK PUBLISHING AND TECHNOLOGICAL DEVELOPMENT : A STUDY ON THE BOOK MARKET Ni ve r Ay a ve R.” 2018.
- Anthony, Joya. 2012. “The Challenge of E-Book Growth in International Markets.” *Publishing Research Quarterly* 28 (4): 273–84. <https://doi.org/10.1007/s12109-012-9292-1>.
- Baidis, Samaher, Albert N. Greco, Michael D. Kontolios, Molly McCullen, Nan Rittenhouse, and Robert M. Wharton. 2019. “Creating Competitive Advantage: The Growth of Independent Bookstores in the U.S. 2009–2018.” *Publishing Research Quarterly* 35 (4): 670–84. <https://doi.org/10.1007/s12109-019-09678-0>.
- Baker, Scott R., Robert A. Farrokhnia, Steffen Meyer, Michaela Pagel, and Constantine Yannelis. 2020. “How Does Household Spending Respond to an Epidemic? Consumption during the 2020 COVID-19 Pandemic.” *Review of Asset Pricing Studies* 10 (4): 834–62. <https://doi.org/10.1093/rapstu/raaa009>.
- Carrenho, Carlo, Miha Kovac, Veronika Licher, and Vinutha Mallya. 2013. “The Global EBook Market,” no. October: 1–104.
- Committee, Review, Committee Chairperson, Applied Management, Decision Sciences Faculty, Committee Member, Health Sciences Faculty, Committee Member, Applied Management, Decision Sciences Faculty, and Denise Dezolt. 2007. “Walden University.”
- Jiang, Yabing, and Evangelos Katsamakas. 2010. “The Impact of E-Book Technology on Book Retailing.” *Proceedings of the Annual Hawaii International Conference on System Sciences*, 1–8. <https://doi.org/10.1109/HICSS.2010.383>.
- Liu, Xiaozhong. 2013. “Full-Text Citation Analysis : A New Method to Enhance.” *Journal of the American Society for Information Science and Technology* 64 (July): 1852–63. <https://doi.org/10.1002/asi>.
- Lousada, Marta Sofia Abrantes. 2012. “From Bookstores to Digital Era: How and Why the Information-Seeking Behavior Is Changing in Education and Which Are the Main Factors That Cause Those Changes and Its Impacts and Challenges on the Future of This Business,” no. November.
- Martinez-Estrada, Pedro David, and Roger N. Conaway. 2012. “EBooks: The Next Step in Educational Innovation.” *Business Communication Quarterly* 75 (2): 125–35. <https://doi.org/10.1177/1080569911432628>.
- Nguyen, Hoang Viet, Hiep Xuan Tran, Le Van Huy, Xuan Nhi Nguyen, Minh Thanh Do, and Ninh Nguyen. 2020. “Online Book Shopping in Vietnam: The Impact of the COVID-19 Pandemic Situation.” *Publishing Research Quarterly* 36 (3): 437–45. <https://doi.org/10.1007/s12109-020-09732-2>.
- Parikh, Kshama, Priyanki Vyas, and Saurin Sharad Parikh. 2020. “A Survey on Reading Habit of Library Users during COVID-19 Lockdown.” *Library Philosophy and Practice* 2020 (September): 1–6.
- Schena, Riccardo. 2014. “E-Book Era,” no. May.
- Woody, William Douglas, David B. Daniel, and Crystal A. Baker. 2010. “E-Books or Textbooks: Students Prefer Textbooks.” *Computers and Education* 55 (3): 945–48. <https://doi.org/10.1016/j.compedu.2010.04.005>.
- “BOOK PUBLISHING AND TECHNOLOGICAL DEVELOPMENT : A STUDY ON THE BOOK MARKET Ni ve r Ay a ve R.” 2018.

- 
- Anthony, Joya. 2012. "The Challenge of E-Book Growth in International Markets." *Publishing Research Quarterly* 28 (4): 273–84. <https://doi.org/10.1007/s12109-012-9292-1>.
  - Baidis, Samaher, Albert N. Greco, Michael D. Kontolios, Molly McCullen, Nan Rittenhouse, and Robert M. Wharton. 2019. "Creating Competitive Advantage: The Growth of Independent Bookstores in the U.S. 2009–2018." *Publishing Research Quarterly* 35 (4): 670–84. <https://doi.org/10.1007/s12109-019-09678-0>.
  - Baker, Scott R., Robert A. Farrokhnia, Steffen Meyer, Michaela Pagel, and Constantine Yannelis. 2020. "How Does Household Spending Respond to an Epidemic? Consumption during the 2020 COVID-19 Pandemic." *Review of Asset Pricing Studies* 10 (4): 834–62. <https://doi.org/10.1093/rapstu/raaa009>.
  - Carrenho, Carlo, Miha Kovac, Veronika Licher, and Vinutha Mallya. 2013. "The Global EBook Market," no. October: 1–104.
  - Committee, Review, Committee Chairperson, Applied Management, Decision Sciences Faculty, Committee Member, Health Sciences Faculty, Committee Member, Applied Management, Decision Sciences Faculty, and Denise Dezolt. 2007. "Walden University."
  - Jiang, Yabing, and Evangelos Katsamakas. 2010. "The Impact of E-Book Technology on Book Retailing." *Proceedings of the Annual Hawaii International Conference on System Sciences*, 1–8. <https://doi.org/10.1109/HICSS.2010.383>.
  - Liu, Xiaozhong. 2013. "Full-Text Citation Analysis : A New Method to Enhance." *Journal of the American Society for Information Science and Technology* 64 (July): 1852–63. <https://doi.org/10.1002/asi>.
  - Lousada, Marta Sofia Abrantes. 2012. "From Bookstores to Digital Era: How and Why the Information-Seeking Behavior Is Changing in Education and Which Are the Main Factors That Cause Those Changes and Its Impacts and Challenges on the Future of This Business," no. November.
  - Martinez-Estrada, Pedro David, and Roger N. Conaway. 2012. "EBooks: The Next Step in Educational Innovation." *Business Communication Quarterly* 75 (2): 125–35. <https://doi.org/10.1177/1080569911432628>.
  - Nguyen, Hoang Viet, Hiep Xuan Tran, Le Van Huy, Xuan Nhi Nguyen, Minh Thanh Do, and Ninh Nguyen. 2020. "Online Book Shopping in Vietnam: The Impact of the COVID-19 Pandemic Situation." *Publishing Research Quarterly* 36 (3): 437–45. <https://doi.org/10.1007/s12109-020-09732-2>.
  - Parikh, Kshama, Priyanki Vyas, and Saurin Sharad Parikh. 2020. "A Survey on Reading Habit of Library Users during COVID-19 Lockdown." *Library Philosophy and Practice* 2020 (September): 1–6.
  - Schena, Riccardo. 2014. "E-Book Era," no. May.
  - Woody, William Douglas, David B. Daniel, and Crystal A. Baker. 2010. "E-Books or Textbooks: Students Prefer Textbooks." *Computers and Education* 55 (3): 945–48. <https://doi.org/10.1016/j.compedu.2010.04.005>.
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**INDICATORS OF FAMILY LIFE WELFARE IN TRADITIONAL ECONOMIC SYSTEM OF MANGGARAI SOCIETY (A CULTURAL LINGUISTIC ANALYSIS)**

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*This study explores indicators of family life welfare in traditional economic system of Manggarai society with special reference to forms and meanings of linguistic phenomena they employ in economic culture discourses of agriculture and animal husbandry in Manggarai language. The study is viewed from cultural linguistics. The study is descriptive in nature. The results of study show that forms and meanings of linguistic phenomena used in economic culture discourses of agriculture and animal husbandry in Manggarai language are specific to Manggarai culture designating indicators of family life welfare in traditional economic system of Manggarai society. As conceptualized in cognitive map of Manggarai society, indicators of family life welfare related to agriculture are marked by availability of abundant corn and rice as staple foods and of vegetables as side dishes, while the indicators of life welfare related to animal husbandry are marked by availability of pigs and chickens raised.*

*Key words: indicator, family life welfare, traditional economic system, Manggarai society*

**INTRODUCTION**

Culture is one of the most prominent features signifying the existence of a society as members of a social group and, at the same time, differentiating them from those of other social groups (Ochs, 1988). The function of culture as the distinctive feature of a society as members of a social group is reflected in language they employ both in macro-interactional levels and in micro-interactional levels like in certain speech events and speech acts (Duranti, 2001). As Kramsch (2001) pointed out, a society is identified as members of a social group as they acquire common ways of viewing the world through interactions with other members of the same group and the views are reinforced through institutions like family and other sites of socialization. Common attitudes, beliefs and values are reflected in the ways they use language, for example, what they choose to say or not to say and how they say it (Wardaugh, 2011). This implies that language in its use as a means of communication among members of a social group serves both as the mirror of their culture and the window of their world. The view comes closest to the conception of Brown (1994) that culture adhered by a society as members of social group is deeply ingrained part of the very fiber of their being, but language as the means for communication among them is the most visible and available expression of culture they adhere.

The use of language as the most visible and available expression of culture shared by a society as members of a social group can be seen, for instance, in the system of economy as one of the main elements shaping the content of their culture. Similar to other elements, the features of language they employ in the system of economy are specific to culture they share as the parent culture in which that language is embedded. This is because the features or characteristics of language they employ designate the cultural conceptualizations ascribed and imprinted in their cognitive map in viewing the world involving the factual world and the symbolic world. Along with the context of use, more specifically, the cultural conceptualizations are reflected in the forms and meanings of linguistic phenomena they employ in the economic culture discourses of agriculture and animal husbandry as the subdivisions of economy system.

Bearing the matters stated above in minds, this study investigates the relationship of Manggarai language, Manggarai culture, and conceptualization of Manggarai society as members of Manggarai ethnic group living or residing in the land of Manggarai which approximately occupies one-third in the length of the island of Flores in the province of East Nusa Tenggara, Indonesia (Erb, 1999; Bustan, et al., 2017; Bustan and Bire, 2018; Bustan and Liunokas, 2019; Bustan and Bire, 2019; Bustan, et al., 2020). As the relationship is so complex that the study is mainly concerned with the indicators of family life welfare in the traditional economic system or small scale economy (Adimihardja, 1983) of Manggarai society paying special attention to the forms and meanings of linguistic phenomena they employ in the economic culture discourses of agriculture and animal husbandry in Manggarai language. As family can be defined differently, the term family that is meant here refers to nuclear family which is known as *kilo koe* 'small family' in Manggarai language and extended family which is known as *wa'u* 'patrilineal-genealogical clan' in Manggarai language (Bustan, 2005).

Along with its main concern, we are interested in conducting the study for the reason that the forms and meanings of linguistic phenomena they employ in the economic culture discourses of agriculture and animal husbandry in Manggarai language are specific to Manggarai culture designating the indicators of family life welfare in the traditional economic system of Manggarai society, as reflected in the cultural conceptualizations ascribed and imprinted in their cognitive map or cultural knowledge. Added to this, even though the traditional economic system is no longer practiced by Manggarai society today because of the application rice field system and the presence of such trading crops as coffee, cloves, and family, the forms and meanings of linguistic phenomena in the economic culture discourses of agriculture and animal husbandry in traditional economic system are still used as the sources of references for them in designating the indicators of their family life welfare (Bustan, 2005). Another reason is that the study is mainly viewed from cultural linguistics as one of the new theoretical perspectives in cognitive linguistics exploring the relationship of language, culture, and conceptualization (Palmer and Sharifian, 2007; Palmer, 1996). This is the novelty dimension of the study because because the results of previous studies show that there has no any study exploring in more depth the indicators of family life welfare in traditional economic system of Manggarai society in view of the perspective of cultural linguistics.

Cultural linguistics, as it name implies, is regarded a new paradigm or model in cognitive linguistics as it draws on the combined resource of anthropological linguistics and cognitive linguistics (Palmer and Sharifian, 2007; Palmer, 1996) in providing an account of the communicative behavior of a society (Malcolm, 2007). In the perspective of cultural linguistics, language is explored through the prism of culture aimed at uncovering conceptualizations ascribed and imprinted in the cognitive map or cultural knowledge of its speakers in viewing the world. The aim is based on assumption that language in its use as a chief means of communication among members of a social group is a window into their minds (Casson, 1981; Whorf, 2001). The assumption is related to the conception that both language and cognition are closely related as the main concern of study in cognitive linguistics (Palmer and Sharifian, 2007).

At the same time, it worth noting that cultural linguistics is an approach to identifying language differences due to cultural differences (Occi, 2007), as Humboldt propounded, the diversity of languages is not the diversity of signs and sounds, but the diversity of cultures. The conception comes closest to the theory of linguistic relativity proposed by Sapir and Whorf that the varying cultural concepts and categories inherent in different languages affect the cognitive classification of the experienced world in such a way that the speakers of different languages think and behave differently. Therefore, the basic concepts that should be taken into account when we explore the relationship of language and culture are as follows: (a) we perceive the world in terms of categories and distinctions found in our native language and (b) what is found in one language may not be found in another language due to cultural differences (Miller, 1968; Sapir, 1949; Richards, et al., 1992).

As language can be defined differently, according to Palmer and Sharifian (2007), in the perspective cultural linguistics, language is defined as a cultural activity and, at the same time, as an instrument for organizing other cultural domains. This is because language used by a society as members of a social group is shaped by their special and general innate potentials as human beings as well as by their physical and sociocultural experiences in the contexts of living together for years. Similar to language, as culture may mean different things for different people, in the perspective of cultural linguistics, culture is defined as the source of conceptualization of experience encountered by a society as members of a social group in their context of living together for years. Culture as the source of conceptualization contains a bulk of cultural knowledge that functions as a display illustrating how they organize their ways of thinking about items, behaviors, and beliefs or events in cultural domains.

On the ground of insight that cultural concepts are embedded in language, the relationship of both language and culture belonging to a society as members of a social group are reflected in their conceptualizations as fundamental cognitive processes which naturally lead to the development of schemas, categories, metaphors, and scripts. The ways a society as members of a social group conceptualize their experiences in cultural domains are called cultural conceptualizations that contain such cultural aspects as beliefs, norms, customs, traditions, and values. As cultural conceptualizations and language are two intrinsic aspects of cultural cognition, cultural conceptualizations have conceptual existence and linguistic encoding. In line with this, language as a central aspect of cultural cognition serves as a collective memory bank for cultural conceptualizations, past and present. This view emphasizes that language is shaped by cultural conceptualizations that have prevailed at different stages in the story of it speakers and these different stages can leave their traces in current linguistic practices. Language in this light is one of the primary mechanisms to store and communicate cultural conceptualizations functioning as a memory bank and, at the same time, as a fluid

vehicle for the retransmission of the socioculturally embodied cultural conceptualizations (Palmer and Sharifian, 2007).

Cultural conceptualizations may not be correlated objectively with external world because cultural conceptualizations are the results of interactions between members of a culture through continuous process of negotiation and renegotiation passing through time, space, and across generations. Besides functioning as a means of communicating cultural conceptualizations, language also serves as a means for embodying the cultural conceptualizations. This is because language as a system of symbols serves as the vehicle for expressing the cultural identity of a society as members of a speech community. The cultural conceptualizations distributed across the minds of a speech community representing their cognition at the cultural level are called linguistic imagery which is concerned with how they speak about the world that they themselves imagine. The linguistic imagery is identified from the physical forms of linguistic phenomena used, while the meanings stored in the forms are interpreted along with the situational context of speech event and the sociocultural context of its speakers as members of speech community of that language (Scharifian, 2007).

Language in its use as a symbolic system with the power to shape and create such cultural realities as norms, values, perceptions, and identities is expressed through discourse as its vehicle (Kramsch, 2001). The significance of discourse as the vehicle for expressing cultural realities can be seen, for instance, when members of a social group interact with each other for particular purposes. To achieve the intended goals of interactions, they produce particular discourses as assemblies of meanings dealing with particular subject matters. When the discourses present a conceptual framework within which significant subject matters are discussed in their culture and latent norms of conduct, discourses in this regard are defined as ideologies or worldviews (Kovecses, 2009; Fairclough, 2003) and, as such, according to Geertz (1973) and Schneider (1976), a discourse is a source of making meaning in a culture.

Along with the conception that meaning as fundamental to language and culture is realised in a cultural discourse as its vehicle, Gumperz (1992) defines cultural discourse as an umbrella term for any form of discourse taking place within a cultural domain that, in terms of its content, it contains a set of items, behaviors, and beliefs defined as belonging to the same category of things. A cultural domain is a basic unit of meaning that shapes how a society as members of a cultural community conceptually organize their worlds. The cultural discourse functions the vehicle for the representation of cultural conceptualizations ascribed and imprinted in their cognitive map. Further, as the use of language as an essential instrument and component of culture is reflected in linguistic structure, a cultural discourse serves as a repository of meanings stored in the forms of linguistic signs commonly shared by members of a culture in which that language is embedded (Kovecses, 2009).

This study is descriptive in nature as it describes the indicators of family life welfare in the traditional economic system relationship of Manggarai society, as reflected in the forms and meanings of linguistic phenomena used in the economic culture discourses of agriculture and animal husbandry in Manggarai language (Muhadjir, 1995; Afrizal, 2014). The study was based on two kinds of data involving primary and secondary data. In line with these two kinds of data, the procedures of research implemented were field and library research. The field research was aimed at collecting the primary data in the land of Manggarai, especially in Ruteng town as the capital city of Manggarai regency as the main location of research. The main sources of primary data were Manggarai society, especially those living in Pagal as the main location of field research. For the purpose of this study, however, they were represented by five key informants selected on the basis of ideal criteria proposed by Spradley (1997), Sudikan (2001), and Bungin (2007). The data were mainly obtained by using ethnographic approach, especially dialogic-ethnographic approach (Spradley, 1997; Geertz, 1973; Hymes, 1974; Duranti, 2001). The methods of data collection were observation, interview, and focused-group discussion elaborated together with recording, elicitation, and note-taking technique. The library research was aimed at collecting the secondary data. The method of data collection was documentary study. The documents used as the sources of the data were general documents (books) and special documents (scientific articles). The data were analyzed qualitatively by inductive method as the analysis was started from data to local-ideographic theory describing the indicators of family life welfare in the traditional economic system of Manggarai society on the basis of cultural conceptualizations ascribed and imprinted in their cognitive map or cultural knowledge paying special attention to the forms and meanings of linguistic phenomena they employ in the economic culture discourses of agriculture and animal husbandry in Manggarai language.

## **RESULTS AND DISCUSSION**

The results of study show that there is a close relationship between Manggarai language, Manggarai culture, and conceptualization of Manggarai society in viewing the world. The relationship is manifested in the cultural



conceptualizations of Manggarai society on the indicators of family life welfare in their economic traditional system, as reflected in the forms and meanings of linguistic phenomena they employ in the economic culture discourses of agriculture and animal husbandry in Manggarai language. The forms and meanings of linguistic phenomena designate that (1) the indicators of family life welfare related to agriculture are marked by the availability of abundant corn and rice as staple foods and the availability of abundant vegetables as side dishes and (2) the indicators of family life welfare related to animal husbandry are marked by the availability of pigs and chickens raised being side dishes. The indicators reveal that the sources of livelihood in the traditional economic system of Manggarai society are (1) agriculture with the main types of crops grown being corn and rice as staple foods and vegetables as side dishes and (2) animal husbandry with the main types of animals raised being pigs and chickens.

### **The indicators of family life welfare related to agriculture**

The indicators of family life welfare related to agriculture in the economic traditional system of Manggarai society are reflected in the forms and meanings of linguistic phenomena they employ in the following verbal expressions: (01) *Latung peno mbaru, woja peno ca'o* 'Corn full house, rice full storehouse'; (02) *Cumang hang gula, remong hang leso, haeng hang mane* 'Meet breakfast, meet lunch, meet dinner'; (03) *Cing nggersili, wela nggerpe'ang, tewar wua, wecak wela* 'Sprout down, flower outward'; and (04) *Tewar wua, wecak wela* 'Sprout down, flower outward, fruits scatter, flowers scatter'. The forms and meanings of linguistic phenomena used in the verbal expressions are lexicosemantically related to one another in revealing the cultural conceptualizations of Manggarai society on the indicators of family life welfare in their traditional economic system related to agriculture as the sources of their livelihood.

#### **Latung peno mbaru, woja peno ca'o.**

As can be seen in the forms of linguistic phenomena used, the verbal expression (01), *Latung peno mbaru, woja peno ca'o* 'Corn full house, rice full storehouse', appears as a compound sentence made up of two independent clauses or complete sentences as its component parts. The two independent clauses or complete sentences as its component parts are (a) *Latung peno mbaru* 'Corn full house' and (b) *Woja peno ca'o* 'Rice full storehouse'. The forms of linguistic phenomena used in the verbal expression imply meanings that, in the cultural conceptualization of Manggarai society, the indicators of family life welfare related to agriculture in the economic traditional system of Manggarai society are marked by the availability of abundant corn in the house, as reflected in the independent clause or complete sentence (a), and the availability of abundant rice in the storehouse, as reflected in the independent clause or complete sentence (b). As conceptualized in the cognitive map or cultural knowledge of Manggarai society, if they have abundant corn available in the house and abundant rice available in the storehouse, they will not suffer from starvation due to the lack of foodstuff, especially is corn and rice as their staple foods.

#### **Cumang hang gula, remong hang leso, haeng hang mane**

As can be seen in the forms of linguistic phenomena used, the verbal expression (01), *Cumang hang gula, remong hang leso, haeng hang mane* 'Meet breakfast, meet lunch, meet dinner', appears as a compound sentence made up of three independent clauses or complete sentences as its component parts. The three independent clauses or complete sentences as its component parts are (a) *Cumang hang gula* 'Meet breakfast', (b) *Remong hang leso* 'Meet lunch', and (c) *Haeng hang mane* 'Meet dinner'. The forms of linguistic phenomena used in the verbal expression imply meanings that, in the cultural conceptualization of Manggarai society, the indicators of family life welfare related to agriculture are marked by eating three times a day. If they have abundant corn and rice as foodstuff produced from their farming lands, they can have breakfast, as reflected in the independent clause or complete sentence (a), they can have lunch, as reflected in the independent clause or complete sentence (b), and they can have dinner, as reflected in the independent clause or complete sentence (c). As conceptualized in the cognitive map or cultural knowledge of Manggarai society, if they only eat twice or once a day due to the lack of foodstuff, especially corn and rice as their staple foods, it indicates that their family life is less prosperous.

#### **Cing nggersili, wela nggerpe'ang**

As can be seen in the forms of linguistic phenomena used, the verbal expression (03), *Cing nggersili, wela nggerpe'ang* 'Sprout down, flower outward', appears as a compound sentence made up of two independent clauses or complete sentences as its component parts. The two independent clauses or complete sentences as its component parts are (a) *Cing nggersili, wela nggerpe'ang* 'Sprout down' and (b) *Wela nggerpe'ang* 'Flower outward'. The forms of linguistic phenomena used in the verbal expression imply meanings that, in the cultural conceptualization of Manggarai society, the indicators of family life welfare related to agriculture are marked by the availability of abundant vegetables, that is sprout (*cing*) and flower (*wela*), as side dishes. As

conceptualized in the cognitive map or cultural knowledge of Manggarai society, if the vegetables they plant in their farming lands grow well, they will not suffer from starvation due to the availability of abundant vegetables as side dishes, or vice versa, if the vegetables they plant in their farming lands do not grow well, they will suffer from starvation due to the lack of vegetables as side dishes other than corn and rice as their staple foods.

#### **Tewar wua, wecak wela**

As can be seen in the forms of linguistic phenomena used, the verbal expression (04), *Tewar wua, wecak wela* 'Fruits scatter, flowers scatter', appears as a compound sentence made up of two compound sentences as its component parts. The two compound sentences as its component parts are (a) *Tewar wua* 'Scatter fruit' and (b) *Wecak wela* 'Scatter flower'. The forms of linguistic phenomena used in the verbal expression imply meanings that, in the cultural conceptualization of Manggarai society, the indicators of family life welfare related to agriculture are marked by the availability of abundant vegetables, that is fruit (*wua*) and flower (*wela*), as side dishes. As conceptualized in the cognitive map or cultural knowledge of Manggarai society, if the vegetables they plant in their farming lands yield abundant crops, they will not suffer from starvation due to the availability of abundant vegetables as side dishes, or vice versa, if the vegetables they plant in their farming lands do not grow well, they will suffer from starvation due to the lack of vegetables as side dishes other than corn and rice as their staple foods.

#### **The indicators of family life welfare related to animal husbandry**

The indicators of family life welfare related to animal husbandry in the economic traditional system of Manggarai society are reflected in the forms and meanings of linguistic phenomena they employ in the following verbal expressions: (01) *Tela galang pe'ang, dila api one* 'Open manger outside, flame fire inside' and (02) *Res baling lele, ras baling racap* 'Chickens cackle around armpits, chickens crackle around sides'. The forms and meanings of linguistic phenomena used in the verbal expressions are lexicosemantically related to one another in revealing the cultural conceptualizations of Manggarai society on the indicators of family life welfare in their traditional economic system related to animal husbandry as the sources of their livelihood.

#### **Tela galang pe'ang, dila api one**

As can be seen in the forms of linguistic phenomena used, the verbal expression (01), *Tela galang pe'ang, dila api one* 'Open manger outside, flame fire inside', appears as a compound sentence made up of two independent clauses or complete sentences as its component parts. The two independent clauses or complete sentences as its component parts are (a) *Tela galang pe'ang* 'Open manger outside' and (b) *Dila api one* 'Flame fire inside'. The forms of linguistic phenomena used in the verbal expression imply meanings that, in the cultural conceptualization of Manggarai society, the indicators of family life welfare related to animal husbandry are marked by the availability of pigs raised outside the house and the availability of foodstuff being cooked in the house. The availability of pigs raised is reflected in the word (noun) *galang* 'manger' in the independent clause (a) which refers to the container of food for pigs. It is conceptualized in the cognitive map of Manggarai society that, if the manger is opened outside the house, it means that they have pigs raised, or vice versa, if the manger is closed, it means that they have no pigs raised. In line with the availability of pigs raised, the indicators of family life welfare are also marked by the availability of foodstuff being cooked in the house. As conceptualized in the cognitive map or cultural conceptualization of Manggarai society, if the fire is flaming in the house, it means that there is foodstuff being cooked, or vice versa, if the fire is not flaming in the house, it means that there is no foodstuff being cooked symbolizing the welfare of a family's life.

#### **Res baling lele, ras baling racap**

As can be seen in the forms of the linguistic phenomena used, the verbal expression (02), *Res baling lele, ras baling racap* 'Chickens cackle around armpits, chickens crackle around sides', is a compound sentence made up of two independent clauses or complete sentences as its component parts. The two independent clauses or complete sentences as its component parts are (a) *Res baling lele* 'Chickens crackle around armpits' and (b) *Ras baling racap* 'Chickens crackle around sides'. The forms of linguistic phenomena used in the verbal expression imply meanings that, in the cultural conceptualization of Manggarai society, the indicators of family life welfare related to animal husbandry are marked by the availability of chickens raised. The availability of chickens raised is reflected in the word (verb) *res* 'crackle' in the independent clause (a) and the word (verb) *ras* 'crackle' in the independent clause (b). It is worth noting that the two verbs, *res* and *ras*, are synonymous used together to emphasize meaning related to the noise of chickens when fed in the morning before sunrise. The use of the two verbs together in the verbal expression also designate that the number of chickens raised is relatively large, especially chicks.

## CONCLUSION

There is a close relationship between Manggarai language and Manggarai culture, and conceptualization of Manggarai society as members of Manggarai ethnic group in viewing the world. The relationship manifested in their cultural conceptualizations on the indicators of family life welfare in their traditional economic system, as reflected in the forms and meanings of linguistic phenomena they employ in the economic culture discourses of agriculture and animal husbandry in Manggarai language. The forms and meanings of linguistic phenomena used reveal that the indicators of family life welfare related to agriculture are marked by the availability of abundant corn and rice as their staple foods and the availability of vegetables as side dishes, while the indicators of family life welfare related to animal husbandry are marked by the availability of pigs and chickens raised. Theoretically, the study contributes the conception that every language represents the world of thoughts with its own ways proposed in the theory of cultural linguistics of Palmer and Scharifian (2007), the conception of culture as a cognitive map proposed in the theory of anthropological linguistics of Foley (1997), the relationship of language and culture in the theory of language and culture of Kramsch (2001), the relationship of language and society in the theory of sociolinguistics of Wardaugh, (1991), the theory of cultural discourse of Gumperz (1992) and Kovecses (2009). Practically, in addition to enhancing the significance of register as functional variation in Manggarai language employed by Manggarai society in the economic culture discourses of agriculture and animal husbandry in Manggarai language, the study might also be beneficial to inspire other researchers who are interested in conducting studies on the features of Manggarai language in other kinds of registers that the forms and meanings of linguistic phenomena used reflect the cultural conceptualizations of Manggarai society in viewing the world involving both the factual world and the symbolic world.

## SOURCE OF REFERENCE

- Adimihardja, K. (1983). *Kerangka Studi Antropologi Sosial dalam Pembangunan*. Bandung: TARSITO.
- Afrizal. (2014). *Metode Penelitian Kualitatif: Sebuah Upaya Mendukung Penggunaan Penelitian Kualitatif dalam Berbagai Disiplin Ilmu*. Jakarta: Raja Grafindo Persada.
- Brown, H. D. (1994). *Principles of Language Learning and Teaching*. The USA: Prentice Hall Regents.
- Bungin, B. (2007). *Penelitian Kualitatif: Komunikasi, Ekonomi, Kebijakan Publik, dan Ilmu Sosial Lainnya*. Jakarta: Prenada Media.
- Bustan, F. (2005). "Wacana budaya *tudak* dalam ritual *penti* pada masyarakat Manggarai di Flores barat: analisis linguistik budaya". *Disertasi*. Denpasar: Program Pascasarjana Universitas Udayana Denpasar, Bali.
- Bustan, F., Semiun, A., and Bire, J. (2017). *The Features of Anthropomorphic Metaphor in the Manggarai language*. Balti: LAP Lambert Academic Publishing.
- Bustan, F. and Bire, J. "The forms and meanings of baby birth cultural discourse in Manggarai language". In *Opcion: Revista de Ciencias Humanas y Sociales*. Facultad Experimental de Ciencias, 34 (14), 2018, pp. 18-29.
- Bustan, F. and Liunokas, Y. (2019). "The forms and meanings of verbal expressions on the existence of God as supernatural power in Manggarai language (a cultural linguistic analysis)". In *International Journal of Innovation, Creativity and Change*, 5 (3), 16, 2019, pp. 442-457.
- Bustan, F. and Bire, J. (2019). *The cultural discourse of baby birth in Manggarai speech community*. Balti: LAP Lambert Academic Publishing.
- Bustan, F., Semiun, A., and Bire, J. (2020). "Conceptualization of Manggarai society on power relationship in marriage kinship". In *Utopia y Praxis Latinoamericana*, vol. 25, no. Esp. 6, pp. 433-441, 2020.
- Casson, R. W. (1981). *Language, Culture and Cognition: Anthropological Perspectives*. New York: Macmillan.
- Duranti, A. (2001). *Linguistic Anthropology: A Reader*. Massachusetts: Blackwell Publishers.
- Erb, M. (1999). *The Manggaraians: A Guide to Traditional Lifestyles*. Singapore: Times Editions.
- Fairclough, N. (2003). *Language and Power: Relasi Bahasa, Kekuasaan, dan Ideologi*. Diterjemahkan oleh Indah Rohmani-Komunitas Ambarawa. Malang: Boyan Publishing.
- Foley, W. A. (1997). *Anthropological Linguistics: an Introduction*. Oxford: Blackwell.

- 
- Geertz, C. (1973). *The Interpretation of Culture: Selected Essays*. New York: Basic Books
  - Goodenough, W. H. (1964). "Cultural anthropology and linguistics. In *Language in Culture and Society: A Reader in Linguistics and Anthropology*. New York: Harper & Row.
  - Gumperz, J. (1992). "Contextualization of language". In *The Contextualization of Language*. Edited by Aldo di Luzio and Peter Aus. Amsterdam/Philadephia: Benyamins.
  - Hymes, D. (1974). *Foundations in Sociolinguistics: An Ethnographic Approach*. Philedelphia: University of Pennsylvania Press.
  - Kovecses, Z. (2009). "Metaphorical meaning making: discourse, language and culture". *Quardens de Filologia. Estudis Linguistics*. Vol. XIV (2009) 135-151.
  - Kramsch, K. (2001). *Language and Culture*. Oxford: Oxford University Press.
  - Miller, R. L. (1968). *The Linguistic Relativity Principle and Humboldtian Ethnolinguistics: A History and Appraisal*. Paris: The Hague
  - Muhadjir, N. (1995). *Metodologi Penelitian Kualitatif: Telaah Positivistik, Rasionalistik, Phenomenologik, Realisme Metaphisik*. Yogyakarta: Rake Sarasin.
  - Occi, D. J. (2007). "Using cultural linguistics to teach English language inferential schemas used in archeology to Japanenese university students." In *Applied Cultural Linguistics*. Edited by Farzard Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
  - Ochs, E. (1988). *Culture and Language Development: Language Acquisition and Language Socialization in Samoan Language*. Cambridge: Cambridge University Press.
  - Palmer, G. B. (1996). *Towards a Theory of Cultural Linguistics*. Austin: The University of Texas Press.
  - Palmer, G. B., and Sharifian, F. (2007). "Applied cultural linguistics: an emerging paradigm." In *Applied Cultural Linguistics*. Edited by Farzard Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
  - Richards, J. C., Platt., and Platt, H. (1992). *Dictionary of Language Teaching & Applied Linguistics*. Essex: Longman.
  - Sapir, E. (1949). *Selected Writings in Language, Culture and Personality*. D. Mandelbaum (ed.). Berkeley CA: University of California Press.
  - Schneider, D. (1976). "Notes toward a theory of culture". In *Meaning in Anthropology*. Edited by Keith H. Basso and Henry A. Selby. Albuquerque: University of New Mexico Press.
  - Sharifian, F. (2007). "L1 cultural conceptualization in L2 learning: the case of Persian-speaking learners of English". In *Applied Cultural Linguistics*. Edited by Farzard Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
  - Spradley, J. P. (1997). *Metode Etnografi*. Diterjemahkan oleh Misbah Zulfa Elizabeth. Yogyakarta: Tiara Wacana Yogya.
  - Wardaugh, R. (2011). *An Introduction to Sociolinguistics*. New Jersey, United States: Wiley-Blackwell.
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**INFLUENCE OF STUDY HABITS ON ACADEMIC ACHIEVEMENT OF PHYSICAL EDUCATION TRAINEES**

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*Study habits are well-planned, and the study structure is purposefully developed to help learners to comprehend academic subjects and pass an exam. A structured programme of subject matter at institutions is referred to as an academic curriculum in the study. The term "study habit" can apply to a student's study method, which might be systematic, efficient, or ineffective. The phrase "study habit" refers to the patterns that a person has established in relation to his or her academic pursuits. It's a one-of-a-kind capability. Some pupils enjoy reading alone, whereas others prefer reading in a group setting. When it comes to identifying the type of study habits, there are no hard and fast rules. It can be passed down or acquired. On his or her own, the child can form his or her own study habits. Academic achievement refers to a student's, instructor's, or institution's progress toward short- or long-term educational goals. The cumulative grade point average (CGPA) and the completion of educational benchmarks such as secondary school diplomas, bachelor's degrees, postgraduate degrees, and degree programmes are used to assess academic achievement. The purpose of the study was to know the influence of study habits on the academic achievement of physical education trainees belong to Kuvempu University. For achieving the purpose of the study thirty-six male post graduate physical education trainees from Kuvempu University were selected randomly. Standard test tools were used to measure Study habits and Academic Achievement. To know the influence of study habits on the academic achievement of physical education trainees Karl Pearson's co-efficient of correlation statistical technique was used at 0.05 level of significance. Analysis of the data concluded that the study habits of physical education trainees were significantly influenced on their academic achievement.*

**Keywords:** Study habits, Academic achievement, Physical Education Trainees, CGPA, Reading Ability

**1. INTRODUCTION:**

Study habits are well-planned, and the study pattern is purposefully designed to help students to understand academic subjects and pass exams. A planned programme of subject matter at institutions is sometimes referred to as an academic curriculum in the study. Furthermore, the study's key goals are to acquire knowledge and habits that will be effective in dealing with new situations, making decisions, understanding ideas, coming up with new ideas, and honing skills (Crow and Crow, 2007). In their study, Sawar et al. (2009) discovered that the most high achievers had a better attitude and orientation toward the least successful pupils. As a result, research, interpretation, and application are required for success in all academic endeavours. Evans and Julius (Evans & Julius, 2015). They went on to state that in educational terms, performance is defined as academic accomplishment, which is the result of a student's regular study, and that education, in turn, trains and strengthens them. Performance can be described as how well or poorly something is performed in accordance with the system's requirements. Students' aspirations for university education are quite high and competitive nowadays. The instructor, being the most important person at the institution, is responsible for providing the best educational service to the pupils. To pass with flying colours in Physics, students must practise a large number of exercises from tutorials, textbooks, prior year examinations, questions, internet questions, or other reference materials. The performance of students is important in producing high-quality graduates who will serve as outstanding leaders and personnel for the country, and thus be accountable for its economic and social progress (Norhidayah et.al, 2009). Academic achievement refers to how much knowledge a student has gained in school (Bashir &Mattoo, 2012). All instructional activities are focused on observing what the learner does.

Study habits are a component that varies in importance in the establishment of children in the field of education, depending on the individual. Study habits are learnt behaviours that allow pupils to work independently.

The phrase study habit can refer to a student's method of study, whether it is systematic, efficient, or unsuccessful. The term "study habit" refers to the habits that an individual may have developed in relation to his or her studying activities. It is a one-of-a-kind skill. Some kids like to read alone, while others prefer to read in a group. Some kids prefer to read alone, while others prefer to read in a group. There are no hard and fast rules for

determining the type of study habits. It can either be inherited or purchased. The child can develop his or her own study habits.

One of the most important indications of a student's performance is his or her study habits. It is clearly established, both theoretically and practically, that hardworking students attain outstanding results in exams and other extracurricular activities. Time Management, Concentration, Note Taking, Reading Understanding, Test Preparation and Test Taking, Reading Speed, Writing Skills, and Test Anxiety Management are the eight types of standard scales used in the study to assess study habits.

Academic achievement is frequently assessed by continuous evaluations or examinations, but there is no consensus on how to assess it or which components of computational thinking, such as declaratory skills or knowledge, are the most important. Furthermore, there are mixed results as to which individual characteristics, such as surroundings, test anxiety, emotions, and motivation, are effective predictors of academic performance. These elements must be taken into account when building educational accomplishment models. Institutions are now paid based on the academic results of their pupils. An institution with a high level of academic accomplishment would be awarded more money than one with a lower level of achievement.

## 2. METHODS AND MATERIALS:

The purpose of the study was to know the influence of study habits on the academic achievement of physical education trainees belong to Kuvempu University. For achieving the purpose of the study thirty-six male post graduate physical education trainees from Kuvempu University were selected randomly during the academic year 2018-2020. Study habits measured by using the study habits inventory (PSSHI) constructed by Palsane and Sharma and Academic Achievement assessed with the help of a Cumulative Grade Point Average (CGPA) of their master degree result declared by the university.

## 3. STATISTICAL ANALYSIS:

To know the influence of study habits on the academic achievement of physical education trainees Karl Pearson's co-efficient of correlation statistical technique was used at 0.05 level of significance. Data were analyzed by means of statistical package for social science (SPSS) 23<sup>rd</sup> version.

## 4. RESULTS AND DISCUSSIONS:

**Table -1: Shows the Minimum, Maximum, Mean Value and Standard Deviation of Variables Selected for the Study**

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Academic Achievement	36	6.01	7.50	6.93	0.33
Budgeting Time	36	2.00	10.00	7.39	1.89
Physical Condition	36	4.00	12.00	8.81	1.97
Reading Ability	36	6.00	16.00	11.31	2.65
Note taking	36	2.00	6.00	4.17	1.21
Learning Motivation	36	3.00	12.00	8.22	2.09
Memory	36	3.00	8.00	5.69	1.51
Taking Examinations	36	8.00	16.00	11.53	2.08
Health	36	2.00	6.00	4.31	1.33
Study Habits	36	43.00	79.00	61.42	8.95

The above table shows the minimum, maximum, mean value and standard deviation of variables selected for the study. It shows minimum, maximum, mean value and standard deviation of selected variable of academic achievement is 6.01, 7.50, 6.93 and 0.33, budgeting time is 2.00, 10.00, 7.39 and 1.89, physical condition is 4.00, 12.00, 8.81 and 1.97, reading ability is 6.00, 16.00, 11.31 and 2.65, note taking 2.00, 6.00, 4.17 and 1.21, learning motivation is 3.00, 12.00, 8.22 and 2.09, memory is 3.00, 8, 5.69 and 1.51, taking examinations is 8.00, 16.00, 11.53 and 2.08, health is 2.00, 6.00, 4.31 and 1.33 and study habits is 43.00, 79.00, 61.42 and 8.95 respectively.

**Table -2: Shows the Correlation between Study habits and Its Dimensions with the Academic Achievement of Physical Education Trainees**

Variables		Academic Achievement
Budgeting Time	Pearson Correlation	<b>0.495**</b>
	Sig. (2-tailed) / p-value	0.002
	N	36

<b>Physical Condition</b>	Pearson Correlation	<b>0.633<sup>**</sup></b>
	Sig. (2-tailed) / p-value	0.000
	N	36
<b>Reading Ability</b>	Pearson Correlation	<b>0.461<sup>**</sup></b>
	Sig. (2-tailed) / p-value	0.005
	N	36
<b>Note taking</b>	Pearson Correlation	<b>0.615<sup>**</sup></b>
	Sig. (2-tailed) / p-value	0.000
	N	36
<b>Learning Motivation</b>	Pearson Correlation	<b>0.564<sup>**</sup></b>
	Sig. (2-tailed) / p-value	0.000
	N	36
<b>Memory</b>	Pearson Correlation	<b>0.378<sup>*</sup></b>
	Sig. (2-tailed) / p-value	0.023
	N	36
<b>Taking Examinations</b>	Pearson Correlation	<b>0.367<sup>*</sup></b>
	Sig. (2-tailed) / p-value	0.028
	N	36
<b>Health</b>	Pearson Correlation	<b>0.398<sup>*</sup></b>
	Sig. (2-tailed) / p-value	0.016
	N	36
<b>Study Habits</b>	Pearson Correlation	<b>0.803<sup>**</sup></b>
	Sig. (2-tailed) / p-value	0.000
	N	36

<sup>\*\*</sup>. Correlation is significant at the 0.01 level (2-tailed).

<sup>\*</sup>. Correlation is significant at the 0.05 level (2-tailed).

The above table shows the correlation between study habits and its dimensions with the academic achievement of physical education trainees. The table indicates that the p-value between budgeting time and academic achievement is 0.002, physical condition and academic achievement is 0.000, reading ability and academic achievement is 0.005, note taking and academic achievement is 0.000, learning motivation and academic achievement is 0.000, memory and academic achievement is 0.023, taking examinations and academic achievement is 0.028, health and academic achievement is 0.016 and study habits and academic achievement is 0.000. Which are all lesser than the Alpha ( $\alpha$ ) value or significant value 0.01 and 0.05 ( $p \leq 0.01$  and  $p \leq 0.05$ ). Hence, it can be concluded that null hypothesis is rejected and formulated the alternative hypothesis that there was a significant relationship between study habits and its dimensions with the academic achievement of physical education trainees. It can be further concluded that study habits and its dimensions significantly influenced on the academic achievement of physical education trainees.

## 5. CONCLUSION:

In view of the finding and limitation of the study, the conclusions were drawn as study habits and its variables like budgeting time, physical condition, reading ability, note taking, learning motivation, memory, taking examinations, and health were significantly influenced on the academic achievement of physical education trainees.

## 6. REFERENCES:

1. Akagah, F. A. (2001). *Influence of Study Habits on Academic Performance of Junior High School Students in the Gomaa West District of Ghana* (Dissertation, University of Education, Winneba). Retrieved from [https://www.academia.edu/25997693/Influence\\_of\\_Study\\_Habits\\_on\\_](https://www.academia.edu/25997693/Influence_of_Study_Habits_on_)
2. Alimohamadi, N., Dehghani, M., Almasi, S., Ashtarani, E., Jonbakhsh, F., Paymard, A., & Khalili, A. (2018). Relation Study between Study Habit and Academic Performance of Nursing Students in Hamadan. *Pajouhan Scientific Journal*, 16(3), 29-38.
3. Amuda, B. G., & Ali, D. G. (2018). Relationship among Study Habits, Gender, Marital Status, Age, Parents' Level of Education and Academic Performance of NCE Students in Kashim Ibrahim College of Education Maiduguri, Borno State, Nigeria. *International Journal of Education, Learning and Development*, 6(4), 78-98.

4. Bantil, J., Donkoh, K. E., & Ghanney, R. A. (2018). Study Habits of Students: Keys to Good Academic Performance in Public Junior High Schools in the Ekumfi District of Ghana. *International Journal of Quantitative and Qualitative Research Methods*, 6(3), 10-23.
5. Chamundeswari, S., Sridevi, V., & Kumari, A. (2014). The present study investigates the relationship between self-concept, study habit and academic achievement of students. *International Journal of Humanities Social Sciences and Education*, 1(10), 47-55.
6. Devi, S. S. (2016). An Investigation into the Study Habits of High School Students in Relation to Their Academic Achievement in Tribal Area of Yercaud. *Shanlax International Journal of Education*, 4(3), 13-18.
7. Dey, C. (2014). Effect of Study Habit on Academic Achievement. *International Journal of Research in Humanities and Social Sciences*, 2(5), 101-105.
8. Gudaganavar, N. V., & Halayannavar, R. B. (2014). Influence of Study Habits on Academic Performance of Higher Primary School Students. *International Journal of Science and Research*, 3(2), 277-280.
9. Hamdan, N. A., Makhtar, N., & Aadenan, A. (2017). Study Habits in Physics Among Students and Effects on Academic Performance. *Advance Physics Letter*, 4(1-2), 9-13.
10. Hassanbeigi, A., Askari, J., Nakhjavani, M., Shirkhoda, S., Barzegar, K., Mozayyan, M. R., & Fallahzadeh, H. (2011). The relationship between study skills and academic performance of university students. *Procedia-Social and Behavioral Sciences*, 30(2011), 1416-1424.
11. Jafari, H., Aghaei, A., & Khatony, A. (2019). Relationship between study habits and academic achievement in students of medical sciences in Kermanshah-Iran. *Advances in Medical Education and Practice*, 2019(10), 637-643.
12. Kaur, A., & Pathania, R. (2015). Study Habits and Academic Performance among Late Adolescents. *Studies on Home and Community Science*, 9(1), 33-35.
13. Khurshid, F., Tanveer, A., & Qasmi, F. N. (2012). Relationship between Study Habits and Academic Achievement among Hostel Living and Day Scholars' University Students. *British Journal of Humanities and Social Sciences*, 3(2), 34-42.



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**INFLUENCE OF TELEVISION ADVERTISEMENT ON FEMALE CONSUMER BUYING BEHAVIOUR WITH RESPECT TO COSMETICS DURING PANDEMIC PERIOD**

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*The current trends among young women in this millennium era wish to have their looks as per their idols portrayed in the cosmetic advertisements. Young women play an important role in the market as they exert enormous influence over the spending power across a growing number of product categories including cosmetics. The beauty industry tends to reveal unrealistic beauty standards in cosmetic advertisements which some may lead to negative effects on young women such as feeling inadequate of self-esteem and lack of self-confidence. As a result of this negative effect of personal beauty evaluation, The purpose of this study is to identify the Influence of television advertisement on female consumer buying behavior with respect to cosmetics at Chennai city, Tamil Nadu during pandemic. The research design used was descriptive in nature and the Sample size was 200 female consumers. The present study followed Friedman test to establish the relationship between television advertisement and female consumer buying behavior with respect to cosmetics. Based on the findings television advertising have great Influence on buying behavior of women customers towards cosmetics products. It was found that there is a greater Influence of Effective Advertisement and Consumer Buying Behavior towards Cosmetics on Satisfaction of them towards Cosmetics especially during COVID period. Based on findings of the study the researchers have given suggestions and conclusions.*

*Key words: Television advertisement, Female consumer Buying behavior & Select cosmetics.*

**1. INTRODUCTION**

The Indian cosmetic industry has witnessed rapid growth over the last couple of decades. In that time the range of cosmetic and beauty products in India has widened tremendously. Indian competitors have begun to manufacture products to cater to an international need. Herbal cosmetics from India have a great demand in the overseas market and many cosmetic products that are manufactured in India today are supplied to international suppliers of branded cosmetic products. New facts that have been reveal that the industry of cosmetic products in India is growing at an average rate of almost twenty percent annually; this increase is attributed to two main factors. The first being the increase for the demand in Indian cost effective products and the second being the increased purchasing power of the average Indian. A boom in the Indian fashion industry has been linked to the increased awareness of Indian people about their appearances and consequently contributed to an increase in the demand for cosmetic products. This means that the Indian cosmetic industry has an even greater potential for growth than it is presently experiencing and it is highly fragmented and concentrated in the Tier - I cities only.

There are also many reasons for the increased demand for cosmetic products in particular. With the introduction of satellite television and a wide array of television channels as well as the internet, the average Indian consumer is constantly bombarded with advertisements and information on new cosmetic products which often translates into the desire to purchase them. Here the advertisement in marketing plays an important role. Advertising changes the behavior of consumers especially in cosmetics products. The companies need to understand the expectations of prospects and according to them they should modify the advertisement to enhance their buying behavior. Women are very fond of cosmetics and they purely rely on television advertisement than other mode of advertisement namely hoardings, pamphlets, journals, newspapers, magazines etc. Hence thorough understanding of consumer behavior and buying motives is considered as a significant responsibility of any cosmetics companies to improve their turnover and to attract majority of women consumers. Consumer behavior is the behavior that consumers display in searching for, purchasing, using and evaluating products, services and ideas which they expect will satisfy their needs.. Therefore the study has been undertaken by the researcher entitled "Influence of television advertisement on female consumer buying behavior towards select cosmetics at Chennai city" to identify the effect of television advertisement on buying behavior of women consumers towards cosmetics at Chennai city

**2. STATEMENT OF THE PROBLEM**

Advertising is essentially to fulfill the traditional desire of firms to reach the ever increasing population so that their products may receive optimum exposure. The role of advertisement; to increase sales revenue and profits of the local firms and increase the demand for goods, has been falling apart. (Sundarsan, 2007). We are considering cosmetic product because we believe it satisfies the conditions of commodities on which it is

effective to advertise. There are a lot of cosmetic products which are differentiated but serve the same purpose. Again these products are believed to have intrinsic qualities which can only be known after it has been used and lastly, some consumers attach strong emotions to the end products of these good and use it to improve their social status.

### 3. OBJECTIVES OF THE STUDY

1. To study the factors influencing buying behavior of female consumer towards cosmetics at Chennai city.
2. To access the level of perception of female consumer towards television advertisement with respect to cosmetics
3. To identify the Influence of television advertisement on consumer buying behavior with respect to cosmetics
4. To suggest possible measures to enhance the television advertisement and to improve the buying behavior with respect to cosmetics.

### 4. LITERATURE REVIEW

**Nirmala et al. (2019)**, in their research concluded that there is a significant relationship between television advertising and buying behavior of women consumers towards cosmetics and it is positively correlated. The women who are in the age group of 41 – 50 and working mostly in the private concern agree that most of the cosmetic products used by them are by the information gained from the television. Especially women buy more number of cosmetic products not only to have good appearance among others but to gain more confidence. In the competitive world, women have to struggle a lot to reach her aspiration; a positive vibration is gained by using cosmetics.

**Ligo Koshy and Dr. S. John Manohar (2016)**, analysed the Influence of Television Advertisements on Buying Behaviour of Youth towards Cosmetics Products. The study was conducted among 100 respondents. The study concluded that the younger generation is spending more time in front of Television. It has created tendency to try out new things. But many of the claims made by the advertisements are baseless. So there must be some legal regulation from the side of the government to control the claims in sales promotion and advertisement. **Ersoy et al. (2015)** tested the attitudes of Turkish men toward beauty intake and elements which can be in all likelihood to influence men' beauty intake behaviour. The effects unconcealed that self-esteem, lifestyle, organization beliefs, shopping for and self-image are critical determinants of fellows' beauty intake. Findings confirmed that beauty buying behaviour of fellows is coupled to self-image and lifestyle. **Mukherjee (2012)** in their study Influence of celebrity endorsement on Brand Image showed that buyers report higher self-brand connection for brands with images that are according to the image of a star that they aspire to be like, particularly within the case when the image of the celebrity and therefore the brand match. **Kumar et al. (2011)**, in their study of advertising and consumer buying behavior with special reference to Nestle Limited, India, showed that, advertising and sales promotion together with the image of a company influence the consumer buying decision. **Ilicic and Webster (2011)** they stated that when consumers buy products there are number of factors that influence them and affect the decision of purchasing the product and one among them is celebrity attachment.

### 5. RESEARCH GAP

The research gap identified is that the above said research does not deal with Influence of television advertisement on women consumer behavior Select branded cosmetics products. Chennai city.

### 6. RESEARCH METHODOLOGY

In this study the researcher has made an attempt to describe the socio-economic status of women consumers and factors pertaining to the women consumer buying behavior towards cosmetics. There has also been an attempt to find out whether there is any association between the television advertisement and women consumer buying behavior towards select cosmetics products by applying statistical tools. Hence, in order to achieve these targets the researcher elects descriptive and analytical study. The data collection method offered by the researcher is primary and secondary data. The primary data were collected from the consumers located in at Chennai city concerning their buying behavior towards select cosmetics products during pandemic period. The researchers have used interview schedule method to gather primary data from the working women. The records and documents concerning with television advertisement and consumer buying behavior were collected from secondary source. A structured questionnaire is framed which contains both open-ended and closed ended questions. The sample size was 200 respondents and therefore the sampling method adopted is convenient sampling technique which has been chosen to pick the sample respondents consistent with the convenient

accessibility and proximity to the researcher. The statistical tools such as frequencies, descriptive, Independent sample t-test and One Way Analyses of Variance (ANOVA), Chi-square test, Bivariate Correlation and Regression and Friedman test were used.

## 7. DATA ANALYSIS AND INTERPRETATION

### Pearson Correlation

**HO:** There is no significant relationship between effectiveness of advertisement, consumer buying behavior and satisfaction towards cosmetics.

**H1:** There is a significant relationship between effectiveness of advertisement, consumer buying behavior and satisfaction towards cosmetics.

**Table 1 Effectiveness of Advertisement, Consumer Buying Behavior and Satisfaction towards Cosmetics (Pearson Correlation)**

Factors	Effectiveness of advertisement	Consumer buying behavior	Satisfaction
Effectiveness of advertisement	1	-	-
Consumer buying behavior	0.868**	1	-
Satisfaction	0.898**	0.918**	1

Source: Primary data

### Multiple Regression

**HO:** There is no significant Influence of effective advertisement and consumer buying behavior on satisfaction of them towards cosmetics.

**H1:** There is a significant Influence of effective advertisement and consumer buying behavior on satisfaction of them towards cosmetics.

**Table 2 Predictor Variables of Multiple Regression Analysis**

Multiple R value	R Square value	Adjusted R2 value	F value	Standard error	P value
0.923	0.852	0.851	538.339	3.90545	<0.001**

Source: Primary data

**Table 3 Coefficients between Effective Advertisement and Consumer Buying Behavior on Satisfaction of them towards Cosmetics**

Variables	USC	SE	SC	t value	P value
(Constant)	4.571	1.028		4.448	<0.001**
Effective Advertisement	0.166	0.045	0.227	3.659	<0.001**
Consumer Buying Behavior	0.302	0.026	0.714	11.503	<0.001**

Source: Primary data

### Friedman Test (Covid time)

**H0:** There is no significant difference in the mean rank of factors attracting the consumer to prefer particular cosmetics brand.

**H1:** There is a significant difference in the mean rank of factors attracting the consumer to prefer particular cosmetics brand.

**Table 4 Factors Attracting Consumer to prefer Particular Brand (Friedman Test)**

Factors	Mean Rank	Chi- square value	P value
Price	5.76	938.321	<0.001**
Packaging	6.62		
Glow	1.53		
Flavor	3.96		
Quantity	5.08		

Lack of skin allergy and irritation	2.16		
Long time sustainability	2.89		

**Source:** Primary data

## FINDINGS

- It is concluded that effectiveness of advertisement and consumer buying behavior towards cosmetics have positive and strong relationship with satisfaction of consumers' towards cosmetics. This implies that as the level of effectiveness of advertisement and consumer buying behavior towards cosmetics increases, the level of satisfaction of them towards cosmetics is also increases.
- The linear combination of advertisement and consumer buying behavior towards cosmetics are significantly related to satisfaction of consumers towards cosmetics ( $F = 538.339$  and  $P = <0.001^{**}$ ). It also implies that the most possible combination of predictor variables could contribute to the relationship with the dependent variable. It also found that there is a direct relationship between effective advertisement, consumer buying behavior and satisfaction of consumers towards cosmetics.
- It is concluded that there is a significant difference among the factors attracting the consumers to prefer particular cosmetics brand. Based on the mean rank, the most significant factor that greatly attract the customers to prefer particular brand is glow (1.53), followed by lack of skin allergy and irritation (2.16), long time sustainability (2.89), flavor (3.96), quantity (5.08), price (5.76) packaging (6.62).

## CONCLUSION

It has been concluded that television advertising have great Influence on buying behavior of women customers towards cosmetics products. It has been found that before purchasing any product, the women consumers' collects information for their proper purchasing decision making activities Television advertisement is having the power to change the opinion of the customers about the product. Women customers are likely to watch more of the advertisement which affects their buying behavior towards cosmetics products. Celebrities leave greater impression especially in the mind of their fans and they have a superior Influence on buying behavior of consumers during Covid 19 Pandemic. Television advertisement has been considered as a strong means of communication media to convey the intended message to the targeted group of customers. The study provides suggestions for the modifications of television advertisement and if the marketers follow these suggestions, it may enhance the buying behavior of women consumers towards cosmetics products.

## REFERENCE

- ASSOCHAM (2013), Associated Chambers of Commerce and Industry in India, <http://www.assocham.org/prels/shownewsarchive.php?id=4128> (Accessed on 13/05/14)
- Bin Junaid A. et al. (2013), "A Study on the Purchase Behavior and Cosmetic Consumption Pattern among Young Females in Delhi and NCR", Journal of Social and Development Sciences, Vol. 4, No. 5, pp. 205-211, May 2013 (ISSN 2221-1152).
- C. R. Kothari, C. R., "Research Methodology", New Age International Publishers, 2<sup>nd</sup> Edition.
- Ekelund, R. B., Jr., and Saurman D. S (1988), "Advertising and the Market Process: A Modern Economic View", San Francisco, CA: Pacific Research Institute for Public Policy.
- Jasmina Ilicic, C. M., & Webster. (2011). "Effects of multiple endorsements and consumer-celebrity attachment on attitude and purchase intention", Australasian Marketing Journal (AMJ), Vol. 19(4), pp. 230-237.
- Philip Kotler, "Marketing Management" 12th edition, Prentice Hall of India.
- Raju, D. D (2013), "The Role of Advertising in Consumer Decision Making. IOSR Journal of Business and Management (IOSR-JBM), Vol. 14(4), pp. 37-45.
- Saksena, G. (1990), "Advertising Through T.V., Social Implications", Journal of Indian Institute of Mass Communication", Vol. 25, No. 1, pp.44-49.
- Sharma, J., and Sharma S (2009), "Sales and Advertisement Relationship for Selected Companies Operating in India", School of Doctoral Studies (European Union) Journal, No. 1.

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**INVESTIGATION INTO ENERGY EFFICIENT AND SUSTAINABLE ASPECTS OF VERNACULAR ARCHITECTURE AS COMPARATIVE WITH MODERN ARCHITECTURE: A CASE STUDY OF HAMIRPUR DISTRICT, HIMACHAL PRADESH**

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**ABSTRACT**

*Concept of sustainability today is not just confined to judicious usage of resources, low energy /energy efficient architecture or green architecture but also addresses centuries' old aspects of architecture interwoven into fabrics of society, evolved from nature in crude form and refined later with advancements in both science and technology. This paper deals with similar aspect of sustainability: vernacular architecture, today keenly seen as alternative solution to high energy and resource consuming modern construction practices. This paper unfolds vernacular architecture through a case study of Hamirpur district located in Indian state of Himachal Pradesh, to explore the social and environmental sustainability hidden in architectural and spatial features of old traditional construction techniques. The aim of research is to highlight merits hidden in the vernacular architectural style which can be incorporated in modern construction practices, identify problems in its use in modern context and suggest ways to mitigate them. The research covered 40 villages (out of total 82) with similar distribution of vernacular and modern conventional architectural style on the basis of visual socio-economic survey based on information as per official document "Development plan –Hamirpur". Further 60 houses at random were selected representative of these villages which comprised of 30 houses for traditional vernacular architectural style: V-I and 30 houses for conventional architectural style: C. Based upon the exhaustive regression analysis of the data collected, conclusions were drawn regarding the ways in which vernacular architecture can contribute towards sustainability.*

*Keywords: Sustainability; Vernacular architecture; Construction; Himachal Pradesh*

**1. INTRODUCTION**

Local people built Vernacular buildings using indigenous and locally available materials constructed by their expertise of local techniques and technology [1, 2]. Therefore, in vernacular buildings planning, design and construction aspects necessarily correspond to traditional knowledge which is the outcome of trial and error methods being refined, modified and perfected over the ages by people [3]. Today building construction industry is one of the major consumers of energy which is increasingly gaining attention for the reasons of optimization of energy usage, achieving energy efficiency and acquiring goal of sustainability [4, 5]. Not only during construction a building also consumes significant portion of energy during its entire lifecycle and maintenance [6, 7, 8]. This aspect therefore also needs to be attended in order to achieve sustainable development in terms of energy efficiency. Vernacular buildings fit most appropriately in this framework for their efficient energy performance and usage [2, 3,]. Not only the embodied energy in case of vernacular materials and buildings is low but also their entire lifecycle shows low carbon footprints which reflects low operational energy consumption [9]. Also, vernacular materials being local and natural, does not exert extra pressure on the natural resources.

Many studies have focused their research work in field of vernacular architecture whereby the area of research has varied from finding of merits and demerits in the indigenous architecture with respect to conventional architecture practices prevalent in the area based on socio-economic surveys and field studies [10-12] to finding of more appropriate solution to the factors responsible for demise of vernacular architecture in the area specific, giving modification of vernacular materials [13-19], amalgamating the types of modified materials with the adapted construction techniques for better performance of vernacular architecture [20-23], giving guidelines as adaptations in design and planning aspects for better acceptability of indigenous architecture [24-26], gauging thermal performance of vernacular buildings as against the conventional buildings [27-33], giving solutions as design parameters for maintaining conducive temperature range for the houses. The researchers undertook surveys, field measurements based on certain parameters [34-39]. Present work focuses study on indigenous vernacular architecture style of District Hamirpur. For this purpose, case study of different types of residential units of the district was conducted for 60 houses which constituted 30 vernacular and 30 conventional houses. Data was recorded for these houses in terms of spatial dimensions, observations, questionnaires, aesthetic features. Then two representative houses were selected with more or less same design pattern and number of occupants but with different materials used.

## 2. VERNACULAR ARCHITECTURE OF HAMIRPUR

The case studies of houses and their analysis reflect a typical living/ spatial pattern and the use of design principles prevalent in the area having subtropical warm humid climate. The study includes plans, sections and the photographs of houses to understand the type of spatial pattern and the architectural construction techniques in hidden in vernacular style.

### 2.1 Location

Situated at an altitude of about 765 meters, Hamirpur town has 30°41' 00" North latitude and 76°31' 00" East Longitude. Hamirpur has sub-tropical climate with average yearly rainfall of about 124.8cms. [40-42].

### 2.2 Climate

The state of Himachal Pradesh has been divided into four bio-climatic zones namely: 1) High hills temperate dry, 2) High hills temperate wet, 3) Mid hills sub humid and 4) Sub-montane and low hills subtropical. The study area of Hamirpur falls in fourth category that is sub-montane and low hills subtropical bio-climatic zone [40-42].

## 3. METHODOLOGY

For understanding the architectural features in terms of vernacular and conventional architecture of Hamirpur district, whole district was studied with the help of Development Plan Hamirpur and then the specific areas were taken out as representative of two architectural styles on the basis of exhaustive survey of whole area. After demarcation of the whole district few villages were selected as representative for each style. These areas were studied with the help of questionnaire based socio-economic surveys, field measurements incorporating recording of spatial measurements, dimensions, architectural features, material usage. All the 82 villages were visited for observation of architectural style prevalent. It was found that out of total 82 revenue villages of Hamirpur district 50% villages that is nearly 40 have more or less same distribution of vernacular styled and conventional styled houses with family size varying from three to five.

Further based upon their percentage, respective numbers of houses were selected for socio-economic survey and field measurements. Out of these 40 villages 60 houses were selected. The houses were grouped into following architectural style categories based on visual survey and observations. These 60 houses comprised of 30 houses in traditional vernacular architectural style: V-1, 30 houses in conventional architectural style: C on the basis of visual survey and field observations. Here, V-1 category represents those houses which are very old (up to 60-70 years) and involves usage of vernacular materials for construction of various systems like local stone and adobe bricks for foundations, adobe bricks for walls, bamboo and wood for roof and rammed earth and mud phuska for floors. C category represents those houses which are made of conventional modern materials with conventional styled construction practices like use of burnt bricks for walls, tiles for finish, R.C.C roof and floor made of cement concrete and marble/tiles.

As indicated by literature review [34], there are factors influencing the vernacular architecture perception and preference of people for a particular construction system. These factors have been categorized on the basis of form, shape, style, age, location, social order, local culture, environment, building orientation, envelope design, building layout, size, materials used and their condition, shading, openings and activities areas, accessibility, selected architectural elements and spatial patterns (representative of socio-cultural and climate aspects), indoor environment relation with basic living requirements, housing aspects, building prospective aspects and sustainable development. These factors have been summed up more appropriately in the form of physical conditions of the house, social and cultural aspects related with the house, technological and lifestyle requirements as functional requirements, sustainable performance aspects and building prospective aspects as given in Table 1. Weights and ratings used for calculation purposes were as; 3: criteria most prevalent, 2: criteria average prevalent, 1: criteria less Prevalent, 0: criteria not prevalent as per Guttman scale to understand prevalence of existing building spatial features of different houses in coherence with socio-economic and cultural factors as explained in later section 5.

## 4. ANALYSIS

The objective of the case study through spatial measurements and socio-economic questionnaires is to identify sustainable building materials and energy efficient features in the design and planning of the vernacular houses. Results of the regression analysis of data collected through case study for traditional vernacular houses and modern conventional houses have been presented in subsequent subsections.

### 4.1 Traditional vernacular house; V-1

These houses are more than 70 years old and are made of adobe brick (mud sun-dried brick) walls, thatch/slate roof and mud/stone flooring (Fig.1). Houses have very simple linear layout with generally two to three habitable

rooms, a small store, separate kitchen and verandah in front. Openings are smaller in size. Walls construction involves the use of mud, ground floor is made up of stone flooring topped by coatings of cow dung and mud called mud phuska, and upper floors are made of wood with bamboo and mud phuska, while wooden rafters with bamboo lengths, bamboo splits in the form of chachra topped by slates are used for roof construction. Perception of people was recorded through exhaustive questionnaires in terms of housing aspects, sustainable performance and building prospective aspects.



**Fig 1.** Traditional vernacular styled Houses: V-1 selected for monitoring

#### 4.2. Conventional modern houses: C

These houses are generally recent constructions (20-30 years old) and are made of burnt brick walls, reinforced cement concrete sloping or flat roof and cement concrete /tiled/marble /terrazzo flooring (Fig. 2). Spatial arrangement of these houses are spacious with additions of more informal spaces in the form of dining rooms, living rooms, Pooja room, etc. as against presence of only sleeping, cooking and store area as in case of vernacular houses. Construction of houses include use of modern materials with design and planning suiting to modern lifestyle conditions. Walls are constructed with burnt bricks, ground floor and upper floors are made up of cement concrete /tiles or marble, and roof is made with reinforced cement concrete slab. Perception of people was recorded through exhaustive questionnaires in terms of housing aspects, sustainable performance and building prospective aspects.



**Fig.2** Modern conventional houses: C selected for monitoring

Existing building construction scenario interwoven with socio-economic and cultural patterns of the study area was studied in terms of different features in both architectural styles as listed in Table 2.

**Table 2.** Comparative analysis of design-planning features of vernacular and conventional houses of District Hamirpur, Himachal Pradesh

S N	Elements	Vernacular architecture		Conventional architecture	
		Features	People preference	Features	People preference
1	Materials	Wood, slates, stone, adobe, bamboo	Partially preferred (1)	Reinforced cement concrete, Wood, Aluminum, Marble, Tiles, Steel	Partially preferred (1)
2	Spatial planning	Loosely packed houses, sunspaces in front and back in cold areas etc.	Preferred (2)	Compact house plans including extensive use of heating and cooling equipment	Not preferred (0)
3	Aesthetics	Less pleasing, simple and functional	Not preferred (0)	Pleasing by use of conventional materials like marble, tiles	Preferred (2)

		aesthetics		(ornamentation materials)	
4	Technology/ techniques	Self-help tendencies	Preferred (2)	Uses sophisticated tools, machines, and equipment and labour with technical expertise	Partially preferred (1)
5	Transportation cost	Negligible/ very low since material available nearby	Preferred (2)	High since burnt bricks, marble, cement, steel etc. required, comes from specialized locations	Partially preferred (1)
6	Thermal comfort	Very high, do not require external energy equipment	Highly preferred (3)	Low without the use of external supplementary	Not preferred (0)
7	Maintenance and repair	Periodic, laborious and tedious process)	Not preferred (0)	Long period generally after 10-15 years, comparatively easy maintenance	Highly preferred (3)
8	Natural light and ventilation	Inbuilt provisions	Preferred (3)	Not always & generally artificial lighting is provided	Partially preferred (1)

**Source:** compiled by author based on pilot study of 60 residences (30 vernacular architecture style, 30 conventional/contemporary architecture style); *People's preference: (Guttman scale): not preferred: 0, partially preferred: 1, preferred: 2, highly preferred: 3*

As is given in the Table 2, the study showed that traditional vernacular houses have advantages of better indoor thermal environment, low cost of construction and maintenance, ease of construction and most importantly use of eco-friendly materials which makes this system sustainable and better over conventional modern style but due to problems like structural defects and difficulty of maintenance, it is being replaced by conventional modern style at a very rapid pace. However, traditional vernacular houses have defects namely plaster peeling, structural and surface cracks, deterioration, infestation by rodents & termites and problems of dampness resulting in frequent repair and maintenance, however, there is no problem of excessive heat gain or loss in seasons of summers and winters. However, conventional houses, problem of excessive heat loss and gain in winter and summer respectively is present, resulting in creating an uncomfortable indoor thermal environment.

## 5. RESULTS AND DISCUSSION

Based upon the comparative analysis of different design-planning features and spatial layout of vernacular and modern houses, some advantages and disadvantages in both types of architectural styles were arrived at which further indicated the problematic areas in both types of architectural styles. Comparative analysis of both architectural style yielded advantages and disadvantages in both the styles as listed in Table 3.

Analysis of advantages and disadvantages of both architectural styles that is vernacular architecture comparative with modern conventional architecture showed that vernacular architecture has many sustainable design and planning features which can be incorporated in modern dwellings to make them more energy efficient and sustainable. It also helped in identification of problems forming the basis of its replacement by less energy efficient and sustainable modern conventional architecture. Climate responsive passive design, planning features of traditional vernacular architecture which can be advantageously used in modern houses to improve their indoor thermal environment located in similar composite climatic zone are identified as: provision of verandah in front of house, solariums, small sized windows on south side, orientation of building as per sun and wind direction, provision of proper drainage and insulation at roof level, protection of walls against weathering agents like rain, avoiding unnecessary use of glazed tiles where it can be avoided and replaced by more eco-friendly materials like modified adobe and stone, avoiding unnecessary glazed windows.

**Table 3** Advantages and disadvantages of both architectural styles

V1: Traditional vernacular style	C: Conventional modern style
<b>Advantages</b>	
Better Thermal comfort	More durable construction



Sustainable building materials	No problem of Deterioration and structural or surface cracks
Energy efficient designing and planning	No problem of Plaster peeling and infestation
Low cost construction	High Design flexibility
Self-help tendencies	More room height
<b>Disadvantages</b>	
Problems of deterioration, cracks (structural and surface), plaster peeling, infestation by rodents, termites, dampness	Excessive heat gain in summers and excessive heat loss in winters
Requires frequent maintenance	Indoor thermal environment uncomfortable
Masons with knowledge not available	Construction and maintenance of structure expensive
Less room height and no design flexibility	New conventional materials neither eco-friendly nor energy efficient

Further, in order to propagate vernacular architecture there is need to check problems in its use like structure and design problems in terms of low compressive strength and durability of building material adobe, inflexibility of structural design to undergo renovation and change as per changing lifestyle requirements, deterioration defects in terms of structural and surface cracks, in availability of masons, changing trends of construction that is preference for modern and aesthetically appealing materials like marble, ceramic tiles etc. which restrict the use of vernacular construction techniques on wider scale. This forms the ground work for future research work for further improvement in vernacular materials to suit to present modern lifestyle requirements or to modify modern conventional architecture in order to make it more energy efficient and sustainable.

## 6. CONCLUSION

Vernacular wisdom has never failed to provide comfortable solutions which serve the dual purpose of serving under financial constraints and constraints on energy resources thus helping to achieve sustainability. Built-in mechanism of vernacular architecture in their construction techniques, technologies and materials take care of environmental concerns. For these reasons even today although tremendous advancement has been made in terms of materials and sophisticated construction equipment and techniques still this indigenous sector remains a main backbone that can always be relied upon in terms of energy crisis, resources depletion and environmental degradation. Vernacular architecture has climate responsive energy efficient features and involves use of sustainable building materials. While the energy efficient bio-climatic features can be successfully amalgamated in design process of modern houses, vernacular building material like adobe can be modified by improving its compressive strength and durability properties. This vernacular material modification can successfully mitigate the problems of structural defects like cracks, plaster peeling, infestation, and erosion by weathering agents and design flexibility in rural mud houses thereby making this vernacular material more suitable to suit to design-planning needs of modern housing.

## REFERENCES

- [1]. Oliver P. 1997. Encyclopedia of vernacular architecture of the world. Cambridge University Press.
- [2]. Oliver P. 1983. Earth as a building material today. Oxf. Art J. 5(2), 31–38,
- [3]. Sassu M. 2011. Vernacular housing construction. University of Pisa, Italy, In: World Housing Encyclopedia. <http://www.world-housing.net/>
- [4]. Tiwari P. 2001. Energy efficiency and building construction in India. Building and Environment. 36(10), 1127–1135.
- [5]. Yan H., Shen Q., Linda C.H. Fan, Wang Y., Zhang L. 2010. Greenhouse gas emissions in building construction: A case study of One Peking in Hong Kong Building and Environment. 45(4), 949–955.
- [6]. Oka T., Suzuki M., Konnya T. 1993. The estimation of energy consumption and amount of pollutants due to the construction of buildings, Energy and Buildings. 19(4), 303–311.
- [7]. Chandel S. S., Sharma A., Marwaha B. M. 2016. Review of energy efficiency initiatives and regulations for residential buildings in India. Renew. Sustain. Energy Rev. 54,. 1443–1458,
- [8]. Reddy B.V., Jagadish K.S. 2003. Embodied energy of common and alternative building materials and technologies, Energy and Buildings. 35(2), 129–137

- 
- [9]. Tiwari P., Parikh J., Sharma V. 1996. Performance evaluation of cost effective buildings—a cost, emissions and employment point of view. *Build. Environ.* 31(1), 75–90.
- [10]. Teo E. Ai-Lin, Guangming L. 2010. Developing a model for computing the building adaptation potential index for public housing in Singapore. *Architectural Science Review*, 53(12), 429–440.
- [11]. Majakairamo. 1975. Vernacular architecture and its adaptation to the needs of modern life: the situation in Finland”, ICOMOS, VOL.15 Symposium on vernacular architecture, Plovdiv, Sept. 24-Oct 2. [http://www.international.icomos.org/monumentum/vol15-16/vol15-16\\_9.pdf](http://www.international.icomos.org/monumentum/vol15-16/vol15-16_9.pdf)
- [12]. Foruzanmehr A., Vellinga M. 2011. Vernacular architecture: questions of comfort and practicability. *Building Research & Information*. 39(3).
- [13]. Sharma V., Marwaha B.M., Vinayak H., Sharma A. 2014. Bio-Climatic Features of adobe Vernacular Houses of Hamirpur. *SITACEE*, New Delhi, India. 211–215.
- [14]. Sharma V., Marwaha B. M., Hemant K. V, Sharma Aniket. 2014. Understanding vernacular architecture: a case study of Hamirpur district of Himachal Pradesh, *NICHE*, Jalandhar, India, 593–598,
- [15]. Sharma V., Vinayak H.K., Marwaha B.M., 2015. Enhancing compressive strength of soil using natural fibers. *Construction and Building Materials*. 93, 943–949.
- [16]. Sharma V., Vinayak H. K., Marwaha B. M. 2015. Enhancing sustainability of rural adobe houses of hills by addition of vernacular fiber reinforcement. *International Journal of Sustainable Built Environment*. 4, 348–358.
- [17]. Sharma V., Vinayak H. K., Marwaha B. M. 2016. Enhancing durability of adobe by natural reinforcement for propagating sustainable mud housing. *International Journal of Sustainable Built Environment*. 5(1), 141–155.
- [18]. Shukla A., Tiwari G. N., Sodha M. S. 2009. Embodied energy analysis of adobe house. *Renew. Energy*, 34(3), 755–761.
- [19]. Quiteria A., Ángeles M., Vicente G , Sántolaria-Montesinos J. L. 2012. Traditional braces of earth constructions. *Construction and Building Materials*. 30, 389–39.
- [20]. Liu J., Hu R., Wang R., Yang L. 2010. Regeneration of vernacular architecture: new rammed earth houses on the upper reaches of the Yangtze River Front. *Energy Power Eng. China*. 4(1), 93–99.
- [21]. Foruzanmehr A., Nicol F. 2008. Towards new approaches for integrating vernacular passive-cooling system into modern building in warm-dry climates of Iran. In *Proceedings of conference: Air Conditioning and the low Carbon Cooling Challenge*, Cumberland Lodge, Windsor, UK. London.
- [22]. Bezemer V. 2008. Can Vernacular Architecture in the Tropics assist with Modern Passive Ventilation Design in Domestic Buildings?. <http://cambodiarchitecture.files.wordpress.com>
- [23]. Singh J. Down to Earth The Mud Architecture of Didi Contractor: A photo-essay (Works of Didi contractor in the Kangra Dharamshala Region ), [www.scribd.com/doc/44677665/Down-to-Earth-Didi-Contractor](http://www.scribd.com/doc/44677665/Down-to-Earth-Didi-Contractor)
- [24]. Majida N.H.A., Shuichi H., Takagi N. 2012. Vernacular Wisdom: The Basis of Formulating Compatible Living Environment in Oman. *Sciences*. 19, 637–648
- [25]. Kennedy J. F. 2004. *Building without Borders: sustainable construction for the global village*. New Society Publishers, Canada
- [26]. Singh M. K., Mahapatra S., Atreya S. K. 2009. Bioclimatism and vernacular architecture of north-east India,” *Build. Environ.* 44(5), 878–888.
- [27]. Bouden C., Ghrab N. 2005. An adaptive thermal comfort model for the Tunisian context: a field study results. *Energy and Buildings*. 37(9), 952–963.
- [28]. Richard J.D., Brager G. 1998. Developing an adaptive model of thermal comfort and preference, *ASHRAE Transactions*. 104(1).
- [29]. Algifri A.H., Bin Gadhi S.M., Nijaguna B.T. 1992. Thermal behaviour of adobe and concrete houses in Yemen, *Renewable Energy*, Volume 2, Issue 6, December, Pages 597–602
-

- 
- [30]. Singh M. K., Mahapatra S., Atreya.S. K. 2010. Thermal performance study and evaluation of comfort temperatures in vernacular buildings of North-East India. *Build. Environ.* 45(2), 320–329,
- [31]. Singh M. K., Mahapatra S., Atreya.S. K. 2011. Adaptive thermal comfort model for different climatic zones of North-East India. *Appl. Energy*. 88(7), 2420–2428.
- [32]. Singh M. K., Mahapatra S., Atreya.S. K. 2010. Thermal monitoring and indoor temperature modeling in vernacular buildings of North-East India. *Energy and Buildings*. 42, 1610–1618.
- [33]. Olesen B.W., Parsons K. C. 2002. Introduction to thermal comfort standards and to the proposed new version of EN ISO 7730. *Energy Build.* 34(6), 537–548,
- [34]. Chandel S.S, Sharma V., Marwah BM. 2016. Review of energy efficient features in vernacular architecture for improving indoor thermal comfort conditions. *Renewable and Sustainable Energy Reviews*. 65, 459–477
- [35]. Foruzanmehr A., Vellinga M., 2011. Vernacular architecture: questions of comfort and practicability. *Build. Res. Inf.*, 39 (3), 274–285.
- [36]. Pacheco-Torgal F., Jalali S. 2012. Earth construction: Lessons from the past for future eco-efficient construction. *Constr. Build. Mater.* 29, 512–519.
- [37]. Lynne E., Adams C. 2005. *Alternate Construction: Contemporary Natural Building Materials*. John Wiley & Sons, New Delhi.
- [38]. Baird G., Leaman A., Thompson J. 2012. A comparison of the performance of sustainable buildings with conventional buildings from the point of view of the users. *Architectural Science Review*. 55(2).
- [39]. Singh M. K., Mahapatra S., Atreya.S. K. 2011. Solar passive features in vernacular architecture of North-East India. *Solar Energy*. 85(9), 2011–2022.
- [40]. Agro climatic zones. Department of agriculture, <http://www.hpagriculture.com/agro.htm> on 12th Oct. 2012
- [41]. Revised Development Plan. Hamirpur, <http://himachal.nic.in/tcp/DPHamirpur.pdf>
- [42]. Geographical feature of Himachal Pradesh. <http://hpplanning.nic.in/GEOGRAPHICAL%20FEATURES%20OF%20HIMACHAL%20PRADESH.pdf>
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**JOB SATISFACTION AND WORK MOTIVATION IN PRIVATE SECTOR BANKS EMPLOYEES: A REVIEW LITERATURE**

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**Niyati Sharma<sup>1</sup> and Dr. Anurag Shakya<sup>2</sup>**Research Scholar<sup>1</sup> and Associate Professor<sup>2</sup>, Institute of Business Management, Mangalayatan University, Beswan, Aligarh (UP)**ABSTRACT**

*The study examined that the relationship between job satisfaction and job motivation has a positive effect on employees and also increases their job performance. Private sector banks provide transaction service liquidity fluctuations faster than government banks in India. This document has been prepared for the identified people who work for private sector banks, their environment, their work motivation and everything related that may influence banking sector employees for their performance and work motivation. The study examined that the relationship between job satisfaction and job motivation has a positive effect on employees and also increases their job performance. Private sector banks provide liquidity fluctuations in transaction services faster than government banks in India. This document has been prepared for the identified persons who work for private banking, their environment, their work motivation and everything related to it that may influence the performance and work motivation of employees in the banking sector.*

*Keywords: Job Satisfaction, Work Motivation, Private Banks, Relationship, Review Literature*

**INTRODUCTION**

In recent years, the banking industry has been able to attract young talents who choose banking as a career path. The type of work is changing at a rapid pace and the factors that make employees happy with their work are also changing. Contemporary Banking considers the satisfaction of its employees as the most important thing to retain its valuable professionals (Islam and Hasan, 2005). Job satisfaction is the difference between what people expect and want from work and what is actually offered to them (Lim, 2008). In this age of fierce competition, the success of any organization depends on its human resources.

Banks are no exception. Bank employees are a valuable asset of the organization. If they are very satisfied, they will produce more than is profitable for the organization. Therefore, in this highly competitive environment, it is necessary to understand employee attitudes towards work and measure satisfaction in all aspects of job satisfaction (Bhatti, 2011). Effectively managing the bank's staff and maintaining a high level of satisfaction and enthusiasm at work not only determines the performance of the bank, but also determines the growth and performance of the entire economy. Job satisfaction refers to a person's emotional response to work. Therefore, it is an integral part of the corporate environment and an important part of employee relationship management. Job satisfaction is the positive emotional state that occurs when a person's work appears to be in line with their important work values (Katuwal & Randhawa, 2007). There are several factors that affect employee satisfaction with the workplace, including architectural design, air quality and temperature, noise and lighting, the ability of employees to customize the workplace.

**JOB SATISFACTION**

Job satisfaction is a positive feeling that arises among the employees about the love and employee satisfaction with their work. High job satisfaction can increase employee motivation and loyalty and low job satisfaction can decrease employee motivation and loyalty when there are multiple indicators of job satisfaction. However, according to Hasibuan (2016), job satisfaction is a pleasant emotional environment and you love the job. This attitude is reflected in work ethic, discipline, and job performance. Job satisfaction is enjoyed in the workplace, outside of work, and a combination of internal and external work. According to Titisari (2014), job satisfaction is an expression of the feelings or attitudes of a person towards their work, opportunities for promotion, relationships with colleagues, supervision and satisfaction with the job itself. However, Priansa (2014) found that job satisfaction has a positive influence on the organizational goals

Job satisfaction is a very important attribute that organizations often measure. Organizational scientists have long been interested in why some people are very satisfied with their work, while others are significantly less satisfied. (Locke, 1976). The search for to understand and explain job satisfaction was motivated by useful and practical reasons, as it can increase productivity, improve organizational commitment, decrease absenteeism and turnover, and ultimately increase employee turnover. organizational effectiveness. In essence, this facet is critical for air defense operators, as their roles and responsibilities were to maintain national security, requiring a highly skilled workforce with the right attitudes, knowledge and skills. In this sense, it takes time, effort, and

high cost to train and retrain an airman to the level required to perform a specific task. Job satisfaction also affects humanitarian interests, as employees deserve to be treated with respect and their psychological and physical well-being maximized. Schnake (1991) found that a satisfied employee usually met or exceeded their formal job requirements. While a dissatisfied worker tends to engage in counterproductive behaviors, such as withdrawal, burnout, and aggression in the organization.

Tomar, Shalini (2016), presents the title “Analysis of employee motivation in the banking sector” Employees are the most important factor in the success and failure of any organization. Motivational factors play an important role in increasing employee job satisfaction. In return, satisfied employees can help improve company performance. In this study, motivation was examined as one of the most important factors that can potentially contribute to employee performance relative to the banking sector. According to the results of the study, the most important motivating factors for employees are “fair pay and support”, “expanded health services and other social facilities” and “work environment”. Another decisive result of the study is the fact that the “fair pay and promotion” with the highest potential for employee motivation does not differ according to demographic characteristics. As at present, all banks have strict HR policies to keep their staff, but after that there are some loopholes whereby staff are not well motivated to work with nationalized banks. Since there are currently two types of banks, one is the public sector and the other is the private sector. In between, private sector banks attract people by offering higher salaries and other benefits, thus requiring strong public sector banking personnel policies.

Gupta, Shalini and Pandey, Vinay Kumar (2016), stated in the study “SBI Employee Satisfaction A Case Study of SBI Gorakhpur Districts”, In this age of competitive world, the success of any organization depends on its human resources. Banks are no exception to this rule. Bankers are valuable assets of the organization. If they are very satisfied, they will produce more and that benefits the organization. Thus, in this competitive environment, it is necessary to know employees' views of their work and measure satisfaction with various aspects of job satisfaction. Effectively managing human resources and maintaining a higher level of job satisfaction in a bank not only determines the Bank's performance, but also affects the growth and performance of the entire economy. . Thus, for the success of the bank, it is important to effectively manage human resources and determine if the bank's employees are satisfied, as long as they are satisfied they will work with them. commitment and positive image of the organization. If they are very satisfied, they will produce more and it will pay off to the Job Organisation. Satisfaction is an integral part of the organizational environment and an important factor in the relationship with management personnel.

Khan, Suhaila Sikeen (2015), “Measuring Employee Job Satisfaction Using Demographic Data: An HDFC Bank Study”, in this highly competitive world, the success of any company depends on its human resources. Banks are no exception. A satisfied, happy and hardworking employee is the greatest resource in any business, including banks. A bank's workforce is largely responsible for its increased productivity and profitability, as well as increased shareholder value, and it also plays a vital role in sustaining the economic development of a country. In view of this widespread opinion, the present study attempted to assess the job satisfaction of HDFC bank employees in the Kashmir division. The study also focused on the influence of various demographic factors such as age, gender, income, education, position, and marital status on employees' overall job satisfaction. The study used an independent student test and a one-time ANOVA to reveal variation, if any, between overall job satisfaction level and demographic / control variables. According to data from two hundred respondents, the results showed that employees are satisfied

Job satisfaction indicators according to Spector Yuwono (2005), namely:

1. Wages: the amount and sense of justice
2. Promotion: opportunity and a sense of fairness to get a promotion
3. Supervision: fairness and competence of managerial assignments by supervisors
4. Benefits: insurance, holidays and other forms of facilities
5. Contingent rewards: respect, recognition and appreciation
6. Operating procedures: policies, procedures and rules
7. Coworkers: fun and competent coworkers
8. Nature of work: the task itself can be enjoyed or not
9. Communication: various information within the organization (verbal and nonverbal)

10. 13. Take care of organizational property and / or not waste it.
11. 14. Work safely.
12. 15. Do not circumvent organizational rules including sick leave.

### **WORK MOTIVATION**

Work motivation is a wave of energy that arises from within the employee that does a job effectively, efficiently and at most with passion to achieve the expected goals, for which there are various indicators of work motivation. However, according to Sunyoto (2013), work motivation is a part of the situation that encourages the individual activities to carry out certain activities in order to achieve their desires. Work motivation is a potential force that exists in a person that can be developed through a series of external forces, which basically revolve around monetary rewards and non-monetary rewards, which can positively or negatively affect results. Performance. Meanwhile, according to Hasibuan (2011), work motivation is providing a motivation that creates a person's enthusiasm for work so that they are willing to work together, to work effectively, and is integrated into all of its efforts . to achieve satisfaction.

Also according to Winardi (2009) states that work motivation is: "a latent force that has in people, which can be developed, in mainly around monetary and non-monetary rewards, can affect resulting in its performance either positively or negatively, depending on the situation and conditions it faces ."

Francis, Deepa and Santhosh, VA (2016), titled "Research on employee motivation in : A comparative study with specific reference to public sector organizations and private sector", the study investigated the nature and assessed the level of motivation of public and private sector employees. telecommunications industry organizations. The level of motivation was measured based on the perception of the sample population collected by questionnaire survey. Modified version of the Diagnostic Employment Survey questionnaire used to collect data for the study. it also assesses whether there are changes in employees' motivation levels based on their gender, age, marital status, number of children and total work experience. The study fundamentally rejects the alternative hypothesis and thus clearly states that there is not much of a significant difference in the motivation level of employees working in the public and private telecommunications sectors.

Rashid Uzma, Wani, Nisar Ahmad and Ahmad, Fayaz (2013) examine in the document entitled "Difference in job satisfaction and job motivation between government employees and private companies" the job satisfaction and motivation level of government companies and private with respect to both intrinsic and private extrinsic factors. The study also tries to find out what factors influence employee motivation and job satisfaction. When comparing the determinants of job satisfaction and motivation, significant positive and negative correlations were observed between male and female employees.

Wani, Showkat Khalil (2013) analyzes in the document entitled "Work stress and its impact on employee motivation: a study of a selected commercial bank" that the productivity of the employees and the productivity of the company can be significantly increased by managing work stress and motivating employees. they can become employees. In this way, employee job satisfaction can be increased by reducing job stress and increasing employee motivation. The article concludes with the conclusion that a high level of stress leads to lower motivation and job satisfaction. The organization shall list human resource development programs to motivate employees by providing opportunities for personal and professional development, appropriate use of skills, and conducive working conditions that result in overall employee job satisfaction.

Indicators regarding motivation according to Mangkunegara (2017) are as follows:

1. Hard work
2. Future orientation
3. High level of aspiration
4. Task orientation and seriousness of the task
5. Effort to move forward
6. Persistence to work
7. Relationships with coworkers
8. Use of time

**METHODOLOGY**

The method in this research is a theoretical study according to experts from several literatures, both textbooks and journals to obtain constructs regarding definitions and indicators of work motivation, definitions and indicators of job satisfaction.

**RESULT & DISCUSSION**

Based on the results of theoretical studies, according to experts from several literatures, both textbooks and journals, constructs regarding definitions and indicators of work motivation, definitions and indicators of job satisfaction.

Work motivation is an increase in energy that arises from within the employee, giving passion for a job that achieves effectively, efficiently and maximally expected goals, with various indicators of work motivation.

Job satisfaction is the positive feeling emanating from employees about the employees' love and satisfaction with the work they do. A high level of job satisfaction can increase employee motivation and loyalty and a low level of job satisfaction can decrease employee motivation and loyalty when there are many job satisfaction index.

**CONCLUSION**

Based on the research results and results from the above discussion, conclusions can be drawn, specifically as follows:

- 1) Work motivation is the energy boost that comes from inner training. of passionate workers performing work efficiently and effectively and to the maximum extent to achieve expected goals, including several indicators of motivation at work .
- 2) Job satisfaction is the positive feeling emanating from within employees about the employee's love and satisfaction with the work they do. High level of job satisfaction can increase employee motivation and loyalty and low level of job satisfaction can decrease employee motivation and loyalty when there are many indicators number on job satisfaction.

**REFERENCES**

- [1] Robbins, S.P. & Judge, T.A. (2015). Organizational Behavior. New Jersey; Pearson Education.
- [2] Hasibuan, 2016. Human Resource Management. Jakarta: PT. Earth Literacy.
- [3] Titisari, P. (2014). Peranan organizational citizenship behavior (OCB) dalam meningkatkan kinerja karyawan. Universitas Jember.
- [4] Priansa, Donni Juni. 2014. Perencanaan dan Pengembangan Sumber Daya Manusia. Bandung: Alfabeta.
- [5] Suwatno & Priansa, D. 2014. Manajemen SDM dalam organisasi Publik dan Bisnis. Bandung: Alfabeta.
- [6] Hosmani, A., & Shambhushankar, B. (2014). Study on Impact of Quality of Work Life on Job Performance amongst Employees of Secunderabad Division of South-Central Railway. Research Journal of Management Sciences, 3(11), 8-11.
- [7] Wibowo, P. D. (2013). Manajemen Kinerja. Jakarta: Rajawali Press.
- [8] Burso, 2018. The Effect of Job Stress and Job Satisfaction on Employee Performance.
- [9] Munandar, D. (2011). Customer Relationship Management Terhadap Loyalitas Pelanggan Bisnis PT. Frisian Flag Indonesia Bandung. Majalah Ilmiah Unikom.
- [10] Mangkunegara, A.P. (2017), Manajemen Sumber Daya Manusia Perusahaan. PT. Remaja Rosdakarya, Bandung.
- [11] Siagian, S. P. (2002). Fungsi-fungsi manajerial. Bumi Aksara: Jakarta.
- [12] Danang, Sunyoto. (2013). Metodologi Penelitian Akuntansi. Bandung: PT Refika Aditama Anggota Ikapi
- [13] Hasibuan, M. S., & Hasibuan, H. M. S. (2016). Manajemen sumber daya manusia. Jakarta: Bumi Aksara.
- [14] Winardi, J. (2009). Manajemen Perilaku Organisasi. Jakarta: Kencana Prenada Media Group.
- [15] Hendra Indy, H., & Seger Handoyo, N. I. D. N. (2013). Hubungan kepuasan kerja dengan motivasi kerja pada karyawan Bank BTPN Madiun. Jurnal Psikologi Industri dan Organisasi, 2(2), 100-104.

- 
- [16] Vroom, 2011 "The Effect of Training on Employee Work Motivation at the Sulawesi Regional V Social Welfare Training and Education Center in Makassar City".
- [17] Anoraga, P. (2006). Psikologi kerja. Jakarta: PT. Rieneka Cipta.
- [18] Rivai, V., & Sagala, E. J. (2013). Manajemen Sumber Daya Manusia untuk Perusahaan, Jakarta. Murai Kencana.
- [19] Hariandja, MTE 2005, Manajemen sumber daya manusia. Jakarta: Grasindo.
- [20] Nawawi, H 2011, Manajemen Sumber Daya Manusia, Yogyakarta: Gadjah Mada University Press". [21] Torang, S. (2013). Organisasi & manajemen; Perilaku, struktur, budaya & perubahan organisasi. Alfabeta, CV: Bandung.
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**KNOWLEDGE OF THE FACULTY MEMBERS ON OPEN EDUCATIONAL RESOURCES: AN ANALYTICAL STUDY**

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**ABSTRACT**

*The continuous development of information and communications technologies (ICT) is one of the drivers of the knowledge economy. Technology continues to gain ground in higher education and has already enhanced the on-campus student experience, through student portals, Internet access, digital libraries, and the availability of laptops, handhelds and other portable devices. The study aimed to analysis the knowledge of the faculty members on open educational resources and it's attempted to present the relationship of the knowledge on open access among their experience of teaching. The study highlighted that most of the faculty members are having good level of knowledge on the open educational resources such areas of Open Educational Resources costs less than non- open access ones, open access journals have faster publication times than other types of journals, The study highlighted relationship of the experience of the faculty members and their knowledge on the open educational resources.*

*Keywords: Open Access, Attitude, Engineering*

**INTRODUCTION:**

Open educational resources are somewhat different from open learning, in that they are primarily content, while open learning includes both content and educational services, such as specially designed online materials, in-built learner support and assessment.

Open educational resources cover a wide range of online formats, including online textbooks, video recorded lectures, YouTube clips, web-based textual materials designed for independent study, animations and simulations, digital diagrams and graphics, some MOOCs, or even assessment materials such as tests with automated answers. OER can also include Powerpoint slides or pdf files of lecture notes. In order to be open educational resources, though, they must be freely available for at least educational use.

In recent years, a wide range of different open access models have been proposed and there has been considerable debate regarding the role of research funding bodies, universities and their libraries, and academic publishers within the context of these models. Amongst these models are: open access repositories which managed by universities and subject communities, pure open access journals such as traditionally published by enthusiasts or organizations in a subject community, but more recently being launched by academic journal publishers and, green and gold open access publication routes into traditional subscription-based scholarly journals published by academic publishers. By categorizing perceived reasons for users' interaction with open access and by identifying common patterns, we can gain a more realistic understanding of those interactions. There is no doubt that a better understanding of authors' attitude towards the use of open access to scholarly publications is a prerequisite for a successful open access usage. Indeed, published articles require much effort and because they form the basis for academic rewards such as tenure, promotion or future research grants, decisions about where to publish are not lightly taken by lecturers.

Open access publishing is on the rise around the world. It is responding to this transition by providing solutions designed to stimulate participation in both open access and open science across our global community of authors and researchers, while maintaining high quality standards in peer review and digital publishing practices. Globally, more researchers are increasingly under funder and institutional mandates to publish open access. These trends, along with changing researcher attitudes toward open access are important drivers in the overall open science movement.

**REVIEW OF LITERATURE**

**Chakyarkandiyil, Nisha (2020)** attempted to find out the attitude of research scholars towards open access resources. The findings of the study indicate that the research scholars showed a positive attitude towards open access resources. The study explored the awareness of research scholars about open access resources and it

stresses the fact the research scholars should be trained more towards open access resources and publishing, its cost-effectiveness and approval of open-access resources among the academic community.

**Issa, A. I., Ibrahim, M. A., Onojah, A. O., & Onojah, A. A. (2020)** Investigated Undergraduates' Attitude towards the utilization of OER among Undergraduates and the influence of gender and area of specialization on their attitude towards the use. The findings of the study were: Undergraduates have a positive attitude towards utilization of OER for learning. The study concluded that students have a positive attitude towards use of OER for learning. The research recommends that institutions should endeavor to create their own OERs where students can access anytime and anywhere.

**Govindarajan, R., Dhanavandan, S (2019)** aims to identify how well that teaching community working in higher education institutions in Tamil Nadu, know about the open access model, OA licensing terms, OA tools and their attitude towards open access model The top most open access repository used by the teaching staff was DOAJ and least was NPTEL. Teaching staffs' attitude towards open access doesn't have any statistical relationship with teaching staffs' individual characteristics and their experience in teaching, research and publishing. The study results help the academic libraries, institutions, higher education system, and open access publishers to ascertain the facts and take required steps to promote and strengthen the OA use among the academic community

**Segado-Boj, F., Martín-Quevedo, J., & Prieto-Gutiérrez, J. J. (2018)** aims to gain a better understanding of the perspectives of contributors to Spanish academic journals regarding open access, open peer review, and altmetrics. Contributors to Spanish scholarly journals hold a favourable opinion of open access but were more cautious about open peer review and altmetrics. Younger and female scholars were more reluctant to accept open peer review practices. A positive attitude toward social networks did not necessarily translate into enthusiasm for emerging trends in scholarly publishing. Despite this, Research Gate users were more aware of altmetrics.

**Rowley, J., Johnson, F., Sbaffi, L. et al. (2017)** seeks to contribute to knowledge in relation to open access publishing by surveying an international and interdisciplinary. Despite reporting engagement in OAP, academics were unsure about their future intentions regarding OAP. Broadly, academics identified the potential for wider circulation as the key advantage of open access publishing, and were generally more positive about the benefits of OAP, than they were negative about its disadvantages. Comparing the two major disciplinary groups, science, technology and medicine and arts, humanities and social sciences, showed a significant difference in attitude.

**Sheikh, Arslan (2017)** analyzes the awareness, use and attitudes of Pakistani faculty members towards scholarly open access. The findings of the study reveal that, although majority of the Pakistani faculty members were aware of the scholarly open access before this survey, their awareness level about open access-related resources and initiatives was very low. A lack of awareness to publish in open access venues, and publication fees of open access journals were the key challenges faced by the Pakistani faculty members. The attitudes of faculty members towards open access were very positive in all contexts. Large readership, impact factor, free access to readers and no publication fee were the key motivational factors for the faculty members to publish in open access journals.

**Mishra, Sanjaya (2016)** describes the entire methodology for the development of a scale to measure Attitude towards Open Educational Resources. Traditionally, it is observed that some teachers are more willing to share their work than others, indicating the need to understand teachers' psychological and behavioral determinants that influence use of OER. It also discusses the significance of the scale and how to use it with other variables effectively in different contexts to help develop appropriate strategies for promoting the use of OER in educational institutions.

**Perryman, L-A and Seal, T (2016)** reports on research intended to help fill that knowledge gap by conducting a pan-India survey using many of the questions developed by the UK Open University's Open Education Research Hub (OERH) for use in its OER impact research around the world. Accordingly, this paper presents an emergent model intended to better capture the rich contextual factors inhibiting and enabling OER use and OEP in the Global South. It must be acknowledged, however, that our findings relate to a fairly highly educated selection of educators, teacher-educators, students, education managers, academics, activists and policymakers.

**OBJECTIVES:**

The study aimed to analysis the knowledge of the engineering faculty members on open educational resources and it's attempted to present the relationship of the knowledge on open educational resources among their designation and experience.

**METHODOLOGY:**

Descriptive research design adopted this study which describes the opinion of the engineering faculty members on OER. To collect the opinion from the engineering faculty members, the study adopted questionnaire method to collect the data. The study collected 180 responses. The collected responses analyzed with SPSS and presented in the tables.

**DATA ANALYSIS AND INTERPRETATION****Table No: 1 Profile of the respondents**

		No of Respondents	Percentage
<b>Gender</b>	Male	112	62.2
	Female	68	37.8
	<b>Total</b>	<b>180</b>	<b>100</b>
<b>Age</b>	Below 25	34	18.9
	26 - 35	53	29.4
	36 - 45	48	26.7
	Above 45	45	25.0
	<b>Total</b>	<b>180</b>	<b>100</b>
<b>Designation</b>	Assistant Professor	75	41.7
	Associate Professor	51	28.3
	Professor	54	30
	<b>Total</b>	<b>180</b>	<b>100</b>
<b>Experience</b>	Less than 3 Years	21	11.7
	3 to 5 years	33	18.3
	6 to 8 years	48	26.7
	9 to 11 Years	35	19.4
	Above 11 years	43	23.9
	<b>Total</b>	<b>180</b>	<b>100</b>

The table presents the profile of the respondents. On gender category, 62.2% of the respondents are male and 37.8% of the respondents are female. Among the age group, it is noticed that 18.9% of the respondents are below 25 age and 29.4% of the respondents are 26-35 aged. 26.7% of the respondents are 36-45 age and 25% of the respondents are aged above 45. On the designation group, 41.7% of the respondents are Assistant Professors, 28.3% of the respondents are Associate Professors and 30% of the respondents are Professors. Among the experience category, 11.7% of the respondents are having less than 3 years of experience and 18.3% of the respondents are 3 to years of experience. 26.7% of the respondents are having 6 to years of experience, 19.4% of the respondents are having 9 to 11 years of experience and 23.9% of the respondents are having more than 11 years of experience.

**Table No: 2 Respondents' opinion about the Knowledge of Open Educational Resources**

Sl. No	Factors		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
1	OER is beneficial to the scholarly community	N	38	37	73	20	12	180
		%	21.1	20.6	40.6	11.1	6.7	100
2	It is a good idea using OER publications for my works	N	13	39	85	29	14	180
		%	7.2	21.7	47.2	16.1	7.8	100
3	Having good awareness on publishing in OER	N	19	30	100	22	9	180
		%	10.6	16.7	55.6	12.2	5	100
4	OER possess high quality publications	N	38	33	69	14	26	180
		%	21.1	18.3	38.3	7.8	14.4	100

5	Open access guarantees the principle of free access for all readers	N	29	42	66	39	4	180
		%	16.1	23.3	36.7	21.7	2.2	100
6	Open access journals have faster publication times than other types of journals	N	41	56	41	24	18	180
		%	22.8	31.1	22.8	13.3	10	100
7	Open access readership is larger than subscription-based journals	N	41	4	42	44	49	180
		%	22.8	2.2	23.3	24.4	27.2	100
8	Articles are more frequently cited in Open access journals	N	51	26	61	27	15	180
		%	28.3	14.4	33.9	15	8.3	100
9	Open Educational Resources costs less than non- Open access ones	N	40	37	87	14	2	180
		%	22.2	20.6	48.3	7.8	1.1	100
10	Open access will guarantee archiving for future readers	N	42	38	58	22	20	180
		%	23.3	21.1	32.2	12.2	11.1	100
11	Open access is peer-reviewed the experts contributions	N	24	17	73	49	17	180
		%	13.3	9.4	40.6	27.2	9.4	100

The table presents the knowledge of the faculty members on the open educational resources. It is noticed that 21.1% of the respondents are strongly agreed and 20.6% of the respondents are agreed that OER was beneficial to the scholarly community. Around 40.6% of the respondents are neutral about the OER was beneficial to the scholarly community. 11% of the respondents are disagreed and 6.7% of the respondents are strongly disagreed about OER was beneficial to the scholarly community. It is clear that 7.2% of the respondents are strongly agreed and 21.7% of the respondents are agreed that it is a good idea using OER publications for their works. Around 47.2% of the respondents are neutral about good idea using OER publications for their works. 16.1% of the respondents are disagreed and 7.8% of the respondents are strongly disagreed about good idea using OER publications for their works. It is noticed that 10.6% of the respondents are strongly agreed and 16.7% of the respondents are agreed about having good awareness on publishing in open access. Around 55.6% of the respondents are neutral about having good awareness on publishing in open access. 12.2% of the respondents are disagreed and 5% of the respondents are strongly disagreed on having good awareness on publishing in open access. It is clear that 21.1% of the respondents are strongly agreed and 18.3% of the respondent are agreed that open access possess high quality publications. Around 38.3% of the respondents are neutral about open access possess high quality publications. 7.8% of the respondents are disagreed and 14.4% of the respondents are strongly disagreed about open access possess high quality publications. It is noticed that 16.1% of the respondents are strongly agreed and 23.3% of the respondents are agreed that open access guarantees the principle of free access for all readers. Around 36.7% of the respondents are neutral about the open access guarantees the principle of free access for all readers. 21.7% of the respondents are disagreed and 2.2% of the respondents are strongly disagreed on open access guarantees the principle of free access for all readers.

It is clear that 22.8% of the respondents are strongly agreed and 31.1% of the respondents are agreed that open access journals have faster publication times than other types of journals. Around 22.8% of the respondents are neutral on open access journals have faster publication times than other types of journals. 13.3% of the respondents are disagreed and 10% of the respondents are strongly disagreed about open access journals have faster publication times than other types of journals. It is noticed that 22.8% of the respondents are strongly agreed on open access readership is larger than subscription-based journals. Around 2.2% of the respondents are agreed and 23.3% of the respondents are neutral about open access readership is larger than subscription-based journals. 24.4% of the respondents are disagreed and 27.2% of the respondents are strongly disagreed on open access readership is larger than subscription-based journals. It is clear that 28.3% of the respondents are strongly agreed and 14.4% of the respondents are agreed that articles are more frequently cited in open access journals. Around 33.9% of the respondents are neutral about articles are more frequently cited in open access journals. 15% of the respondents are disagreed and 8.3% of the respondents are strongly disagreed about articles are more frequently cited in open access journals.

It is noticed that 22.2% of the respondents are strongly agreed and 20.6% of the respondents are agreed that Open Educational Resources costs less than non- open access ones. 48.3% of the respondents are neutral about the Open Educational Resources costs less than non- open access ones. 7.8% of the respondents are disagreed and 1.1% of the respondents are strongly disagreed that Open Educational Resources costs less than non- open access ones. It is clear that 23.3% of the respondents are strongly agreed and 21.1% of the respondents are agreed that open access will guarantee archiving for future readers. Around 32.2% of the respondents are neutral about open access will guarantee archiving for future readers. 12.2% of the respondents are disagreed

and 11.1% of the respondents are strongly disagreed on open access will guarantee archiving for future readers. It is noticed that 13.3% of the respondents are strongly agreed and 9.4% of the respondents are agreed that open access is peer-reviewed the experts contributions. Around 40.6% of the respondents are neutral about the open access is peer-reviewed the experts contributions. 27.2% of the respondents are disagreed and 9.4% of the respondents are strongly disagreed about open access is peer-reviewed the experts contributions.

**Table No 3 Relationship on Knowledge on OER with Experience**

*H<sub>0</sub>: There is no significant relationship between experience of the faculty members and their knowledge on Open Educational Resources*

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.395 <sup>a</sup>	.156	.101	1.269

**ANOVA<sup>b</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	49.843	11	4.531	2.814	.002 <sup>a</sup>
Residual	268.872	167	1.610		
Total	318.715	178			

The table presents the regression test between relationship between experience of the faculty members and their knowledge on Open Educational Resources. It is noticed that F value is 2.814 and calculated significant value is 0.002 at the significance level of 95%. Hence the table of test noticed that null hypothesis is rejected and alternative hypothesis accepted. It is proved that *“The knowledge on the Open educational Resources is differ to the experience of the faculty members”*

## RESULTS AND DISCUSSION

It is good understanding that 42% of faculty members are agreed that open educational resources was beneficial to the scholarly community, 30% of faculty members are agreed that it is a good idea using Open Educational Resources for their works, 27% of faculty members are agreed about having good awareness on publishing in open access and 39% of the respondent are agreed that open access possess high quality publications. It is good response that 39% of faculty members are agreed that open access guarantees the principle of free access for all readers, 54% of faculty members are agreed that open access journals have faster publication times than other types of journals and 23% of faculty members are agreed on open access readership is larger than subscription-based journals. It is clear that 44% of faculty members are agreed that articles are more frequently cited in open access journals, 42% of faculty members are agreed that open access publications costs less than non- open access ones, 44% of faculty members are agreed that open access will guarantee archiving for future readers and 23% of faculty members are agreed that open access is peer-reviewed the experts contributions. Among the various factors, most of the faculty members are having good attitude on the open access in the areas of open access publications costs less than non- open access ones, open access journals have faster publication times than other types of journals, articles are more frequently cited in Open access journals, Open access is beneficial to the scholarly community, Open access will guarantee archiving for future readers and, Open access guarantees the principle of free access for all readers.

## CONCLUSION

The present study present the knowledge of the faculty members on open educational resources. It is found that majority of the faculty members are having good level of knowledge on open educational resources. Most of the faculty members like to good attitude on the open educational resources in the areas of open access publications costs less than non- open access ones, open access journals have faster publication times than other types of journals. Hence the ambitious faculty members must be trained well enough to use open access resources wisely for their academic activities. Globally, most of the faculty members are increasing their interest on to look a funder and their institutional mandates to publish open access. These trends, along with changing engineering faculty college attitudes toward open access resources are important drivers in the overall engineering field of research.

**REFERENCES:**

1. Govindarajan, R & Dhanavandan S (2019) Awareness and Attitude Towards Open Access Among Teaching Staff in Higher Education Institutions in Tamil Nadu, *International Journal of Information Studies & Libraries*, 4 (1) 2019, 1-8
2. Issa, A.I., Ibrahim, M.A., Onojah, A.O., & Onojah, A.A (2020) Undergraduates' attitude towards the utilization of open educational resources for learning. *International Journal of Technology in Education and Science (IJTES)*, 4(3), 227-234.
3. Kelem Kassahun and Chatiwa Nsala. (2015) The awareness of academic librarians towards Open Access resources to support reference services: A case of private institutions of higher learning in Gaborone, Botswana, Satellite Meeting: Reference and Information Services 11-13 August 2015 University of Botswana, Gaborone, Botswana
4. Mishra, Sanjaya (2016) Development of a Scale to Measure Faculty Attitude towards Open Educational Resources, *Open Praxis*, 8 (1), 55-69
5. Nisha Chakyarkandiyil, (2020) "A Study on Attitude of Research Scholars towards Open Access Resources", *International Journal of Science and Research*, 9(7) 87 - 90
6. Perryman, L-A and Seal, T 2016 Open Educational Practices and Attitudes to Openness across India: Reporting the Findings of the Open Education Research Hub Pan-India Survey. *Journal of Interactive Media in Education*, 2016(1): 15, pp. 1-17, DOI: <http://dx.doi.org/10.5334/jime.416>
7. Reed, Peter (2012) Awareness, attitudes and participation of teaching staff towards the open content movement in one university, *Research in Learning Technology*, 20, <http://dx.doi.org/10.3402/rlt.v20i0.18520>
8. Rowley, J., Johnson, F., Sbaffi, L. et al. (2017) Academics' behaviors and attitudes towards open access publishing in scholarly journals. *Journal of the Association for Information Science and Technology*. [eprints.whiterose.ac.uk/114578/](http://eprints.whiterose.ac.uk/114578/)
9. Segado-Boj, F., Martín-Quevedo, J., & Prieto-Gutiérrez, J.J. (2018). Attitudes toward Open Access, Open Peer Review, and Altmetrics among Contributors to Spanish Scholarly Journals. *Journal of Scholarly Publishing*, 50(1), 48-70.
10. Sheikh, Arslan (2017) Faculty awareness, use and attitudes towards scholarly open access: A Pakistani perspective, *Journal of Librarianship and Information Science*, 51 (3), 612-628
11. Uwaifo, Stephen Osahon (2011) Researchers' Attitude towards the Use of Open Access Scholarly Publications: The Position of LIS Lecturers in Southern Nigeria, *International Journal of Digital Library Services*, 3 (2), 14-29.

## MINIMUM DOMINATING ENERGY OF SOME BIPARTITE GRAPHS

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## ABSTRACT

M.R. Rajesh Kanna et al defined the minimum dominating energy,  $E_D(G)$  of some families of graphs such as, Star graph, Complete graph, Crown graph and Cocktail graphs. Motivated by this, we obtained the minimum dominating distance energy of Barbell graph and Shadow graph of  $D_2(K_{1,n})$ . Relation between domination number, energy and rank of minimum dominating distance matrix of graphs are also established.

AMS Subject Classification: 05C50, 05C69

Keywords: minimum dominating set, minimum dominating matrix, minimum dominating eigenvalues, minimum dominating energy of a graph.

## 1. INTRODUCTION

Let  $G = (V, E)$  be a simple undirected graph. I. Gutman [3] introduced the concept of energy of a graph in the year 1978. Let  $G$  be a graph with  $n$  vertices and  $m$  edges and let the adjacency matrix of the graph be  $R = (r_{ij})$ .

$\omega_1, \omega_2, \dots, \omega_m$  assumed in non-increasing order, are the eigenvalues of the graph  $G$ . The eigenvalues of  $G$  are real with sum equal to zero. Since,  $A$  is real symmetric. The energy  $E(G)$  of  $G$  is defined to be the sum of the

absolute values of the eigenvalues of  $G$ . i.e.,  $E(G) = \sum_{s=1}^m |\omega_s|$  [4,5]

## 2. THE MINIMUM DOMINATING ENERGY

**Definition 2.1:** A dominating set in a graph  $G$  is a subset  $M$  of  $V(G)$  such that each element of  $V(G) - M$  is adjacent to at least one vertex of  $M$ .

Equivalently  $N[M] = V$ .

If  $M$  is a dominating set of a graph  $G$ , then every super set  $M' \supset M$  is also a dominating set.

**Definition 2.2:**[6] The minimum dominating set in a graph  $G$  is a dominating set of minimum cardinality. This set is also called  $\gamma$  - set.

**Definition 2.3:**[6]The domination number of  $G$ , denoted by  $\gamma(G)$ , is the minimum cardinality of all dominating sets of  $G$  that is  $\gamma(G) = \min \{ |M| / M \subseteq V, N[M] = V \}$

**Definition 2.4:**[6] Let  $G$  be a simple graph of order  $n$  with vertex set  $V = \{ t_1, t_2, \dots, t_m \}$  and edge set  $E$ . Let  $M$  be a minimum dominating set of the graph  $G$ . The minimum dominating matrix of  $G$  is the  $m \times m$  matrix defined by  $R_M(G) = (r_{ij})$ , where

$$r_{ij} = \begin{cases} 1 & \text{if } t_i t_j \in E, \\ 1 & \text{if } i = j \text{ and } t_i \in M, \\ 0 & \text{otherwise.} \end{cases}$$

The characteristic polynomial of the minimum dominating matrix  $R_M(G)$  is

$\det(\omega I - R_M(G))$ .

The trace of the minimum dominating matrix is equal to the cardinality of the minimum dominating set.

**Definition 2.5:** [2] If the distinct eigenvalues of the adjacency matrix are  $\omega_1 > \omega_2 > \dots > \omega_r$ ,

$r < m$  with their multiplicities are  $m_1, m_2, \dots, m_r$ , then we write the spectrum as

$$\text{Spec}(G) = \begin{pmatrix} \omega_1 & \omega_2 & \dots & \omega_{r-1} & \omega_r \\ m_1 & m_2 & \dots & m_{r-1} & m_r \end{pmatrix}$$

**Definition 2.6:**[6] The minimum dominating eigenvalues of the graph  $G$  are the eigenvalues of the minimum dominating matrix  $R_M(G)$ . Since  $R_M(G)$  is real and symmetric, its eigenvalues are real numbers and label them in non-increasing order  $\omega_1 \geq \omega_2 \geq \omega_3 \geq \dots \geq \omega_m$ . The **minimum dominating energy** of  $G$  is defined as sum of the absolute values of the eigenvalues of  $G$ , that is,

$$E_M(G) = \sum_{s=1}^m |\omega_s|.$$

**Example 2.7:** The possible minimum dominating sets for the following graph  $G$  are

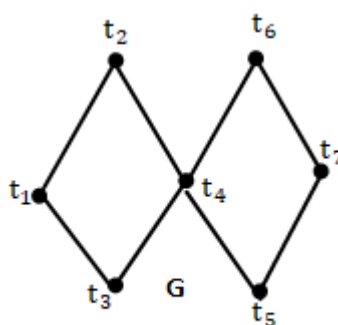


Fig 3.4

i)  $M_1 = \{t_1, t_4, t_7\}$

ii)  $M_2 = \{t_1, t_5, t_6\}$

iii)  $M_3 = \{t_2, t_3, t_7\}$

i)  $M_1 = \{t_1, t_4, t_7\}$

Minimum Dominating Matrix of  $M_1$ :

$$R_{M_1}(G) = \begin{pmatrix} 1 & 1 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 & 1 & 1 \end{pmatrix}$$

Characteristic equation is

$$\omega^7 - 3\omega^6 - 5\omega^5 + 15\omega^4 + 4\omega^3 - 12\omega^2 = 0.$$

Minimum dominating eigenvalues are

$$\omega_1 \approx -2.0000, \omega_2 \approx -1.0000, \omega_3 \approx -0.0000, \omega_4 \approx 0, \quad \omega_5 \approx 1.0000, \omega_6 \approx 2.0000, \omega_7 \approx 3.0000.$$

Minimum dominating energy is

$$E_{M_1}(G) \approx |-2| + |-1| + |1| + |2| + |3|$$

$$= 9.$$

Similarly,

$$E_{M_2}(G) \approx 9.3548$$

$$E_{M_3}(G) \approx 9.3548.$$



∴ The minimum dominating energy depends on the minimum dominating set.

### 3. MINIMUM DOMINATING ENERGY OF BARBELL GRAPH

**Definition 3.1.** The Barbell graph is the simple graph obtained by connecting two copies of a complete graph  $K_n$  by a bridge.

**Theorem 3.2. Theorem 3.3.1.** For  $n \geq 2$ , the minimum dominating energy of Barbell graph  $B(K_n, K_n)$  is equal to  $4(n-1)$ .

**Proof:** Consider the Barbell graph  $B(K_n, K_n)$  with  $2n$  vertices. So the vertex set  $V = \{x_1, x_2, x_3, \dots, x_{2n}\}$ . Minimum dominating set is  $M = \{x_1, x_2\}$ .

Minimum dominating matrix is

$$R_M[B(K_n, K_n)] = \begin{pmatrix} 1 & 1 & 1 & \dots & 1 & 1 & 0 & \dots & 0 \\ 1 & 1 & 0 & \dots & 0 & 0 & 1 & \dots & 1 \\ 1 & 0 & 0 & \dots & 1 & 1 & 0 & \dots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & 0 & 1 & \dots & 0 & 1 & 0 & \dots & 0 \\ 1 & 0 & 1 & \dots & 1 & 0 & 0 & \dots & 0 \\ 0 & 1 & 0 & \dots & 0 & 0 & 0 & \dots & 1 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 1 & 0 & \dots & 0 & 0 & 1 & \dots & 0 \end{pmatrix}$$

Characteristic equation is  $(\omega + 1)^{2n-3} [\omega - (n-1)] [\omega^2 - n\omega + (n-3)] = 0$ .

The minimum dominating eigenvalues are

$$\omega \approx -1 \quad [(2n-3) \text{ times}], \quad \omega \approx n-1 \quad \{\text{one time}\}, \quad \omega \approx \frac{n \pm \sqrt{n^2 - 4n + 12}}{2} \quad (\text{one time each})$$

The minimum dominating energy is

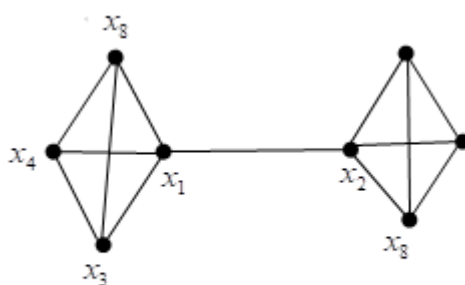
$$E_M[B(K_n, K_n)] \approx |-1| \times (2n-3) + |n-1| + \left| \frac{n + \sqrt{n^2 - 4n + 12}}{2} \right| + \left| \frac{n - \sqrt{n^2 - 4n + 12}}{2} \right|$$

$$= 2n - 3 + n - 1 + n$$

$$= 4(n-1).$$

$$E_M[B(K_n, K_n)] \approx 4(n-1).$$

**Example 3.3.** The minimum dominating energy of Barbell graph  $B(K_4, K_4)$  is equal to 12.



**Fig. 3.1**  
 $B(K_4, K_4)$

The minimum dominating distance energy of Barbell graph  $B(K_4, K_4)$  is equal to 12.

#### 4. MINIMUM DOMINATING ENERGY OF SHADOW GRAPH OF $D_2(K_{1,n})$

**Definition 4.1.:** The Shadow graph  $D_2(G)$  of a connected graph  $G$  is constructed by taking two copies of  $G$  say  $G'$  and  $G''$  join each vertex  $v$  in  $G'$  to the neighbors of the corresponding vertex  $v''$  in  $G''$ .

**Theorem 4.2:** For  $n \geq 1$ , the minimum dominating energy of Shadow graph  $D_2(K_{1,n})$  is equal to  $1 + \sqrt{16n+1}$ .

**Proof:** Consider the Shadow graph  $D_2(K_{1,n})$  with  $2n+2$  vertices. So the vertex set  $V = \{x, y, x_1, x_2, x_3, \dots, x_n, y_1, y_2, y_3, \dots, y_n\}$ . Minimum dominating set is  $M = \{x, y\}$ .

Minimum dominating matrix is

$$R_M[D_2(K_{1,n})] = \begin{pmatrix} 1 & 0 & 1 & \dots & 1 & 1 & 1 & \dots & 1 \\ 0 & 1 & 1 & \dots & 1 & 1 & 1 & \dots & 1 \\ 1 & 1 & 0 & \dots & 0 & 0 & 0 & \dots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & 1 & 0 & \dots & 0 & 0 & 0 & \dots & 0 \\ 1 & 1 & 0 & \dots & 0 & 0 & 0 & \dots & 0 \\ 1 & 1 & 0 & \dots & 0 & 0 & 0 & \dots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & 1 & 0 & \dots & 0 & 0 & 0 & \dots & 0 \end{pmatrix}$$

Characteristic equation is  $\omega^{2n-1}(\omega-1)(\omega^2-\omega-4n)=0$ .

The minimum dominating eigenvalues are

$$\omega \approx 0 \quad [(2n-1) \text{ times}], \quad \omega \approx 1 \quad \{\text{one time}\}, \quad \omega \approx \frac{1 \pm \sqrt{16n+1}}{2} \quad (\text{one time each})$$

The minimum dominating energy is

$$E_M[D_2(K_{1,n})] \approx 0 \times (2n-1) + |1| + \left| \frac{1 + \sqrt{16n+1}}{2} \right| + \left| \frac{1 - \sqrt{16n+1}}{2} \right|$$

$$= 1 + \sqrt{16n+1}.$$

$$E_M[D_2(K_{1,n})] \approx 1 + \sqrt{16n+1}.$$

**Example 3.3.6.** The minimum dominating energy of Shadow graph  $D_2(K_{1,4})$  is equal to 9.0622.

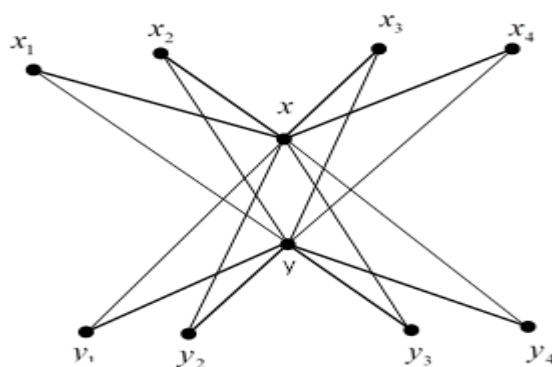


Fig. 4.1

$D_2(K_{1,4})$

$$E_M[D_2(K_{1,4})] \approx 9.0622.$$

## 5. RELATION BETWEEN DOMINATION NUMBER, MINIMUM DOMINATING DISTANCE ENERGY RANK OF THE MINIMUM DOMINATING MATRIX OF A GRAPH

In this section we introduced the new concept relation between Domination number, Minimum dominating energy and Rank of the minimum dominating matrix of all above graphs

**Theorem 5.1** In Barbell graph  $B(K_n, K_n)$ ,  $\gamma[B(K_n, K_n)] > \left\lfloor \frac{E_M[B(K_n, K_n)]}{\text{rank}[B(K_n, K_n)]} \right\rfloor$ .

**Proof :** From Theorem 3.2.,

In Barbell graph  $B(K_n, K_n)$ ,  $E_M[B(K_n, K_n)] = 4(n-1)$  and  $\text{rank}[B(K_n, K_n)] = 2n$

$$\gamma[B(K_n, K_n)] = 2$$

$$\frac{E_M[B(K_n, K_n)]}{\text{rank}[B(K_n, K_n)]} = \frac{4(n-1)}{2n}$$

$$= 2 - \frac{2}{n}$$

$$= \lceil 1 \rceil$$

$$\gamma[B(K_n, K_n)] > \left\lfloor \frac{E_M[B(K_n, K_n)]}{\text{rank}[B(K_n, K_n)]} \right\rfloor.$$

**Theorem 5.2.** In Shadow graph  $D_2(K_{1,n})$ ,  $\gamma[D_2(K_{1,n})] > \left\lfloor \frac{E_M[D_2(K_{1,n})]}{\text{rank}[D_2(K_{1,n})]} \right\rfloor$ .

**Proof:** From Theorem 3.3.5,

In Shadow graph  $D_2(K_{1,n})$ ,  $E_M[D_2(K_{1,n})] = 1 + \sqrt{16n+1}$  and

Rank  $D_2(K_{1,n}) = 2n + 2$ ,  $\gamma[D_2(K_{1,n})] = 2$

$$\frac{E_M[D_2(K_{1,n})]}{\text{rank}[D_2(K_{1,n})]} = \frac{1 + \sqrt{16n+1}}{2n+2}$$

$$< \frac{n+5}{2n+2}$$

$$< \lceil 2 \rceil$$

$$\gamma[D_2(K_{1,n})] > \left\lfloor \frac{E_M[D_2(K_{1,n})]}{\text{rank}[D_2(K_{1,n})]} \right\rfloor.$$

## 6. CONCLUSION

In this paper, we have studied minimum dominating energy of graphs and relation between domination number, energy and rank of the minimum domination matrix of a graph. We have also studied some classes of graphs such as Barbell graph and Shadow graph of  $D_2(K_{1,n})$ .

## REFERENCES

- [1] Adiga C., Bayad a., Gutman I., Srinivas S.A. 'The Minimum Covering Energy of a Graph' Kragujevac J. Sci., Vol.34, pp.39-56 (2012)

- 
- [2] Bapat R.B. (2011), 'Graphs and Matrices', Hindustan Book Agency
  - [3] Covetkovic D., Gutman I. 'Applications of Graph Spectra', Mathematical Institution, Belgrade (Eds.) (2009)
  - [4] Covetkovic D., Gutman I. (Eds.) (2011) 'Selected Topics on Applications of Graph Spectra', Mathematical Institution, Belgrade
  - [5] Gutman I. 'The energy of a graph', Ber. Math-Statist. Sect. Forschungsz. Graz, Vol.103, pp.1-22 (1978)
  - [6] Gutman I., Li X., Zhang J., 'Graph Energy' (Ed-s: Dehmer M., Emmert F., Streib., Analysis of Complex Networks, From Biology to Linguistics, Wiley-VCH, Weinheim, pp.145-174 (2009)
  - [7] Gutman I., The energy of a graph: Old and new results (Ed-s: Betten A., Kohnert A., Laue R., Wassermann A.) 'Algebraic Combinatorics and Applications', Springer, Berlin, pp.196-211 (2001)
  - [8] Rajesh Kanna M.R., Dharmendra B.N., Sridhara G. 'The Minimum Dominating Energy Of a Graph', International Journal of Pure and Applied Mathematics Vol. 85 No.4 pp.707-718 (2013)
  - [9] Wayne Goddard, Michel A. Henning (2013), 'Independent domination in graphs: A survey and recent results', Discrete Mathematics, Vol.313, Issue 7, pp.839-854.

## ON GENERALIZED METRIC SPACE TYPE AND RELATED FIXED POINT RESULTS

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*In this paper, generalizing certain conclusions from the literature to re-prove them in the context of rectangular space generalization.*

*Keywords. b-metric space; rectangular metric space; b-rectangular metric space; Banach contraction principle.*

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**1. INTRODUCTION**

Banach contraction principle which has many applications in several sections of science and engineering it was developed on either developing type of metric space or the type of contractive mapping see [34]. The development of type metric space is established on decrease or changing the metric conditions. To extra details, see [2, 43]. Consider that abusing or debilitating a portion of the metric conditions rise to the loss of some topological advantages, thus getting hard in proving some fixed point theorems. These difficulties impose the Authors to devolve new methods in the development of fixed point theorems to solve extra specific applications. A lot of researchers have shown the Banach contraction principle in several developed metric spaces. In the complements, by replacing the sum on the right-hand side of the triangular inequality in the definition of a metric space, Branciari [12] established the notion of rectangular metric space (RMS) by a three-term code and showed asymmetric of the Banach contraction principle in this space. Then, more fixed point studies for several contractions on the rectangular metric space appeared, see [1, 4, 5, 14, 18, 19, 20, 21, 22, 29, 36, 38, 41]. Furthermore, a generalization of metric space as b-metric space was established by Bakhtin [6] and showed the symmetric for Banach contraction principle in b-metric space from then, many papers have studied a fixed point theory or the changeful notion for sole - evaluative and multi-evaluative mappings in b-metric spaces (see [3, 9, 10, 11, 16, 17, 26]). In this paper, we have shown the notion of rectangular b-metric space, which does not need Hausdorff spaces. With non Hausdorff topological plays a necessary part in Tarskian way to program a language Vocabularies applied in computer fields (For more information see [37]). Studies are still being carried out in the evolution of the basic types of deflation such as Banach, Canan, Chatterjee, and others. From those studies see [8, 35, 39, 42]. In this paper, we fetter our study to evolve metric space by introducing b-rectangular metric spaces. We shall show some contraction type in the b-rectangular metric space, as the parallel of the Banach contraction type as well as the Kannan contraction type.

**2. PRELIMINARIES**

In this section, we introduce the basis of our main results.

**Definition 2.1.** [6] Suppose  $M$  be a nonempty set and  $b \geq 1$ , be a given real number. A function  $\delta : M \times M \rightarrow [0, \infty)$  is a b-metric on  $M$  if for all  $\alpha_1, \alpha_2, \alpha_3 \in M$ , the following terms hold:

- (i):  $\delta(\alpha_1, \alpha_2) = 0$  if and only if  $\alpha_1 = \alpha_2$ ;
- (ii):  $\delta(\alpha_1, \alpha_2) = \delta(\alpha_2, \alpha_1)$ ;
- (iii):  $\delta(\alpha_1, \alpha_2) \leq b[\delta(\alpha_1, \alpha_3) + \delta(\alpha_3, \alpha_2)]$ .

In this case, the pair  $(M, \delta)$  is called a b-metric space.

**Remark 2.2.** [15] The type of b-metric spaces is bigger than the type of metric space, where

a (bMS) is a (MS) when  $b = 1$ .

**Example 2.3.** [15] Suppose,  $M = \mathbb{R}$  and  $\delta : M \times M \rightarrow \mathbb{R}^+$ , such that  $\delta(\alpha_1, \alpha_2) = |\alpha_1 - \alpha_2|^3$ . Hence,  $(M, \delta)$  is a b-metric space with  $b=3$ .

**Definition 2.4.** [12] Suppose  $M$  be a nonempty set. A function  $\delta : M \times M \rightarrow [0, \infty)$  is a b-metric on  $M$  if,  $\forall \alpha_1, \alpha_2 \in M$  and all distinct points  $\beta_1, \beta_2 \in M$  each distinct from  $\alpha_1, \alpha_2$ , the following terms hold

(i):  $\delta(\alpha_1, \alpha_2) = 0$  if and only if  $\alpha_1 = \alpha_2$ ;

(ii):  $\delta(\alpha_1, \alpha_2) = \delta(\alpha_1, \alpha_2)$ ;

(iii):  $\delta(\alpha_1, \beta_1) \leq \delta(\alpha_1, \beta_2) + \delta(\beta_2, \alpha_2) + \delta(\alpha_2, \beta_1)$ , (rectangular inequality), Then  $(M, \delta)$  is called a rectangular metric spaces. For more definitions of concept related to this new category of the rectangular metric space, see [12, 23, 25, 27, 30, 31, 34].

**Definition 2.5.** [24, 32] Suppose  $M$  be a nonempty set. A function  $\delta : M \times M \rightarrow [0, \infty)$  is a b-metric on  $M$  if,  $\forall \alpha_1, \alpha_2 \in M$  and all distinct points  $\beta_1, \beta_2 \in M$  each distinct from  $\alpha_1, \alpha_2$ , the following terms hold

(i):  $\delta(\alpha_1, \alpha_2) = 0$  if and only if  $\alpha_1 = \alpha_2$ ;

(ii):  $\delta(\alpha_1, \alpha_2) = \delta(\alpha_1, \alpha_2)$ ;

(iii):  $\delta(\alpha_1, \beta_1) \leq b[\delta(\alpha_1, \beta_2) + \delta(\beta_2, \alpha_2) + \delta(\alpha_2, \beta_1)]$ , (b-rectangular inequality),

Then  $(M, \delta)$  is called a b-rectangular metric space .

**Remark 2.6.** [24] Every metric space is a rectangular metric space and every rectangular metric space is b-rectangular metric space (with  $b = 1$ ). Moreover the opposite of implying above is not valid.

**Example 2.7 :** Suppose  $M = \mathbb{N}$ , define  $\delta : M \times M \rightarrow M$  as:

$$\delta(\alpha_1, \alpha_2) = \begin{cases} 0, & \text{if } \alpha_1 = \alpha_2 \\ 4\sigma, & \text{if } \alpha_1, \alpha_2 \in \{1, 2\}, \alpha_1 \neq \alpha_2 \\ \sigma & \text{if } \alpha_1 \text{ or } \alpha_2 \notin \{1, 2\}, \alpha_1 \neq \alpha_2 \end{cases}$$

Consider  $\sigma(0, \infty)$ . Hence,  $(M, \delta)$  is a b-rectangular metric space,  $b = \frac{4}{3}$  but not rectangular metric space, since,  $\delta(1, 2) = 4\sigma > 3\sigma = \delta(1, 3) + \delta(3, 4) + \delta(4, 2)$ .

The convergent sequences and Cauchy sequence also competence of the b-rectangular metric space as following:

**Definition 2.8.** [24] Suppose,  $(M, \delta)$  be a b-rectangular metric space,  $\{\alpha_i\}$  be a sequence in  $M$  and  $\alpha \in M$ . Then

(i) : A sequence  $\{\alpha_i\}$  is said to be convergent in  $(M, \delta)$  and converges to  $\alpha$ , if  $\forall \varepsilon > 0$  there exists

$i_0 \in \mathbb{N}$  such that  $\delta(\alpha_i, \alpha) < \varepsilon, \forall i > i_0$  and this truth is act via  $\lim_{i \rightarrow \infty} \{\alpha_i\} = \alpha$  or  $\{\alpha_i\} \rightarrow \alpha$  as  $i \rightarrow \infty$

(ii) : A sequence  $\{\alpha_i\}$  is said to be Cauchy sequence in  $(M, \delta)$  if  $\forall \varepsilon > 0$  there exists  $i_0 \in \mathbb{N}$  such that

$\delta(\alpha_i, \alpha_{i+\eta}) < \varepsilon, \forall i > i_0, \eta > 0$  or coequally, if  $\lim_{i \rightarrow \infty} \{\alpha_i\} = 0, \forall \eta > 0$ .

(iii): We said that  $(M, \delta)$  is a complete b-rectangular metric space if every Cauchy sequence in  $M$  converges to a few  $\alpha \in M$ .

The next main lemmas are helpful in providing principle results

**Lemma 2.9.** [40, 24] Suppose,  $(M, \delta)$  be a b-rectangular metric space with  $b \geq 1$  and suppose  $\{\alpha_i\}$  be a Cauchy sequence in  $M$  such that  $\alpha_i = \alpha_j$  when it was  $i \neq j$ . Then  $\{\alpha_i\}$  be able convergence at most one point.

### 3. MAIN RESULTS

Next theorem is the parallel of Banach [7] contraction principle in b-rectangular metric space

**Theorem 3.1** Suppose  $(M, \delta)$  be a complete b-rectangular metric space with  $b > 1$  and suppose a mapping  $f : M \rightarrow M$ , for all  $\alpha_1, \alpha_2 \in M$  satisfies the following:

$$\delta(f\alpha_1, \alpha_2) \leq b^{-1}\delta(\alpha_1, \alpha_2). \quad (3.1)$$

Then  $f$  has a unique fixed point.

**Proof.** Assume that  $\alpha_0 \in M$  be randomly, consider the sequence  $\{\alpha_i\}$  as  $\alpha_{i+1} = f\alpha_i$  for all  $i \geq 1$ . We will prove that  $\{\alpha_i\}$  is Cauchy sequence, such that  $\alpha_{i+1} \neq \alpha_i, i > 0$ . From (3.1), we have

$$\delta(\alpha_i, \alpha_{i+1}) = \delta(f\alpha_{i-1}, f\alpha_i) \leq b^{-1}\delta(\alpha_{i-1}, \alpha_i)$$

$$\delta_i \leq b^{-1}\delta_{i-1}.$$

By applying this process  $i$  times, we get

$$\delta_i \leq b^{-1} \delta_0. \quad (3.2)$$

Further, we enable suppose that  $\alpha_0$  is not a cyclic point of  $f$ . Actually, if  $\alpha_0 = \alpha_i$  for all  $i \geq 2$ , we get

$$\delta(\alpha_0, f\alpha_0) = \delta(\alpha_i, f\alpha_i)$$

$$\delta(\alpha_0, \alpha_1) = \delta(\alpha_i, f\alpha_{i+1})$$

$$\delta_0 = \delta_i$$

$$\delta_0 = b^{-1} \delta_0$$

Thus,  $\delta_0 = 0$  then  $\delta(\alpha_0, \alpha_1) = 0$ , hence  $\alpha_0$  is a fixed point of  $f$ . Now, let  $\alpha_i \neq \alpha_j$  for all  $i \neq j \in \mathbb{N}$ . Tuning  $(\alpha_i, \alpha_{i+2}) = \bar{\delta}$ , by (3.1) we obtain

$$\delta(\alpha_i, \alpha_{i+2}) = \delta(f\alpha_{i-1}, f\alpha_{i+1}) \leq b^{-1} \delta(\alpha_{i-1}, \alpha_{i+1})$$

$$\bar{\delta}_i \leq b^{-1} \bar{\delta}_{i-1},$$

By applying this process  $i$  times, we get

$$\bar{\delta}_i \leq b^{-1} \bar{\delta}_{i_0}. \quad (3.3)$$

Now, consider  $\delta(\alpha_i, \alpha_{i+k})$ , we have to events  $k = 2p$ ,  $k = 2p + 1$ .

If  $k = 2p + 1$ , by (3.2) we get

$$\begin{aligned} \delta(\alpha_i, \alpha_{i+2p+1}) &\leq b[\delta(\alpha_i, \alpha_{i+1}) + \delta(\alpha_i, \alpha_{i+2}) + \delta(\alpha_i, \alpha_{i+2p+1})] \\ &\leq b[\delta_i + \delta_{i+1}] + b^{-2}[\delta(\alpha_{i+2}, \alpha_{i+3}) + \delta(\alpha_{i+3}, \alpha_{i+4}) + \delta(\alpha_{i+4}, \alpha_{i+2p+1})] \\ &\dots \end{aligned}$$

$$\leq bb^{-i}[1 + bb^{-2} + b^2b^{-4} + \dots]\delta_0 + bb^{-(i+1)}[1 + bb^{-2} + b^2b^{-4} + \dots]\delta_0$$

$$= \frac{1+b^{-1}}{1-b^{-1}} b^{1-i} \delta_0,$$

where  $b^{-1} < 1$ . Thus

$$\delta(\alpha_i, \alpha_{i+2p+1}) \leq \frac{1+b^{-1}}{1-b^{-1}} b^{1-i} \delta_0. \quad (3.4)$$

On the other hand, take  $k = 2p$ , by (3.2) and (3.3), we get

$$\begin{aligned} \delta(\alpha_i, \alpha_{i+2p}) &\leq b[\delta(\alpha_i, \alpha_{i+1}) + \delta(\alpha_i, \alpha_{i+2}) + \delta(\alpha_i, \alpha_{i+2p})] \\ &\leq b[\delta_i + \delta_{i+1}] + b^2[\delta(\alpha_{i+2}, \alpha_{i+3}) + \delta(\alpha_{i+3}, \alpha_{i+4}) + \delta(\alpha_{i+4}, \alpha_{i+2p})] \\ &\dots \end{aligned}$$

$$\leq b^{1-i}[1 + b^{-1} + b^{-2} + \dots]\delta_0 + b^{-i}[1 + b^{-1} + b^{-2} + \dots]\delta_0 + b^{(1-i-p)}\bar{\delta}_0.$$

Thus,

$$= \frac{1+b^{-1}}{1-b^{-1}} b^{1-i} \delta_0,$$

where  $b^{-1} < 1$ . Thus

$$\delta(\alpha_i, \alpha_{i+2p}) \leq \frac{1+b^{-1}}{1-b^{-1}} b^{1-i} \delta_0 + b^{(1-i-p)}\bar{\delta}_0, \quad (3.5)$$

where,  $b > 1$ . Hence, by (3.3) and (3.4) we obtain  $\delta(\alpha_i, \alpha_{i+k}) = 0$ , for  $k > 0$ ,  $i \rightarrow \infty$ .

Therefore,  $\{\alpha_i\}$  is a Cauchy sequence. Since  $(M, \delta)$  a complete  $b$ -rectangular metric space then there

exist  $\alpha \in M$  satisfies  $\{\alpha_i\} \rightarrow \alpha$  as  $i \rightarrow \infty$ . Now, we will proof that  $\alpha$  form a fixed point of  $f$ , as

$$\delta(\alpha, f\alpha) \leq b[\delta(\alpha, \alpha_i) + \delta(\alpha_i, \alpha_{i+1}) + \delta(\alpha_{i+1}, f\alpha_{i+1})]$$

Then,  $\alpha = f\alpha$ . Therefore,  $f$  has a fixed point.

Assume  $\omega \in M$ , such that  $f\omega = \omega$  and  $\omega \neq \alpha$ , then  $\delta(\alpha, \omega) = \delta(f\alpha, f\omega) \leq b^{-1}\delta(\alpha, \omega)$ . Hence,  $\delta(\alpha, \omega) = 0$ , and  $\alpha = \omega$ .

**Example 3.2 .** Suppose that  $M = \alpha_1 \cup \alpha_2$  such that  $\alpha_1 = \{\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}\}$ ,  $\alpha_1[1,2]$ . Consider  $\delta: M \times M \rightarrow [0, \infty)$  and  $\delta(\beta_1, \beta_2) = 0$ , where  $\beta_1 = \beta_2$  and  $\delta(\beta_1, \beta_2) = \delta(\beta_2, \beta_1)$ ,  $\beta_2, \beta_1 \in M$ , as

$$\begin{cases} \delta\left(\frac{1}{3}, \frac{1}{2}\right) = \delta\left(\frac{1}{4}, \frac{1}{5}\right) = \frac{3}{100} \\ \delta\left(\frac{1}{5}, \frac{1}{2}\right) = \delta\left(\frac{1}{3}, \frac{1}{4}\right) = \frac{2}{100} \\ \delta\left(\frac{1}{4}, \frac{1}{2}\right) = \delta\left(\frac{1}{4}, \frac{1}{5}\right) = \frac{6}{10} \\ \delta(\beta_1, \beta_2) = |\beta_1 - \beta_2|^2 \text{ else} \end{cases}$$

Therefore  $(M, \delta)$  is a b-rectangular metric space with  $b = 4$ . Define  $f: M \rightarrow M$  as

$$f(\beta) = \begin{cases} \frac{1}{4}, & \beta \in \alpha_1 \\ \frac{1}{5}, & \beta \in \alpha_2 \end{cases}$$

Hence, Condition of Theorem 3.1 is satisfied and  $f$  has a unique fixed point  $\frac{1}{4}$ .

Let  $f: M \rightarrow M$  such that  $F(f) = F(f^i), \forall i \in \mathbb{N}$ . Then  $f$  has P property (see [28]) where,

$F(f) = \{\gamma \in M: f\gamma = \gamma\}$ . So we will introduce the following result

**Corollary 3.3.** Suppose  $(M, \delta)$  be a complete b-rectangular metric space with  $b > 1$  and let  $f: M \rightarrow M$  satisfies for all  $\alpha_1, \alpha_2 \in M$

$$\delta(f^i \alpha_1, f^i \alpha_2) \leq b^{-1} \delta(\alpha_1, \alpha_2). \quad (3.6)$$

Then  $f^i \alpha = \alpha, \forall i \in \mathbb{N}$ , where  $\alpha$  is a fixed point of  $f$ .

Next theorem is the parallel of Kannan's [33] fixed point theorem in the b-rectangular metric space

**Theorem 3.4.** Suppose  $(M, \delta)$  be a complete b-rectangular metric space with  $b > 1$  and suppose a mapping  $f: M \rightarrow M$ , for all  $\alpha_1, \alpha_2 \in M$  satisfies the following:

$$\delta(f \alpha_1, \alpha_2) \leq (b+1)^{-1} [\delta(\alpha_1, f \alpha_1) + \delta(\alpha_2, f \alpha_2)]. \quad (3.7)$$

Then  $f$  has a unique fixed point.

**Proof.** Assume that  $\alpha_0 \in M$  be randomly, consider the sequence  $\{\alpha_i\}$  as  $\alpha_{i+1} = f \alpha_i$  for all  $i \geq 1$ . We will prove that  $\{\alpha_i\}$  is Cauchy sequence, such that  $\alpha_{i+1} \neq \alpha_i, i > 0$ . From (3.1), we have

$$\begin{aligned} \delta(\alpha_i, \alpha_{i+1}) &= \delta(f \alpha_{i-1}, f \alpha_i) \leq (b+1)^{-1} [\delta(\alpha_{i-1}, f \alpha_{i-1}) + \delta(\alpha_i, f \alpha_i)] \\ \delta_i &\leq (b+1)^{-1} [\delta_{i-1} + \delta_i]. \end{aligned}$$

By applying this process  $i$  times, we get

$$\delta_i \leq (b+1)^{-1} \delta_{i-1}.$$

Now, let  $\alpha_i \neq \alpha_j$  for all  $i \neq j \in \mathbb{N}$ . Tuning  $(\alpha_i, \alpha_{i+2}) = \bar{\delta}$ , by (3.1) we obtain

$$\delta(\alpha_i, \alpha_{i+2}) = \delta(f \alpha_{i-1}, f \alpha_{i+1}) \leq (b+1)^{-1} [\delta(\alpha_{i-1}, f \alpha_{i-1}) + \delta(\alpha_{i+1}, f \alpha_{i+1})].$$

Then, we complete the proof using the same method as proof of the Theorem 3.1.

#### 4. CONCLUSION

This paper generalized some results from the literature and re-proved them in the context of generalized rectangular metric space.

#### REFERENCES

- [1] Abdeljawad T, Turkoglu D. Locally convex valued rectangular metric spaces and Kannan's fixed point theorem, Journal of Computational Analysis and Applications 2011; 14(3): 11 pages. arXiv preprint arXiv:1102.2093.



- [2] Abeljawad T, Abodayeh K, Mlaiki N, On fixed point generalizations to partial b-metric spaces, *Journal of Computational Analysis and Applications* 2015; 19(5): 883-891.
- [3] Aydi M, Bota M, Karapinar E, Moradi S, A common fixed point for weak f-contractions on b-metric spaces, *Fixed Point Theory* 2012; 13(2): 337-346.
- [4] Azam A, Arshad M, Kannan Fixed Point Theorems on generalised metric spaces, *J. Nonlinear Sci. Appl* 2008; 1(1): 45-48. DOI: 10.22436/jnsa.001.01.07
- [5] Azam A, Arshad M, Beg I, Banach contraction principle on cone rectangular metric spaces, *Appl. Anal. Discrete Math.* 2009; 3(2): 236-241.
- [6] Bakhtin I, The contraction mapping principle in quasi metric spaces, *Funct. Anal., Unianowsk Gos. Ped. Inst.* 1989;30: 26-37.
- [7] Banach S, Sur les opérations dans les ensembles abstraits et leur application aux équations intégrales, *Fundam. Math.* 1922; 3: 133-181.
- [8] Belc C, Generalization of Banach, Kannan and Chatterjee fixed point theorem, *IJPEM* 2016; 4(11): 27-34.
- [9] Boriceanu M, Strict fixed point theorems for multivalued operators in b-metric spaces, *Inter. J. Mod. Math.* 2009; 4(3): 285-301.
- [10] Boriceanu M, Bota M, Petrusel A, Multivalued fractals in b-metric spaces, *Cen. Eur. J. Math.* 2010; 8(2): 367-377.
- [11] Bota M, Molnar A, Csaba V, On Ekeland's variational principle in b-metric spaces, *Fixed Point Theory* 2011; 12(2): 21-28. DOI: 10.24193/fpt-ro.2019.2.36
- [12] Branciari A, A fixed point theorem of Banach-Caccioppoli type on a class of generalized metric spaces, *Publ. Math. Debrecen* 2000; 57: 3137.
- [13] Chatterjee S, Fixed point theorem, *C. R. Acad, Bulgar Sci.* 1972; 25 :727-730.
- [14] Chen C, Common fixed point theorem in complete generalized metric spaces, *J. Appl. Math.* 2012 ;2012, 14 pages. Article ID 945915.
- [15] Chifu C, Petrusel G, Fixed point results for multivalued Mordar-Rogers contractions in b- metric spaces. Published by faculty of sciences and mathematics, University of Nis, Serbia, *Filomat* 2017; 31(8): 2499-2507. DOI 10.2298/FIL 1708499c.
- [16] Czerwik S, Contraction mappings in b-metric spaces, *Acta. Math. Inform. Univ. Ostraviensis* 1993; 1(1): 5-11.
- [17] Czerwik S, Nonlinear set-valued contraction mappings in b-metric spaces, *Atti Sem. Mat. Univ. Modena* 1998; 46: 263- 276.
- [18] Das P, A fixed point theorem on a class of generalized metric spaces, *Korean J. Math. Sci.* 2002; 9 : 29-33.
- [19] Das P, A fixed point theorem in generalized metric spaces, *Soochow J. Math.* 2007; 33(1): 33-39.
- [20] Das P, B. Lahri B K, Fixed point of a Ljubomir Ćirić's quasi-contraction mapping in a generalized metric space, *Publ. Math. Debrecen* 2002; 61: 589-594.
- [21] Das P, Lahri B K, Fixed Point of contractive mappings in generalised metric space, *Math. Slovaca* 2009; 59(4): 499-504.
- [22] Erhan I, Karapinar E, Sekulic T, Fixed Points of (y;f) contractions on generalised metric spaces, *Fixed Point Theory Appl.* 2012 (2012), 12 pages. Article number: 138 (2012).
- [23] Fadail Z, Ahmad A, Ozturk V, Radenovic S, Some remarks on fixed point results of b2-metric spaces, *Far East J. Math. Sci.* 2005; 97(5):533-548.
- [24] George R, Radenovic S, Reshma K P, Shukla S, Rectangular b-metric spaces and contraction principle, *J. Nonlinear Sci. Appl.* 2015; 8(6):1005-1013.

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- [25] George R, Rajagopalan R, Common fixed point results for  $y;a$ -contractions in rectangular metric spaces, *Bull. Math. Anal. Appl.* 2013; 5 (1): 4452.
- [26] George R, Fisher B, Some generalised results of fixed points in cone b-metric spaces, *Math. Moravic* 2013; 17(2): 39-50.
- [27] Inci M, Erhan, Erdal Karapinar, Tanja Sekulic, Fixed points of  $(y;a)$  contractions on rectangular metric spaces, *Fixed Point Theory Appl.* 2012; 2012(1): 138. 12 pages.
- [28] Jeong G, Rhoades B E, Maps for which  $F(T) = F(Tn)$ , *Fixed Point Theory Appl.* 2007; 6: 71-105.
- [29] Jleli M, Samet B, The Kannan's fixed point theorem in cone rectangular metric space, *J. Nonlinear Sci. Appl.* 2009; 2(3): 161-167.
- [30] Kadelburg Z, Radenovic S, Fixed point results in generalized metric spaces without Hausdorff property, *Math.Sci.* 2014; 8(2): page 125.
- [31] Kadelburg Z, Radenovic S, On generalized metric spaces: a survey, *TWMS J. Pure Appl. Math.* 2014; 5 (1): 313.
- [32] Kadelburg Z, Radenovic S, Pata-type common fixed point results in b-metric and b-rectangular metric spaces, *J. Nonlinear Sci. Appl.* 2015; 8(6):944-954.
- [33] Kannan R, Some results on fixed points, *Bulletin of the Calcutta Mathematical Society* 1968; 60: 71-76.
- [34] Kirk W, Naseer Shahzad, *Fixed Point Theory in Distance Spaces*, vol. XI, Springer 2014, p. 173.
- [35] Kiran Q, Majira M, Kannan's and Chatterjee's type fixed point theorems in intuitionist fuzzy metric space, *Aip conference Proceedings* 2019; 2116(1):<https://doi.org/10.1063/1.5114175>.
- [36] Lakzian M, Samet B, Fixed Points for  $(y;f)$ -weakly contractive mapping in generalised metric spaces, *Appl. Math. Lett.* 2012; 25(5): 902-906.
- [37] Mathews S, Partial Metric Topology, *Papers on general topology appl.*, *Ann. New York Acad. Sci.* 1994; 728 :183-197
- [38] Mihet D, On Kannan fixed point result in generalised metric spaces, *J. Nonlinear Sci. Appl.* 2009; 2(2): 92-96.
- [39] Phancendra T, Kummara K, Fixed points of Chatterjee and Ciric contractions on an b-metric space, *international journal of pure and applied mathematics* 2017; 115(2): 361-367.
- [40] Roshan JR, Parvaneh V, Kadelburg Z, Hussain N, New fixed point results in b-rectangular metric spaces, *Nonlinear Anal. Model. Control* 2016; 21(5): 614634.
- [41] Sarma I, Rao J, Rao S, Contractions over generalised metric spaces, *J. Nonlinear Sci. Appl.* 2009; 2(3): 180-182.
- [42] Seong-Moon C, Fixed point theorems for ciric type z-contractions in generating spaces of Quasi-metric family, *Journal of function spaces* 2019; 2019:8 pages. Article ID 8290686.
- [43] Shukla S, Partial Rectangular Metric Spaces and Fixed Point Theorems, *The ScientificWorld Journal* 2014; 2014: 7pages. Article ID 756298.
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**PATTERNS OF URBAN DEVELOPMENT AND THEIR PROBLEMS IN A HILLY TOWN OF HIMACHAL PRADESH: A CASE OF OLD MANALI**

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**ABSTRACT**

*Hill towns of north-western Indian state Himachal Pradesh are known for their breathtaking beautiful sites, traditional houses, eco-friendly environment and health resorts. Tourists flock such places for health benefits, rejuvenation, meditation, adventure sports etc. purposes. However, over-crowding of these hill stations by the tourists has led to multi-faceted problems like loads of pressure on existing infrastructure facilities, chaotic conditions of traffic, and occurrence of accidents, invitation to natural calamities and many more. Apart from these, another significant implication is on urban pattern that urban form and imaginability of the areas is getting distorted and natural calm beauty of the areas is fast disappearing from the scene. This is due to mushrooming of unplanned and unregulated activities in these areas just to suffice the tourist requirements which eventually also has become significant economic activity generators of the area. Present study deals with case of small hamlet of old Manali whereby problems for permanent population are increasing in terms of breakdown of different infrastructure facilities. With the help of development plan and pilot survey conducted with the help of students and trained personnel and discussion with town planning authorities, problems were identified and appropriate solutions have been provided as remedial strategies for improving the degrading condition of old Manali.*

*Keywords: urban form, Manali, hill town, infrastructure, problems*

**INTRODUCTION**

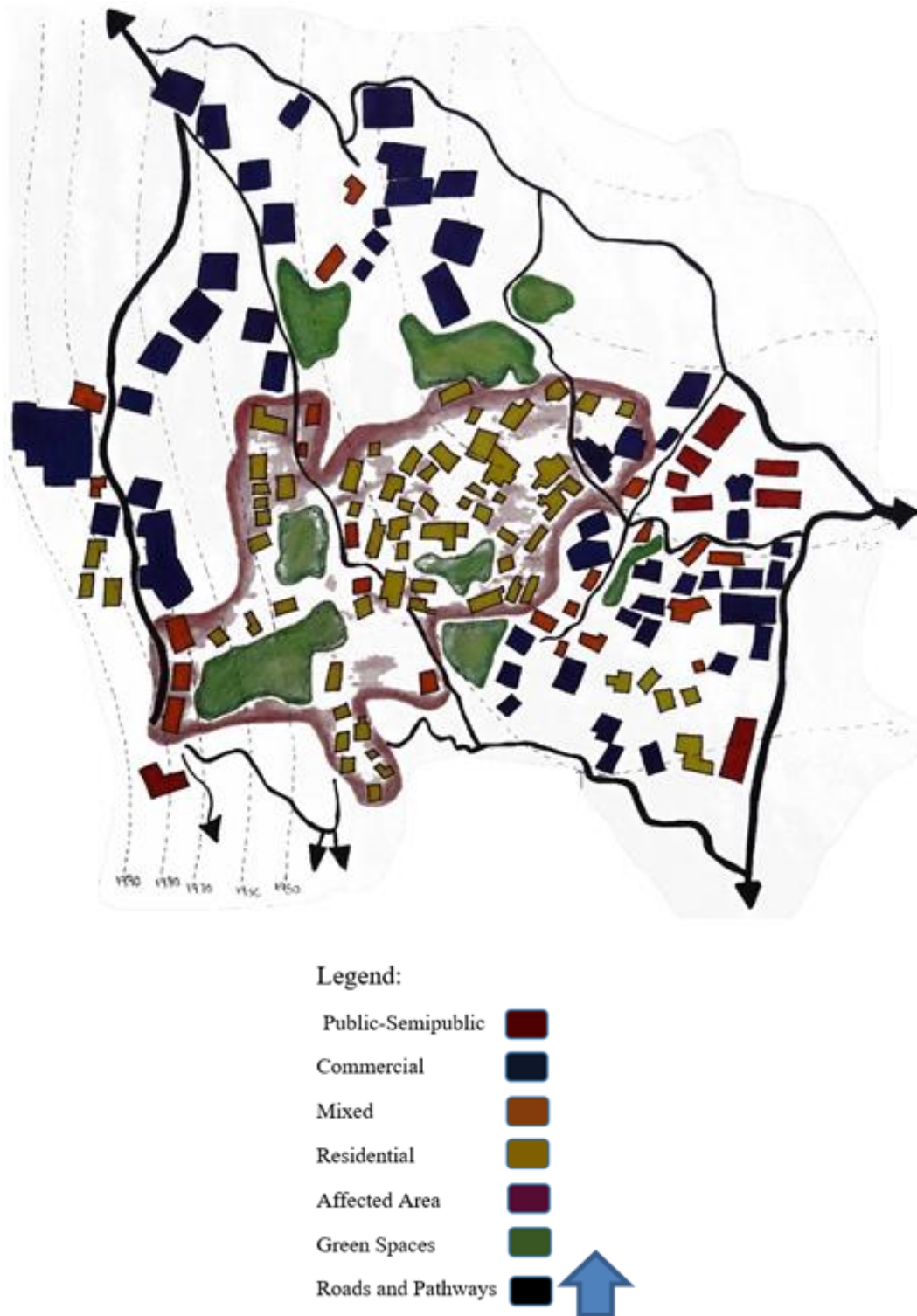
Urban patterns and urban elements that provide image to a urban form define any urban space be it a region or a small city[1]. Urban forms often integrates such aspects which if are sustainable would add to beautification and healthy environment of the city or region or if unsustainable then would degenerate the overall living conditions of the city [2,3] thereby making life of inhabitants quite uncomfortable. For example, urban transport is an essential aspect of urban form but if not planned and managed properly would lead to chaotic traffic conditions, high pollution levels, avoidable accidents and other similar problems. It is therefore, imperative that urban issues related with development are always take care of lest they lead to degeneration of city environment [4,5]. Manali a beautiful hill town located in North-western Himalayan region is well known tourist destination. Regional scenarios state that Manali agglomeration is essentially a part of Kullu valley[6]. Manali town is basically known for tourism driven activities and serves as home for both permanent and floating population especially during peak inflow of tourists. Other than tourism industry; agriculture frames another important economic activity for sustenance and livelihood of the inhabitants. With growing tourism industry and respective workforce, ancillary services and infrastructure facilities also have developed in and around Manali as per the availability of land. Moreover, provision of higher order facilities like education and health also serves as base for upper regions of Lahul-Spiti of state Himachal Pradesh. Present paper describes regional equity and dispersal of economic activities, defines horizons of growth with new opportunities and limitations for expansion and proposals for enhancing Manali's image and structure.

**RESEARCH APPROACH**

In order to study urban –architectural patterns of old Manali, the Development Plan(D.P)[4] was studied and a pilot survey was conducted with the help of people and students to practically gauge and understand the existing scenarios of social , physical and economical infrastructure with reference to the context. This exercise was undertaken to understand 1) the spatial patterns of the area, 2) changes happened in these scenarios so far and 3) the problems therein in order to find remedies which can be forwarded to appropriate town planning authorities for mitigation purposes.

**EXISTING SCENARIOS**

Existing scenario of land use pattern was studied from the survey [7,8] and with the help of development plan is given in Fig. 1 which was further used for analyzing existing social infrastructure, physical infrastructure and economic infrastructure and study problems therein.

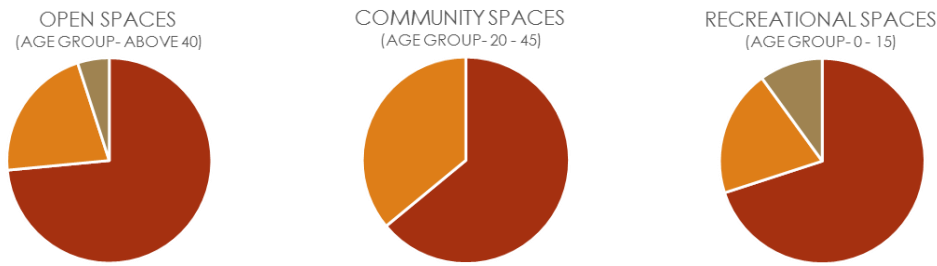


**Fig.1** Existing scenario of landuse pattern of Old Manali (reproduced from D.P by author after survey)

#### 1) Social infrastructure:

It includes provision of green spaces, open spaces, community spaces, and recreational spaces, provision of medical facilities, health facilities, fire stations, educational facilities and distance of schools with reference to residences.

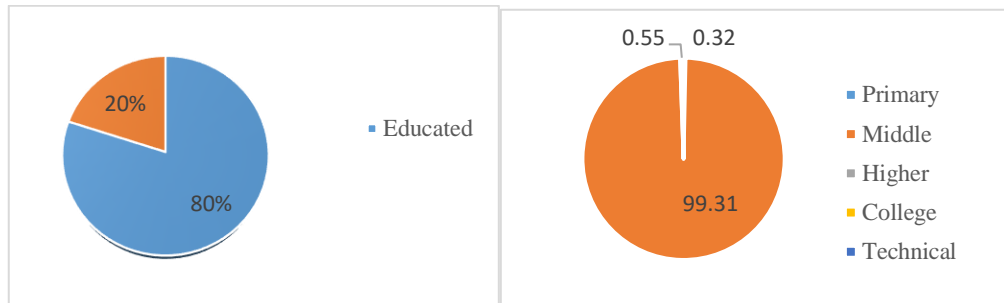
The existing patches of reserve forests within the area are well maintained and serve as green lungs. (7.72 %). The entire area around Manali is a recreational area for tourists (Fig 2), therefore, it is envisaged in the development plan to improve and enrich these areas environmentally instead of making provision for new areas. There is no government land available in the agglomeration area except for these forests. Therefore, total existing area under this use shall continue to remain for the same use and no additional land is required for this use.



**Fig 2.** Proportion of open, community and recreational spaces for different age groups

**Source:** By author (compiled from survey and D.P)

In addition to existing community spaces, parks and open spaces, there are provisions of health facilities, schools, fire services etc. required for social welfare of the people of the area. During survey it was found that almost whole of the population is literate (nearly 80%) and proportion of people with primary and middle education is also very high as is evident from the Fig. 3.



a) Status of literacy

b) Level of literacy

**Fig. 3** Status of literacy level

**Source:** By author (compiled from survey and D.P)

As per survey conducted some problems were identified given in Table 1.

**Table 1.** Problems related with social infrastructure

Main Aspect	Parameters	Present Status	Problems Identified	
			As Per Development Plan	As Per Survey conducted
Social infrastructure.	Basic services • Medical • Education • Fire Service	<ul style="list-style-type: none"> <li>• 01 mission hospital serves the needs.</li> <li>• 02 government schools impart knowledge.</li> </ul>	<ul style="list-style-type: none"> <li>• Sufficient for the needs of the area.</li> <li>• Lack of formal education.</li> <li>• Fire service is not sufficient.</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of first aid and emergency service in the upper reaches.</li> <li>• Lack of social education systems and play-way schools and playgrounds.</li> <li>• Fire extinguishing service is not approachable.</li> </ul>

**Source:** By author (compiled from survey and D.P)

It is clear from the Table 1 that as per survey there is absence of first aid and emergency service in the upper reaches of the area which represents the area of concern and improvement. Also absence of proper social education system and play-way schools and playgrounds is also of concern since it also represents that modification of existing academic structure is present requirement. Moreover, the fire extinguishing service is not well connected which in case of emergency may lead to increase in number of casualties due to improper accessibility. Present fire station is located on mall and it is inadequate to meet future requirements of the old town with population of 50,000.

**2) Physical infrastructure:**

It includes provision of roads, parking spaces, solid waste disposal, sewerage connections, provisions of septic tanks, waste disposal alternatives. As per survey, very narrow roads are in the area that often leads to chaotic traffic conditions on the site. Both development plan and survey verifies the traffic congestion problem in the area especially during peak tourist flow as is given in Table 2.

**Table 2.** Problems related with roads (Physical infrastructure)

Main Aspect	Parameters	Present Status	Problems Identified	
			As Per D.P.	As Per Survey
Physical infrastructure.	Traffic	<ul style="list-style-type: none"> <li>Roads are very narrow</li> <li>Major parking sites are available.</li> </ul>	22 % cars do not get a parking spaces.	Very narrow roads create traffic jams especially during tourist seasons. 30 % residents do not have parking spaces.

**Source:** By author (compiled from survey and D.P)

Survey showed that regarding generation of waste; 66.08 % houses generate less than one kg of garbage, 33.92 % more than one kg of garbage, only 22.98 % houses have dustbins, others do not have any system for proper garbage disposal (Table 3). More than 90% of the population does not have appropriate sewerage treatment provisions. This condition also affects the health condition of the inhabitants (Table 4).

**Table 3.** Status of garbage disposal, solid waste disposal and sewerage connections

Quantity of garbage generated (kg.)C	% age	Disposal Point	% age	Sewerage	% age
0 - 0.5	43.11	Dustbin	22.98	Yes	4.38
0.5 – 1.0	22.11	Street	8.97	No	95.62
1.0 - above	33.92	Any Other	68.05	Other	0

**Source:** By author (compiled from survey and D.P)

**Table 4.** Problems related with waste disposal (Physical infrastructure)

Main aspect	Parameters	Present status	Problems identified	
			As per D.P.	As per survey
Physical infrastructure	Waste disposal.	Garbage disposal methods under development.	75 % houses face garbage disposal problems and 20 % face sewerage clogging problems.	75 % - 80 % houses and 50 % hotels face disposal issues during peak tourist season and sewage clogging.

**Source:** By author (compiled from survey and D.P)

**3) Economic infrastructure:**

It includes provisions of banks, post offices, police station, communication services providing employment opportunities etc. There are facilities of banking, post office and communication services available in town. There are three banks namely – State Bank Of India, State Bank Of Patiala, Kangra Cooperative Bank. Residents' face few problems in this regard like: all lie along the main road (NH-21), residents travel long distance to arrive here, these are insufficient to cater to this area and there is lack of choice. Present status of these facilities is given in Table 5.

**Table 5.** Problems related with Economic infrastructure

Main aspect	Parameters	Present status	Problems identified	
			As per D.P.	As per survey
Economic infrastructure	Banks, ATM's and post office	<ul style="list-style-type: none"> <li>No bank or post office present in the area.</li> <li>Nearest bank located at town</li> <li>Not easily accessible</li> </ul>	Dispersion of services from town required.	Lack of ATM's, bank and post office for the area and a counselor office.

**Source:** By author (compiled from survey and D.P)

## RESULTS AND DISCUSSION

Study of old town of Manali with the help of Development plan and survey helped to understand existing urban patterns and architectural interventions. It also helped to analyze and understand the problems inherent in different infrastructural facilities and respective appropriate solutions have been discussed as below.

### 1) Social infrastructure:

It includes problems associated with Recreation Spaces, basic services, medical education, and fire services listed below.

**Recreation Spaces:** there is lack of open multiuse and dedicated spaces by different age group. This can be improved by planning and developing multiuse open spaces which can serve all age groups, flora and fauna.

**Basic services, medical education, and fire service:** there is lack of first aid and emergency service in the upper reaches, lack of social education systems and primary/ playway schools and playgrounds. Moreover, fire extinguishing service is not approachable. This can be improved by setting up Primary Schools, Anganwadis, Self- help groups, opening of dispensaries/ similar first-aid centers, forming new playgrounds on multiuse lands, developing and expanding fire extinguishing systems and stations to other areas based on requirement and they should be made approachable and available to all areas.

### 2) Physical infrastructure

It includes problems associated with drainage, water, electricity, telephone, traffic, waste disposal as listed below.

**Drainage:** Artificial drains are present. However, problems of water clogging on roads due to improper drainage during rain, lack of sufficient drains causing water seepage in buildings and foundations are there. This can be improved by channelizing surface run-off through natural swales which would also recharge the ground water table. Road-side drains need to be constructed to avoid flooding of roads during/ after heavy rain, rain. Water harvesting be encouraged, especially for agriculture.

**Water, Electricity and Telephone:** At present public and private water supply systems, government subsidized electricity and telephone connections are available. However, there are problems of low water supply during tourist season. Drinking water is not sufficient, electricity systems are not very reliable, telephone connections become insufficient during peak inflow of tourists. This can be improved by constructing water tanks in higher levels propagating rainwater harvesting by making it mandatory. Solar lights should used for street lighting and fresh drinking water jets/taps should be open to all.

**Traffic:** Roads are very narrow and two major parking sites are available. Nearly 22% cars do not get a parking space. Very narrow roads create traffic jams especially during tourist seasons, 30% residents do not have a parking space. This can be improved by restricting number of vehicles per house, developing roads in the interiors only for emergency services, by using extra/unused lands as parking during peak seasons and prohibiting road-side parking.

**Waste disposal:** at present garbage disposal methods are under development. Nearly 75 – 80% houses and 50% hotels face disposal issues during peak tourist season and sewage clogging. This can be improved by placing and maintaining government garbage bins adequately, expanding and well maintaining sewage system and constructing Sewerage Treatment Plant.

### 3) Economic infrastructure

It includes problems associated with banks, ATMs, post offices. At present there are no bank or post office present in the area. Due to lack of ATMs, a bank and post office for the area and a counselor office, people face a lot of problems. In order to improve it, number of ATM'S should be increased and dispersed adequately. In addition, a post office, bank and administrative (counselor's) office should be opened in the area.

### CONCLUSIONS

In order to study urban growth patterns of old town of a famous hill town was studied with the help of development plan and pilot survey conducted in the area. During the study, urban patterns were noted down, measurements recorded, visual observations and opinions of people were recorded. Study of growth of area with reference to infrastructure facilities specifically, social, physical and economical infrastructure revealed some important areas requiring improvement in all the three types of infrastructure facilities.

- Social infrastructure in terms of recreation spaces, basic services, medical education, and fire service requires reconsideration and better provisions
- Physical infrastructure in terms of drainage, water, electricity, roads and parking spaces, and waste disposal requires reconsideration and better provisions
- Economic infrastructure in terms of banks, ATMs, post offices, schools requires reconsideration and better provisions

### REFERENCES

1. Alberti, M. 1996. Measuring urban sustainability. *Environmental Impact Assessment Review* 16(4-6):381-424.
2. Anderson, W.P., P.S. Kanaroglou , and E.J. Miller . 1996. Urban form, energy and the environment: A review of issues, evidence and policy. *Urban Studies* 33(1):7-35
3. Beatley, T. 1995. Planning and sustainability: The elements of a new (improved?) paradigm. *Journal of Planning Literature* 9(4):383-395.
4. Breheny, M. , ed. 1992. *Sustainable Development and Urban Form*. London, U.K.: Pion.
5. Banister, D. , S. Watson , and C. Wood . 1997. Sustainable cities: Transport, energy, and urban form. *Environment and Planning B* 24:125-143.
6. Development Plan, Hamirpur, Accessed at [http://tcp.hp.gov.in/Application/uploadDocuments/devlopmentPlan/PlanDoc020150127\\_174424.pdf](http://tcp.hp.gov.in/Application/uploadDocuments/devlopmentPlan/PlanDoc020150127_174424.pdf)
7. Shalini Singh, Destination development dilemma—Case of Manali in Himachal Himalaya, *Tourism Management*, Volume 29, Issue 6, 2008, Pages 1152-1156.
8. Vandna Sharma, Identification of Urban Design Issues in the Town of Manali, *Journal of Civil Engineering and Environmental Technology*, Volume 5, Issue 1; January-March, 2018, pp. 38-40



## PUBLIC ACCOUNTING - A CONCEPTUAL ANALYSIS

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## ABSTRACT

*Accounting for public institutions is a system, which involves the registration and maintenance of accounting records by public institutions of their financial performance. There are three categories of organizations: public, private and nonprofit concerns. Each of these has different objectives: for example, private sector organizations make the most profit for their long-standing existence, public organizations or governments work for sustainable socio-economic development, and NGOs to provide services to society in general. It is obvious that the financial transactions of each of these organizations are different from each other. It is therefore impossible for their transactions to be recorded on a single accounting standard. It is therefore necessary to apply different accounting standards to these organizations individually. The financial results of public institutions must be made available to the public transparently. To ensure this, it is necessary to have standards applicable to the public sector to take account of their financial transactions. This paper is intended to analyse the accounting system of public institutions globally and in the Romanian context.*

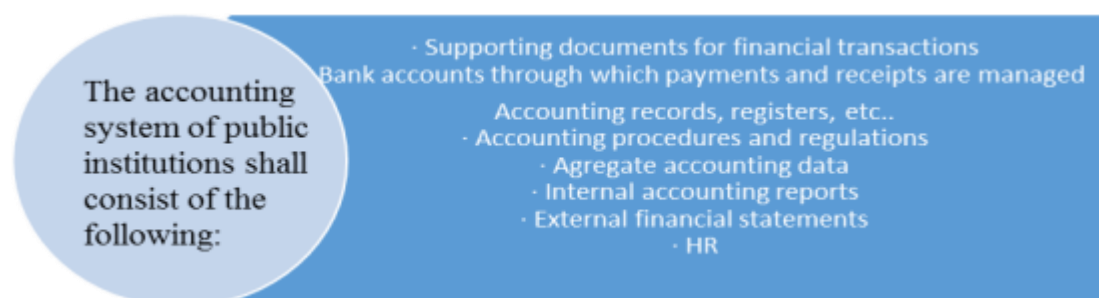
*Keywords: accounting of public institutions; cash base; commitment base; IPSAS; IFRS.*

*JEL Classification: M41, M49*

## 1. INTRODUCTION

Accounting for public institutions is the accounting system that includes the recording and maintenance of accounting records of their financial performance. The essential characteristics of the traditional accounting method of public institutions were mainly based on single entry accounts, recording financial events in cash. But over the period, the accounting of public institutions is transformed by various modern methods of recording and disclosing the financial transactions of public institutions, namely, the system of commitments using accepted accounting standards (García, 2014). Improvement can be done in the financial statements by developing the International Public Sector Accounting Standards and that is the international accounting harmonization project undertaken by the International Federation of Accountants (IFAC, 2008) There are three categories of organizations that we find in any economy: with public, private and nonprofit concerns. Each of these organizations is working for a different reason; for example, private sector organizations are asking to make more profit for their long-standing existence, public institutions or governments work for the country's sustainable socio-economic development, while NGOs are intended to provide services to society in general. If that is the reality, and the financial transactions of each of these organizations are different from each other. It is therefore impossible to record their transactions in accordance with single accounting standards, so it is necessary to apply different accounting standards to these organizations individually. Accounting of public institutions is the accounting system that supports the government to record information about their financial transactions so as to help shape its monetary and fiscal policies.

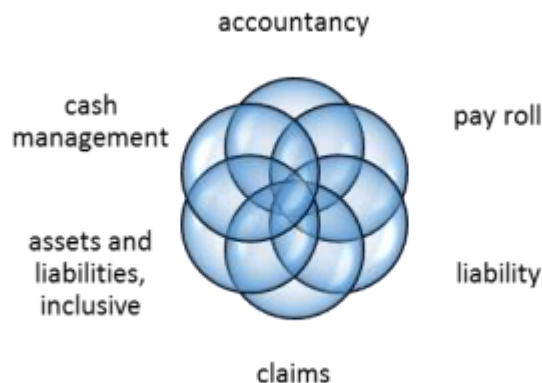
**Fig. 1. Composition of the accounting system of public institutions**



Source: Own Contribution

In addition to the above-mentioned components of the accounting system for public institutions, there are some:

**Fig. 2. Other systems of public institutions**



**Source: Own Contribution**

In Romania, the Romanian Corps of Chartered Accountants and Accountants (CECCAR) is not only involved in setting accounting standards for the private sector, but also in setting accounting standards for accounting of public institutions. The accounting authority should verify whether all guidelines contained in the public sector accounting standards are complied with. Nowadays, we can see that the countries of the world are more or less interdependent and for the recognition of the government itself at international level in financial matters it is necessary to move from the cash base of accounting to the accounting of commitments. The basis for calculating accounting will help recognize, measure and measure different financial items, such as assets, liabilities, revenues, more objective revenues. This is achieved by the Romanian government through the effort to achieve a more advanced accounting system to meet global standards. To support this objective, it is also necessary to involve researchers and accounting professionals who are more involved in this regard. However, the financial statements of public institutions must respond to public transparently.

**This study analyses** the standards applicable to public institutions to account for their financial transactions, so as to highlight the impact of accounting standards in public institutions in a global context, but also in the Romanian one.

**Research methodology:** analysis of the challenges encountered in the implementation of international accounting standards for public institutions. The research methods used are qualitative research by documenting, observing, analysing and interpreting the procedures used. As the economy is undergoing an unprecedented process of change, the accounting of public institutions needs, to respond to evolving challenges, specific international and national regulations to support new business models. This study is a conceptual and is conducted on the basis of secondary data collected through published sources, such as newspapers, research articles, websites.

**The main objectives.** From the analysis of the research gap study, the following objectives were

- ✓ Conceptual analysis of the accounting system based on cash and public sector commitments.
  - ✓ Examination of the process of setting international accounting standards in the public sector.
  - ✓ Examination of the public sector accounting system in the Romanian context.
2. **A review of the literature of speciality.** This section of the paper deals with the analysis of the existing literature on the current research topic to identify the untouched area in the context of the Romanian scenario. Lapsley (1988) analysed various accounting concepts of public institutions, including current developments and areas of neglect. The most important development highlighted is the application of current research methodologies in management accounting in the internal accounting of public sector institutions. The study also identified a major area of neglect by accounting researchers in public institutions: that of funding public sector institutions. Newberry (2015) found that Australian public finance legislation reinforces the need for public accountability, but through delegated regulatory powers, terms such as public accountability and responsibility are subject to subtle reinterpretation. The study noted that the main issue is whether IFRS should apply to all governments and whether government departments should be considered not publicly responsible and therefore allow for reducing information in their

published financial reports. Bracci et al., (2019) analysed the role and impact of accounting in the fragmented field of literature on public value theory. The study found that the lack of empirical research and the limited number of accounting papers for public value creation mean that accounting scientists should address "theoretical stagnation" to gain a deeper understanding of how the process of creating public value is governed. Jayasinghe et al., (2015) has proven that the rapid development of public sector accounting, accountability and auditing in emerging economies creates theoretical and empirical challenges due to the different ways in which public sector reforms and changes are understood and adopted within institutions. Looking at the literature, we found that the reasons why Romania adopted the International Public Sector Accounting Standards (IPSAS) are that public sector reforms and the shift from cash-based accounting to public sector-based accounting have been strongly affected by global pressures imposed by international organizations such as the International Public Sector Accounting Standards Board and the World Bank. The results of the research show the dysfunctional impact of globalization in the public sector accounting standards, as there are major structural problems that have not yet been solved. Additionally, there are growing dilemmas about whether the shift to commitment-based accounting is worth the additional costs and risks involved. The analysis of the existing literature shows that the studies have largely focused on the operational mechanisms of public sector accounting and underlines the need for research for the implementation of the commitment system in public institutions. Thus, this study is intended to conceptually analyze both the cash and the accrual basis of the accounting of public institutions in the global and Romanian context.

#### 4. THE ACCOUNTING BASES OF PUBLIC INSTITUTIONS

There are mainly two bases for accounting financial transactions: one is the cash base and the other is the basis of commitments. It is most advisable for public institutions to use the accounting accrual basis. Because it is impossible to account for significant liabilities, such as employee liabilities, loans and assets, properties, installations, etc., and it is also impossible to respect the principle of accounting prudence. To avoid this problem, IPSASB encourages public sector entities to adopt the accounting commitment base. Accrual-based accounting improves financial management and increases transparency, leading to a more comprehensive and accurate picture of a public financial position.

##### 4.1. Application of accrual-based accounting in public institutions

The accrual-based accounting system is currently only found in the accounting of public institutions. In the initial stages, the accounting model was considered most suitable for public institutions. Its main purpose is compliance with rules and regulations. The main problem in the accounting system is that it provides little or no information about the debts that an organization will have to meet in the future. In addition, it does not recognize the benefits that can be derived from assets acquired over a period of. Moreover, financial reports do not provide full information to financial managers and other stakeholders (decision makers). But traditionally, most countries still adopt cash accounting to provide regular balance sheet information. Commitment accounting is that accounting system in which transactions are identified as the financial event that took place without taking into account the timing of the related cash receipts and payments. So in this system income recognition is done when revenues are earned and expenses are recognized when debts are incurred or resources are used. In the cash system of accounting revenue are considered to be earned and expenses are incurred only when cash is received or paid. Commitment accounting maximizes the efficiency of public management and can be achieved at minimal cost to society.

##### 4.2. The benefits of accrual-based accounting

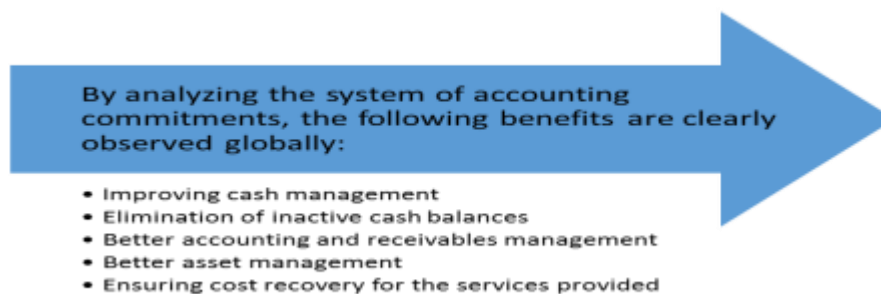
The financial position of the accounting commitment system, information on the financial position of the entities and current assets and liabilities are known by the balance sheets. This is necessary for public institutions to take the necessary decision on the obligation to finance the service plan provided for future financing requirements for maintenance and replacement of assets, to decide on the repayment of existing debts, etc., which allows entities to effectively manage cash and financing requirements. More importantly, the commitment system emphasizes financing decisions on net assets or equity, which in turn make entities adopt a long-term vision when making crucial financing decisions.

*Financial performance under the accrual system* of the accounting revenue statement shall be drawn up where full information on revenue and expenditure is provided. The revenue and expenditure budget helps public institutions focus on management and results and on resource management. Income information is necessary because to assess the impact of taxation on the government's tax position and the requirement of long-term loans, knowledge of expenditure is also necessary, as to assess revenue requirements, the sustainability of existing programs and the estimated cost of the proposed activities and services. Cash accounting for *cash flows*

is not fully neglected in the accounts of commitments, as cash management is an integral part of the accounting and financial management framework based on commitments. *The cash flow situation* is necessary to separate identification of cash receipts and payments related to operating, investment and financing activities. Conventional accrual-based accounting systems support cash-based accounting and reporting and seek to provide comprehensive information on current cash inflows and outflows and certain expected cash inflows and outflows. This helps manage cash efficiently and therefore helps prepare cash budgets efficiently. Reporting and budgeting, the main element of commitment-based reporting, is to meet the different needs of various users in economic decision-making, providing financial information that can be understood, relevant, reliable, accurate, complete and comparable. It widely includes information that is not in cash that is impossible in the cash-reporting system. For example, revaluations, de-registration, pension liabilities and consumption of assets through depreciation, etc., are some important cashless transactions that can be incorporated into the cash system but can find room in the commitment system and better be provided. The financial reports that are prepared by public institutions must depend on budgetary forecasts to show any variation between actual and budgeted results. In some cases, the budget becomes more financially important than the financial statements.

The analysis of the accounting commitment system is clearly observed at the global level, the following benefits, as set out in Fig. 3, are

**Fig. 3. Benefits of the accounting system e commitments**

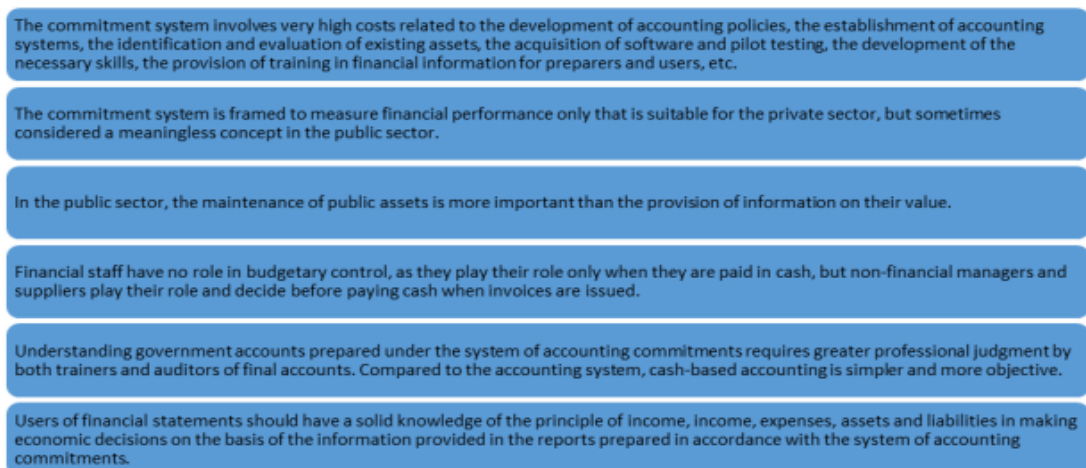


Source: Own Contribution

#### 4.3. Disadvantages of accrual accounting

The accounting commitment system brings several challenges to public institutions, presented in Fig. 4:

**Fig. 4. Challenges of accrual-based accounting**



Source: Own Contribution

## 5. THE GLOBAL CONTEXT OF ACCOUNTING OF PUBLIC INSTITUTIONS

To strengthen the global accounting profession, the International Federation of Accountants (IFAC) was founded on October 7, 1997 in Munich, Germany. The Federation provides support and processes to support the operations of the International Council for Public Sector Accounting Standards (IPSASB). IPSASB develops accounting standards and guidelines for public sector entities. The main tasks and responsibilities of IPSASB are to develop high-quality standards in auditing and ensuring the accounting, ethics and education of public

institutions, in particular for professional accountants and supporting their adoption and use. IPSASB's global operations are facilitated by IFAC. In addition, IPSASB also receives institutional support from the following international organizations:

- a) Asian Development Bank
- b) Chamber of Accounting Professionals of Canada
- c) New Zealand External Reporting Committee
- d) Governments of Canada and New Zealand

IPSASB works with certain objectives that are for "Strengthening public financial management and knowledge globally by increasing the adoption of international public sector accounting standards based on commitments" according to Fig. 5:

**Fig. 5. IPSASB Goals**



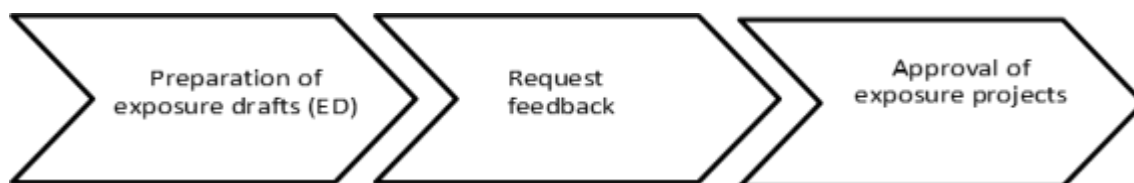
Source: Own Contribution

### 5.1. The process of developing IPSASBs

The fair process used in the establishment of IPSAS is systematic, well structured and provides a great opportunity for stakeholders, would be the preparers and users, to participate in the process and to offer their individual opinions on the standards to be developed.

This process is shown in Figure 6.

**Fig.6: The process of developing international public sector accounting standards**



Source: Own Contribution

#### Preparation of Exposure Drafts (ED)

The exposure projects of IPSASBs are developed by the Task Force or the Project Advisory Group. Exposure projects are also prepared through a consultation document that examines and explores the subject in detail and provides the basis for further discussion, preparation of exposure drafts, request for feedback and then approve exposure projects and policy-making. For public opinion on the ED, the Board provides periods of open and finite comments.

#### Receiving comments (request for feedback)

Comments made by the public on the exhibition drafts are received appropriately and made available to the public on the IPSASBs website. The Council shall review the draft standards for the revision and subsequent comments if changes are made to the exposure drafts after analysing and discussing the replies.

#### Approval of exposure projects

The approval project shall be done by voting mode. To approve the project, at least two-thirds of IPSASB members approve exposure projects, and re-exposure projects and IPSAS.

6. The accounting system in Romanian public institutions, the accounting system in Romanian public institutions is based entirely on rules, which means that all financial transactions must be recorded and maintained on the basis of accepted rules. This rules-based accounting follows the basis of the commitment. The accounting system of public institutions in our country has evolved considering the changes that have taken place at certain times. Many legal provisions were the cornerstone that revolutionized the accounting of public institutions in Romania. After Romania's accession to the European Union, it was necessary to improve the accounting of public institutions by introducing new regulations at the national level through OMFP no. 2021/2013, applicable on January 1, 2014 and at European Union level by Regulation No 2021/2013. 549/2013 on the European System of National and Regional Accounts (ESA 2010) applicable on September 1, 2014, the date from which the information was transmitted to Eurostat in accordance with the ESA 2010 Rules. Therefore, the progress made in our country's public accounting system for the implementation of IPSAS contributes to:
- ✓ increase the quality of financial reporting by institutions,
  - ✓ credibility and transparency of the information provided,
  - ✓ achievement of comparability and responsible evaluation at the level of all managed resources, making exact decisions, assessing financial situation, financial performance and cash flows, good management and management of resources,
  - ✓ more detailed information on the efficient management of costs and results, achieving more efficient internal controls and much more transparent in terms of assets and liabilities.

Emerging international trends in government accounting are good governance, and efficiency and transparency of public spending and fiscal prudence. The main purpose of the legislation in force is to develop government-accounting standards to improve the quality of government accounting and reporting, to enhance the quality of decision-making and public accountability. The Ministry of Finance is working to achieve two independent objectives that are

- improving the existing cash base in the accounts.
- supporting the government in moving from cash-based accounting to the accounting basis

The rules developed by the Ministry of Finance aim to implement accounting standards based on commitments, as well as those of financial reporting of the Romanian government (IFRS).

## 7.0. ACCOUNTING STANDARDS IN ROMANIA

It is necessary for the government to keep accounting records at IFRS, i.e. accrual-based accounting, with IAS, i.e. cash-based accounting. Additionally, Romania has developed rules and regulations:

- Standard on the chart of accounts (uniform object of classification)
- Events after reporting date
- Disclosure of information on the public administration sector
- Presentation of budgetary information in financial statements
- Cash balance standard
- Accounting for government subsidies
- Extra-budgetary loans

Harmonizing the accounting of public institutions with international accounting standards is a challenge for the legislature and the public who can contribute by offering new ideas for improving the current accounting system of public institutions.

## 8. CONCLUSIONS

The government system works differently from country to country. In Romania, it supports socio-economic activities of sustainable well-being. To undertake these activities, it earned income and spent the same for the company in which it works. The amount of income earned and the amount of income spent on the company must be systematically accounted for. To this end, it is necessary to have some accounting and reporting standards compatible with global standards. The overall accounting of public institutions is based entirely on the accounting of commitments, which follows the principle of the prudence of accounting.



The need for a common language at international level is critical because it provides a horizon for professional debate. As a result of changes in public contingency in Romania, in particular since 2016, when the approved regulations contain concepts and definitions of the International Standards for Public Sector Compatibility. For several years, Romania has made the effort to initiate the commitment system, but is not yet fully implemented to the global standard. Therefore, this study concludes that it is necessary to commit accounting professionals, researchers to make the accounting of public institutions in Romania reach a globally acceptable level and to ensure accountability and transparency of financial events and, therefore, to strengthen the country's tax system.

The major limitation of the study is that it is a conceptual and has not analysed the financial statements of public institutions empirically. This will open up many opportunities for researchers to conduct future debates addressing these limitations by using applied and experimental tools to test the importance of determinants and needs for the use of international standards in the accounting or auditing of public institutions. Therefore, this area can become an opportunity for future research.

## REFERENCE

- Abhishek N. and Divyashree M. S. (2019). Journal of Indian Taxation, Volume 6, Issue 2, July-December, pp. 25-36, doi: 10.17492/vision.v6i2.186480
- Bracci, E., Papi, L., Bigoni, M., Deidda Gagliardo, E. & Bruns, H. J. (2019). Public value and public sector accounting research: A structured literature review. *Journal of Public Budgeting, Accounting & Financial Management*, 31(1), 103–136.
- García, F. M. (2014). Developments and challenges in public sector accounting. *Journal of Public Budgeting, Accounting & Financial Management*, 26(2), 345-366.
- International Federation of Accountants. (2008). Handbook. New York, NY
- Jayasinghe, K., Nath, N. D., & Othman, R. (2015). The public sector accounting, accountability and auditing in emerging economies: Insights, gaps and some new ways forward. In *Public Sector Accounting, Accountability and Auditing in Emerging Economies*, 15(1), 1-6.
- Lapsley, I. (1988). Research in public sector accounting: An appraisal. *Accounting, Auditing & Accountability Journal*, 1(1), 21–33. Retrieved from <https://doi.org/10.1108/EUM0000000004618>.
- Newberry, S. (2015). Public sector accounting: Shifting concepts of accountability.
- *Public Money & Management*, 35(5), 371–376. DOI: 10.1080/09540962.2015.1061180.
- Senarath Y.P. & Ukwatte, S. (2015). The new public financial management (NPFM) and accrual accounting in Sri Lanka. *The Public Sector Accounting, Accountability and Auditing in Emerging Economies*, 15, 7–50. DOI: 10.1108/S1479-356320150000015002
- *Public Money & Management*, 35(5), 371–376. DOI: 10.1080/09540962.2015.1061180.

## Weblinks

- <https://cpfga.icaai.org/wp-content/uploads/2017/11/Government-Accounting-System-in-Developed-and-developing-Countries.pdf>
- <https://www.ipsasb.org/public-sector/about-ipsasb>  
<https://www.thehindubusinessline.com/news/education/Government-accounting-%E2%80%94-accrual-is-the-way-to-go/article20657641.ece>

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**RECENT TRENDS IN CASHLESS PAYMENT SYSTEMS IN INDIA**

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**ABSTRACT**

*Electronic payment system refers to the transfer of fund from one individual to another through electronic medium without the involvement of any physical cash or cheques. It can be done with the help of internet. With the advancement in technology the payment system also developed. Present Indian scenario also trying their good to replace the paper based payment system to digital payment system. In this paper study has been done on the various e-payments methods available to the peoples like NEFT, RGTS and IMPS etc. In this study found that cashless payment systems are adopted by peoples only because it's convenient for them. Another finding also found that the major problem faced by the people 'Lack of security'. Finally this study concluded that to increase the usage of cashless payment system, bank should provide a high degree of comfort and offer an utmost security for the peoples financial transactions ensuring zero error. Bankers should join their hands with the awareness programme of RBI to make the people aware. Electronic fund transfer ensures transparency of fund movement which will help for economic development through capital mobilization.*

*Key Words: e-payments, cashless payment system, methods, reasons for adopting cashless transactions, problems*

**INTRODUCTION**

Electronic payment system is a kind of financial exchange that is established online through an electronic medium between buyer and seller without the physical transfer of cash and cheques, irrespective of time and location. With the increased and advancement in technology spread of internet based banking and purchasing, electronic payment systems have increased rapidly in the last decades. As the world is moving forward with technology development, we can see the emergence of electronic payment systems and payment processing devices. E- payments get instant, so it's convenient and saves a lot of time. This is important, especially today when every aspect of our life is fast. As soon as the system increases, improves and a more secure online payment system will be provided, the percentage of cheque and cash transactions will decrease.

Present governments of India have come up with the idea of cash less economy. Government of India launched the campaign known as Digital India in 2015 with the aim of making digital economy. It is one of the most important step taken by government to make cash less economy. The main aim of this programme is to convert cities into smart cities through the uses of high speed internets. With the growing uses of internet in India the concept of e- payments system has become the need of an hour. With the advancement in technology and use of high speed internet there is rapid growth of e-commerce in India as a result of this the use of e-payment system has become an integral part of our lives.

**Evolution of E-Payment System in India**

Reserve Bank of India has made several efforts and reforms in Indian banking system for the implementation of online banking in India. One of them is The Payment and Settlement System Act 2007 (PSS Act), the main objective of this Act is to ensure that all types of payment and settlement systems operating in the country are safe, properly secured, sound, efficient, reachable and authorized. Present government is also making several efforts in this field to make India economy cash less economy and digital economy. The various concepts like Digital India, Digital payment and Smarts City have been launched by the government to make Indian economy a digital economy where all the transaction are done through the electronic form. Internet banking was first started in India in the late 1990s. In 1996 ICICI bank was the first bank to introduce the online banking system in India. After wards Citibank and HDFC Bank followed the internet banking services in 1999. With growth and development in the banking sector and awareness among the people the e-payment system have growth tremendously in last few years.

**NEED OF THE STUDY**

The main advantage of a electronic fund transfer is that a record of all economic and cashless transactions through electronic means makes it almost impossible to sustain black market or underground economics that often prove damaging to national economics. However cash is the preferred mode of payment for those sections of society no having access to formal payment system. A slow transformation has taken place in the various sectors of society migrating financial transactions to electronic mode. This transaction will undoubtedly continue because of the universal concept of computerization and digitalization. Electronic payment is less



expensive compared to payment through cash. However it is the decision in the hands of the peoples. Hence it is significance to study the concept of electronic fund transfer and to measure the people satisfaction.

### STATEMENT OF THE PROBLEM

The world witnesses an Information Technology revolution which has touched every aspect of people's life including banking. Technology has introduced new ways of delivering banking services and products to the peoples such as ATM cards, mobile banking, internet banking, NEFT, RTGS, IMPS and also e-wallets. In order to meet the new challenges, the banking industry has to modern information technology techniques. Electronic Fund Transfer are capable of performing the fund transfer functions of a bank transaction and payment system but bank providing customer easily transfer fund, any payment and a standing instruction viz., the recent trends in electronic fund transfer system in the society, awareness of peoples, know about Electronic Fund Transfer services and utilities of peoples.

### OBJECTIVES OF THE STUDY

- ❖ To know the methods of electronic fund transfer systems in India
- ❖ To know about the challenges of fund transfer systems
- ❖ To know the reasons for adopting the cashless payment systems
- ❖ To preferred the mode of cashless payment systems
- ❖ To identify the major problems faced by the peoples among the cashless transactions

### RESEARCH METHODOLOGY

The study based on survey method. Both primary and secondary data are collected for the purpose of the study. Primary data collected through questionnaire. Secondary data collected was collected journals, magazines and websites. The researcher adopted simple random sampling method and the sample size is 150. Kanyakumari District has been chosen as a study area. The statistical tools are used in this study percentage analysis, Chi-square cross tabulation and chi square test, rank analysis.

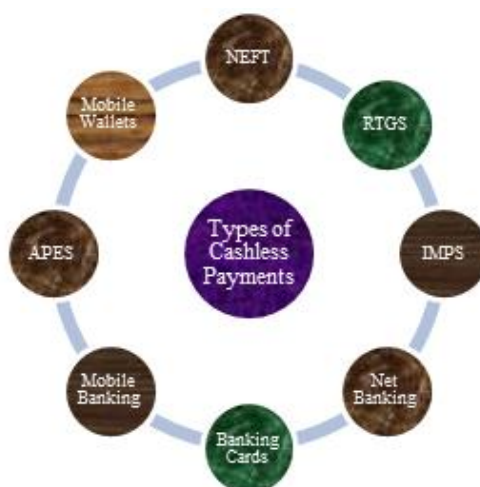
### LIMITATIONS

- Due to time limit this study is conducted in kanyakumari District only. So it cannot be generalized for whole India.
- As the study was conducted general people only, the finding cannot be generalized for overall populations' awareness level about electronic fund transfer systems.

### CONCEPTUAL FRAMEWORK

#### VARIOUS TYPES E-PAYMENTS METHODS

The following are the various types of e- payment methods in India



#### National Electronic Fund Transfer (NEFT)

National Electronic Fund Transfer was introduced by the Reserve Bank of India on November 2005. Under this scheme individual, firms and corporate can electronically transfers funds from any branch to any individual, firms or corporate having an account with any other bank branch in the country participating in the scheme. The minimum amount is Rs. 1 to there is no limit for maximum amount subjected to maximum amount per transaction is limited to Rs. 50,000 for cash based remittances.

**Real Time Gross Settlement (RTGS)**

Real Time Gross Settlement was introduced by the Reserve Bank of India in March 2004. In RTGS fund transfer from one bank to another bank in real time and gross basis which means immediate transfer of funds. Minimum amount for RTGS is Rs. 2 Lakhs and there is no upper limit. The transaction timing of RTGS from Monday to Friday is in between 9 a.m. to 4.30 p.m. and for Saturday from 9 a.m. to 2 p.m.

**Immediate Payment Service (IMPS)**

It is an instant inter-bank electronic fund transfer service through the mobile phone. Users can transfer funds any time anywhere even in bank holiday. Transaction limit for IMPS using Account number is Rs 2 Lakhs.

**Mobile Banking**

Mobile banking refers to service provided by the bank to its customer to execute financial transaction through mobile devices such as smart phone or tablet. It can be used any time anywhere. It is usually done through the banking apps. Customer can pay bills, transfer money, balance enquire and check the mini statement etc.

**Banking Cards**

Banking Cards are cards issued by the banks to its customers. It is the most common method of payment in India. Banking cards offer consumers more security, convenience, and control than any other payment methods. There are two types of cards: they are debit and credit cards. Some of the examples of payment cards are RuPay, Visa and MasterCard.

**Internet Banking**

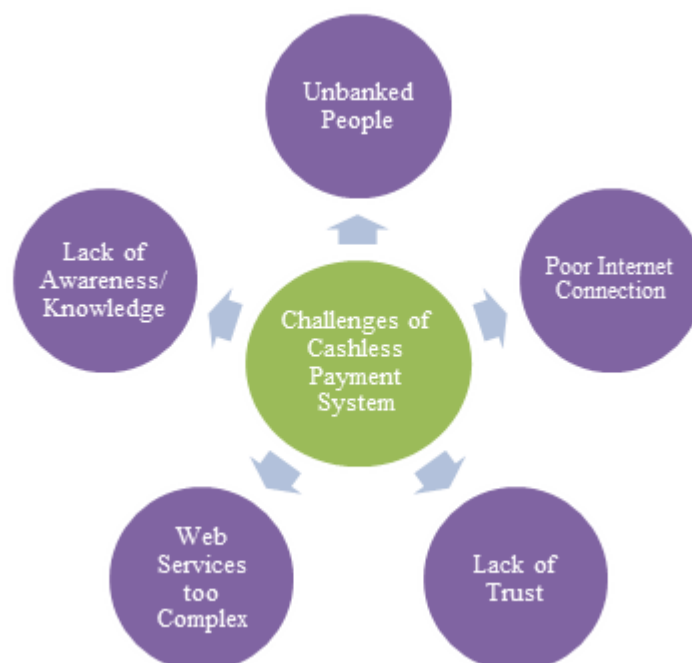
Internet Banking allows customers of the bank to undertake all the financial transaction through computerized system. Internet banking also known as, Online banking, e-banking or virtual banking, is an electronic payment system that enables customers of a bank or other financial institution to conduct a range of financial transactions through the financial institution's website.

**Aadhaar Enabled Payment System (AEPS)**

Aadhaar Enabled Payment System is a payment service developed by a National Payment Corporation of India (NPCI). It is a bank-led model which allows online interoperable financial inclusion transaction at micro ATM through the business correspondent of any bank using Aadhaar authentication. There is no limit for transaction. Through AEPS customer can avail the services like balance enquiry, cash withdrawal, cash deposit and Aadhaar fund transfer.

**Mobile Wallet**

Mobile wallet is a store of money transferred into it. It can be done by linking credit card and debit card information in mobile devices to mobile wallet application. Once the application is installed in the mobile phone, a user is registered and know-your-customer (KYC) documents are submitted, a user can transfer money to this wallet and then make payments.

**CHALLENGES TO E-PAYMENT SYSTEM IN INDIA**

**Poor Internet connection**

E-payment is entirely based on the internet. Majority of people lives in villages and there are no proper internet facilities available. Still the most of the people in India is unaware of the internet. The speed of internet is very slow as compared with the other developed countries in the world.

**Lack of Trust**

Most of the people don't trust in e-payment methods since they have heard of online fraud, misuse and low reliability. They generally prefer cash transaction then the e-payment.

**Web services too complex**

Most of the people in India don't have the idea how to use the web services. In e-payment system all the transaction are done through internet and they can't access the web service and it is too complex to understand for them.

**Lack of Awareness knowledge**

E-payment is not viable to the rural areas most of the people are not very literate so they are unaware of e-payment system. Since they are not very literate they don't know how to operate computer and use smart phone.

**Unbanked People**

Most of the people in India are untouched with banking sector they depends with money lender. All though government are making several efforts to make avail the banking facilities. Governments have launched the programme like Jan-Dhan Yojana but still it not reach the remote places of India.

**DATA ANALYSIS AND INTERPRETATIONS****I-Percentage analysis****Table No 1 Demographic Profile of the respondents**

Variables	Classifications	Frequency	Percentage
Gender	Male	57	38.0
	Female	93	62.0
	<b>Total</b>	<b>150</b>	<b>100</b>
Age (in years)	Upto 25 years	36	24.0
	25-35 years	48	32.0
	35-45 years	45	30.0
	Above 45 years	21	14.0
	<b>Total</b>	<b>150</b>	<b>100</b>
Educational Qualification	Illiterate	3	2.0
	School Level	18	12.0
	Graduates	78	52.0
	Professionals	48	32.0
	Others	3	2.0
	<b>Total</b>	<b>150</b>	<b>100</b>
Occupation	Government Employee	36	24.0
	Private Employee	30	20.0
	Own Business	30	20.0
	House Wife	24	16.0
	Students (Part time)	30	20.0
	<b>Total</b>	<b>150</b>	<b>100</b>
Monthly Income	Below Rs. 25000	30	20.0
	Rs. 25000-Rs.35000	75	50.0
	Rs.35001-Rs.45000	21	14.0
	Above Rs. 45000	24	16.0
	<b>Total</b>	<b>150</b>	<b>100</b>

**Source: Primary Data**

From the above table reveals that the 62% of the respondents are female, 32% of the respondents are belongs to the age group of 25-35 years, 52% of the respondents are graduates, the 24% of the respondents occupation is government employees and 50% of the respondents are earning monthly income belongs to Rs.25000-Rs.35000.

**II- CHI-SQUARE TEST****Hypothesis**

**H0:** There is no significant difference between educational qualification and satisfaction level about the success of demonetization

**H1:** There is significant difference between educational qualification and satisfaction level about the success of demonetization

**Table No 2 Educational Qualification and Satisfaction Level of Demonetization**

Educational Qualification	HS	S	M	DS	HDS	Total
Illiterate	0 (0.0%)	0 (0.0%)	3 (100%)	0 (0.0%)	0 (0.0%)	3 (100%)
School Level	0 (0.0%)	3 (16.7%)	6 (33.3%)	3 (16.7%)	3 (16.7%)	18 (100%)
Graduates	6 (7.7%)	21 (26.9%)	21 (26.9%)	21 (26.9%)	6 (7.7%)	78 (100%)
Professionals	0 (0.0%)	21 (43.8%)	12 (25.0%)	21 (43.8%)	0 (0.0%)	48 (100%)
Others	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (100%)
<b>Total</b>	6 (4.0%)	45 (30.0%)	42 (28.0%)	45 (30.0%)	9 (6.0%)	150 (100%)

**Source: Primary Data**

From the above table reveals that 3% of the respondents are illiterate and they satisfaction level of moderate, 33.3% of the respondents are school level and satisfaction level is moderate and satisfied, 30.8% of the respondents are graduates and the satisfaction level is dissatisfied, 43.8% of the respondents are professionals and the satisfaction level is satisfied and 32% of the respondents are said that satisfied about cashless payment system. Hence the majority of 32% of the respondents are satisfied about cashless payment system.

**Table No 3 Educational Qualification and Satisfaction Level of Demonetization**

FACTOR	Chi-Square	Degree of Freedom	P Value	Remark
Pearson Chi-Square	30.816 <sup>a</sup>	16	.014	Significant

**Source: Primary Data**

The above table reveals that P value (0.014) is less than Significant Value (0.05). Hence the null hypothesis is rejected. So there is a significant relationship between educational qualification and satisfaction level of cashless payment system.

**Table No 4 Reasons for adopting the cashless payment systems**

Reasons	Frequency	Percentage
Convenience	57	38.00
Discounts/cash back offers	35	23.33
Easy tracking to spends	30	20.00
Shortage of currency notes	28	18.66

**Source: Primary data**

From the table found that cashless payment systems are adopted by peoples only because it's convenient for them. There is other reason s of discounts and cash back offers attract to the peoples to adopt the cashless payment system. From this study most of the digital payments preferred for food/beverages, travelling, entertainment, utility bills, shopping and government services is via through online and mobile payments.

**Table No 5 Preferred mode of cashless Payment**

Mode of cashless Payments	Frequency	Percentage
Net banking/Mobile Banking	27	18

E-Wallets	44	29.33
NEFT	25	16.66
RTGS	19	12.66
Debit/Credit Cards	35	23.33

**Source: Primary Data**

From the above table found that the people to turn the mode of cashless payments other than cash, many people using particular banking apps and through net banking, some other people was using of e-wallets. It is also increased like Google pay, phone pay, paytm etc. some other people are using NEFT and RTGS for business purpose and individual reasons, So many people's are using card transaction because of no knowledge of using e-wallets and give to some awareness to the people. In fact that the country was starved of paper currency for a significant period while the people are adopting the cashless payment systems.

**III- RANK ANALYSIS****Table No Problems faced by the people**

Problems	Mean Score	Rank
Lack of technical knowledge	2.70	2
Lack of Security	3.00	1
Lack of prompt service	2.30	3
Lack of Wi-Fi Connectivity	2.10	4
Language barriers	2.00	5

**Sources: Primary Data**

From the above table found that the major problem faced by the people 'Lack of security', the next problem faced by the peoples are low level and lack of technical knowledge, third problem of lack of prompt service, fourth problem of lack of wi-fi connectivity and the final problem of people faced by the language barrier. So the majority of the people faced by the problems of lack of security.

**FINDINGS OF THE STUDY**

- ❖ The demographic profile found that the majority of the 62% of the respondents are female, 32% of the respondents are belongs to the age group of 25-35 years, 52% of the respondents are graduates, the 24% of the respondents occupation is government employees and 50% of the respondents are earning monthly income belongs to Rs.25000-Rs.35000.
- ❖ The cross tabulation proved that the majority of 32% of the respondents are satisfied about cashless payment system.
- ❖ The chi square test proved that the there is a significant relationship between educational qualification and satisfaction level of cashless payment system.
- ❖ The cashless payment systems are adopted by peoples only because it's convenient for them. There is other reason s of discounts and cash back offers attract to the peoples to adopt the cashless payment system.
- ❖ The types of cashless payment system are found that the people to turn the mode of cashless payments other than cash, many people using particular banking apps and through net banking, some other people was using of e-wallets. It is also increased like Google pay, phone pay, paytm etc.
- ❖ The main problems faced by the peoples are while using the cashless payment system to fear the lack of security.

**SUGGESTIONS**

- ✓ The cashless economic activity had a great and brave step to enhance the transparent economic development.
- ✓ Banks must create awareness on the usage of electronic fund transfer through social media and campaign at rural areas to increase the usage of NEFT/RTGS facilities, as it still unnoticed by many peoples.
- ✓ Banks should create trust in the minds of their peoples by using the cashless payment system with high security
- ✓ Banks should communicate to the people that using cashless method helps to cost and time saving are encourage the peoples and online banking transaction by reducing the transaction cost.

## CONCLUSION

In Indian senior e-payment system is still in growing stage it has not reached the entire part of the country. There are several challenges that need to be overcome in order to have a smooth growth of e-payment system. Although Reserve Bank of India along with the government are making several efforts to make Indian economy a cash less economy. They have launched several programmes in regards with online payment. All this efforts will work only when people have awareness regarding e-payment.

Cashless payment systems is one of the best and the easiest methods of carrying out financial transactions in the country through it comes along with certain disadvantages, electronic fund transfer will reduce the paper currency, in turn the plastic money the digital money will play a great role, bringing transparency in bank accounts. To increase the usage of electronic fund transfer, bank should provide a high degree of comfort and offer an utmost security for the peoples financial transactions ensuring zero error.

Creating awareness on usage of NEFT/RTGS is the very first step to increase the volume of electronic fund transfer and to attract many peoples, as it still unnoticed by many peoples. Reserve Bank of India is providing electronic banking awareness and training (e-BAAT) in association with selective public sector banks. Efficiency in dealing with money transfers and secure online transactions are the key focus areas of the training module. Bankers should join their hands with the awareness programme of RBI to make the people aware. Electronic fund transfer ensures transparency of fund movement which will help for economic development through capital mobilization.

## REFERENCE

1. Mamta, Prof. Hariom Tyagi and Dr. Abhishek Shukla (2016), "The Study of Electronic Payment System", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 6, Issue 7, PP. 297-300.
2. Deepankar Roy and Amarendra Sahoo (2016) "Payment Systems in India: Opportunities and Challenges", Journal of Internet Banking and Commerce, vol. 21, no. 2, PP.1-48.
3. Dr. K.A Rajanna (2018) in his article titled "Growth of Cash-Less Transactions in India: Challenges and Prospects", International Journal of Engineering Development and Research, Volume 6, Issue 1, PP. 199-204.
4. Ajayi, L. B. (2014). Effect of cashless monetary policy on Nigerian banking industry: Issues, prospects and challenges. *International Journal of Finance and Business Management Research*, 2, 29-41.
5. <https://www.bigdecisions.com/article/top-5-cashless-countries-in-the-world>
6. Benjamin, G. (2003). The evolution of electronic payment. The University of Queensland, USA. 9-11.
7. Snorckel & Kwast (1995). Federal reserve's survey of customer finances. Retrieved July 18, 2012, from: [http://en.wikipedia.org/wiki/survey\\_of\\_consumerfinances](http://en.wikipedia.org/wiki/survey_of_consumerfinances).
8. Carow K. and Staten M., 1999, "Debit, Credit, or Cash: Survey Evidence on Gasoline purchases", Journal of Economics and Business, 21: 409-421.
9. Wondwosson T & Tsegai G. Kidan (2005). E-payment: challenges and opportunities in Ethiopia. United Nations: Economic Commission for Africa.
10. Balachadher, K.G., Santhan, V., & Norazlin, R, (2000). Electronic banking in Malaysia: A note on evolution of systems and consumer reaction. Journal of Internet Banking and Commerce. 5 (1).
11. Abor, J. (2004). Internationalisation and financing options of Ghanaian SMEs. *Acta Commercii*, 4 (1), 60-72.
12. Hunter, W. C., & Timme, S. G. (1991). Technological change in large US commercial banks. *Journal of Business*, 339-3.
13. Taddesse, W., & Kidan, T. G. (2005). E-Payment: Challenges and opportunities in Ethiopia. *United Nations Economic Commission for Africa*.
14. Baraghani, S. N. (2007). Factors Influencing the Adoption of Internet Banking (Unpublished Master's Thesis). *Lulea university of Technology. Sweden*.
15. Bassey, C. (2008). Digital Money in a Digitally Divided World: Nature, Challenges and Prospects of ePayment Systems in Africa. *scott. mainzone. com/bassey-digitally-divided-world. pdf*.

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16. Worku, G (2010) Electronic Banking in Ethiopia – Practices, Opportunities and Challenges. Journal of Internet Banking & Commerce, August 2010, Vol. 12 No.2.
  17. Akhalumeh, P.B., and Ohiokha, F. (2011): Nigeria's Cashless Economy; The Imperatives. International Journal of Management & Business Studies. vol. 2 pp. 12 – 17.

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**RESPONSIBILITY TILL WHAT EXTENT-A STUDY ON NGOS**

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**ABSTRACT**

*The management runs the business and the board ensures that it is being run in the right direction such, governance keep the companies directed and controlled. Corporate Social Responsibility is a misleading term as responsibility should be voluntary in nature but, in reality it has been mandated by law to a large extent. Implementation of CSR activities realistically requires a willingness to create social and environmental value along with profitability. Responsibility to the stakeholders is crucial and whether such responsibility be mandated by law or kept voluntary is a debate for years and many discussions have been made on this. There have been many instances of upliftment of the marginalized and deprived because of the projects and initiatives by the big and multinational companies. There are projects of various magnitude and some have acclaimed popularity not in India but all over the world. But still we find that there are many situations where destitute people are not receiving such benefits and this pandemic situation have made it more clear. The projects are not always implemented by the companies themselves but through certain NGOs and other agencies and here lies a big problem. Recently, certain proposed amendments in CSR policy have been made and if implemented, the situation will become more severe. We know it is not only the responsibility of the government, but the corporates also have such responsibilities and many corporates are doing their best. But still there is a gap mainly due to implementation. This paper tries to identify the reason for such gap, why these benefits are not reaching the entire community but only to a handful of them. Special reference to south kolkata slum region. This paper also tries to find the future of such projects and potholes of implementation of such projects.*

*Keywords: Social Responsibility, Government, NGOs, CSR policy rules, Implementation*

**INTRODUCTION**

The projects of certain companies like Infosys, ITC (E Chou pal), Mahindra & Mahindra Ltd. (Nanhi Kali), are very famous. The concern lies in the fact that though all these efforts are there, a particular sector specially, in this urban region are not getting such benefits. We have to understand the implementation procedure of such Projects through NGOs in urban area. Actually the procedure is different in rural area. In the rural areas where there is plenty of open land, certain big companies either buy the land or take the land in lease. In urban areas work is done through Nosed other implementing agencies. The NGOs generally apply for grants to work in the slum areas and then after receiving the grant they perform the task.

Section 135 of The Companies Act, 2013 and The Companies (Corporate Social Responsibility Policy) Rules, 2014 deals with the provisions relating to CSR. Therein it is mentioned that the company shall give preference to the local area and areas around it where it operates for spending the amount earmarked for Corporate Social Responsibility activities. Schedule VII of the Companies act 2013 mentions that the activities which may be considered as CSR and in those policies special mention have been made related to rural area development and slum area development. These policies were followed and there had been certain problems. Now the new policies will lead to further problems.

**UNDERSTANDING THE WORKING:**

The NGOS request for a grant as budget proposal for expenditure and the CSR committee approve the grant after having a check of the utilization report of the previous grant allotted. Mostly, such utilization reports are prepared by chartered accountants. If it is a new project, then certain verification and scrutiny is done. It may happen that full grant is allotted or a part is allotted. The NGOs sign the contract papers and there it is mentioned whether the full grant will be disbursed at one go or it will be distributed through instalments. The NGOs generally in South Calcutta region work in the slums of for eradicating hunger, poverty and malnutrition, promoting health care including preventive health care and educational activities.



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**THE PROS AND CONS OF SUCH POLICIES:**

Under this situation the beneficial work has got great momentum. The reasons for this is:

- 1) The local NGOs have a deeper knowledge about the local area and their problems.
- 2) The greater accessibility to needy people helps these NGOs, to work in an efficient manner.
- 3) As the NGOs work in collaboration with the local government agencies and other Non- government agencies, the benefits specially in health related issues like (health and nutrition mapping of residents of slum areas) reach the grass root level which is not possible for the government alone.
- 4) The NGOs work with the CSR committees of the companies and specially the HR committee. They send regular reports and utilization certificates to these companies who after verifying them and disburse the next instalment.

**OBJECTIVES OF THE STUDY:**

- 1) To understand the present implementation procedure of projects in urban area.
- 2) What are the pros and cons of such procedure?
- 3) What will be the effect if new policies are implemented?
- 4) Suggest ways to move out of the problems.

**RESEARCH METHODOLOGY:**

This study is mainly based upon secondary data collected from various articles and views upon them.

**LIMITATIONS**

As it is a sensitive issue, exact names of the companies or beneficiaries could not be mentioned. The focus has also been on South Kolkata region only.

**THE STORY ON THE OTHER SIDE**

There are always some dishonest people and their bad motives which lead to complete breakdown of the well- structured process.

In this sector also, there are many people and institution who with their knowledge about the locality, submit project to the MNCs and other big companies and with the help of insiders receive grants from them. These has led to serious illegal activities like

- 1) The NGOs take these grants and do not do any kind of beneficiary work.
- 2) Either they keep the money with themselves or in a way transfer back the money to the employees or the company after deducting certain commission.
- 3) A number of fake vouchers and bills are produced with which false utilization reports are submitted.
- 4) A huge number of intermediaries are involved - the employees of the companies, the officials of the NGOs or implementing agencies, the accountants, certain shopkeepers.
- 5) Even certain beneficiaries are also involved who vouch by giving false signatures (most of the times thumb impression) for receiving essential items or educational accessories twice thrice a year or to show huge number of beneficiaries where as in reality either they have not received or even if received, very few in number.

**CONSEQUENCES FACED**

As a result of these activities of some dishonest people, huge section of the poverty stricken or backward society are not getting the benefits which is leading to fulfillment of the goals for which the whole concept of CSR was formed. The benefits are not trickling down to the lower most level as a way it was anticipated.

It is not that the government is not aware of such incidents. Because of this, from time to time Government has issued amendments to the Section 135 of The Companies Act, 2013 and The

Companies (Corporate Social Responsibility Policy) Rules, 2014, In Rule 4 of The Companies (Corporate Social Responsibility Policy) Rules, 2014.

It has also been mentioned that, the Board of a Company decides to undertake its CSR activities through a company established under section 8 of the Act or a registered trust or a registered society. Such company or trust or society shall have an established track record of three years in undertaking similar programs or projects and the company will specify the projects or programs to be undertaken and the modalities of utilization of funds of such projects and programs. Although such strict rules and regulation are mentioned, fraudulent activities are going on and for this, the government has introduced The Companies(Amendment) Bill 2020.

Here it has been mentioned that CSR activities can be performed by the companies themselves or by Section 8 companies or companies established by the parliament or state legislature. Along with this there are certain other crucial change like unspent CSR fund account and impact assessment report. But the area of concern and anxiety is proposed removal of registered trust and societies.

As discussed earlier in most of the cases the companies along with the trust or NGOs conduct the CSR activities. In such a situation if the trust or NGOs are not allowed to receive donation, then the whole essence of upliftment of the society will come to a stop due to -

- 1) The NGOS or trust do not have any regular source of funds and so they will not be able to continue the work even though they have the crucial information and knowledge about the problems of the local area.
- 2) The medium and small companies who have a CSR committee but they do not have the required skilled labor force who can undertake such activities in the nearby slums, the required time to be devoted to such activities is not available to the employees also.

Mostly under CSR, projects like establishment of school rooms, toilets or clinics are done, some projects are taken for imparting technical education, social welfare and women upliftment. Or in certain cases plantation activities are taken up. But what happens after that? The reality is too harsh. After the so-called inauguration, these trees wither up, the school buildings are left empty as the fees of the teacher are to be paid by whom comes under question. With the help of some efficient and hardworking people from the NGOs or trusts these projects are run for some time but due to lack of funds they also fail. Fund is required for regular administrative expenses. Because of all these reasons even if crores of rupees are being invested but ultimate goal is not being achieved, the benefits of these projects are not reaching the ultimate beneficiaries or even if benefits are received it is not for a prolonged period of time.

In this situation, if the NGos or trusts stop working the situation will become worse. It will lead to a vicious cycle, a trap from where no one will get benefit, but huge resources will be spent. The companies already have to follow many regulations and compliance rules for their regular course of business. Now with CSR policies, they are required to follow a series of rules. Mentionable ones are, they have to open Unspent Corporate Social Responsibility Account, if non-compliant, then required to pay penalty twice the amount to be transferred to such account or one crore rupees whichever is less. Even the officials in default are required to pay penalty separately.

Along with this, they need to conduct impact assessment for their CSR projects if they spend over INR5 crores. The government is under the hope that such rules will make CSR a fair and transparent one but ultimately so many rules and regulations will make the process more complicated and unmanageable by the companies and ultimately the mission will become unsuccessful.

## **WAY OUT**

To come out of this vicious cycle the government may try for following options:

Instead of issuing so much penalty policies, formation of committees and submission of reports focus must be made on voluntary involvement.

Awareness program should be conducted so that dishonest practices can be avoided.

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More verification and site inspection should be done by the officials with help of local NGOs to know the exact problem.

Policies should be designed in such a manner so that projects after inauguration continue to serve the needy instead of being kept idle after some months of working.

### **CONCLUSION**

The responsibility is not to be vested on the corporates alone, but it should be a collaborative approach. The companies are doing their best to satisfy the needs of hundreds in a country like ours where a full square meal a day is also a luxury to some people. The government should focus more on the voluntary part rather than pressing penalties and rules on them. More initiatives may make even the small firms to come up with some help to the destitute and needy. The pandemic and lock down have brought incident before our eyes where even single individuals from 8 to 80 have taken so much initiative to help others in whatever little ways they can. Instead of top 100 CSR companies or top 10 CSR list, the initiatives by the small companies should be brought under limelight. By working together, the government, the companies, the NGOs and Trusts will be able to achieve the goals of Corporate Social Responsibility, benefits will reach the needy and destitute as Swami Vivekananda said "It is only by doing good to others that one does good to oneself".

### **REFERENCES**

1. The Companies Act 2013
2. The Companies Amendment CSR policy rules 2020
3. Narwal, M., & Sharma, T. (2008). Perceptions of corporate social responsibility in India: an empirical study. *Journal of Knowledge Globalization*, 1(1), 61-79.
4. Demir, A., & Budur, T. (2019). Roles of leadership styles in corporate social responsibility to non-governmental organizations (NGOs). *International Journal of Social Sciences & Educational Studies*, 5(4), 174-183.

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**ROTATING THERMAL WHEEL PERFORMANCE EVALUATION IN VARYING CIRCUMSTANCES IMPLEMENTED IN HOSPITAL CLEAN ROOM**

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*For long-term management, energy efficiency becomes a need that cannot be overstated. It is also a key element in meeting the United Nations Framework Convention On Climate Change's commitments. Energy efficiency is simply a basic need for green buildings. The elderly society is one of the hallmarks of industrialized countries. In these nations, there is a strong need for health care and medical services. Due to the potential primary energy savings, air to air heat exchangers play a critical role in mechanical ventilation equipment, both in the renovation of existing buildings and in the construction of new ones. Heat wheels, in particular, are gaining popularity due to their low pressure drop and excellent efficiency. This research primarily looks into and evaluates the usage of a rotating thermal wheel to recover energy from the return air of a central air conditioning system's air handling unit (AHU) in an hospital cleanroom. The results show that as the temperature and relative humidity of outdoor fresh air rises, as well as when the central chiller's Coefficient of Performance (COP) falls, the percentage energy savings owing to the rotating thermal wheel rises.*

**Keywords:** Energy efficiency, Cleanroom, Heat wheel, air conditioning system, Air handling unit, recirculation air systems, Coefficient of Performance.

**INTRODUCTION**

Air conditioning was discovered to be the most common electrical end use, accounting for more than half of all building energy usage. It's all about providing a safer environment for patients and staff when it comes to HVAC design in health care facilities. The primary distinction between air conditioning for healthcare facilities and air conditioning for other types of buildings is that The requirement to limit air flow inside and across departments (no cross movement). Specific ventilation and filtering needs to dilute and decrease pollution in the form of odor, airborne microorganisms and viruses, as well as dangerous chemical and radioactive compounds. Maintaining proper indoor air quality necessitates the use of efficient ventilation. Different temperature and humidity needs for different locations, as well as precise environmental management. The level of architectural sophistication required to reduce the danger of airborne disease transmission while maintaining a sterile and healing environment for patients and employees. These demands necessitate large amounts of outside air, as well as considerable treatment of this ventilation air, such as chilling, dehumidification, reheating, humidification, and filtering. Air conditioning was discovered to be the most common electrical end use, accounting for more than half of all building energy usage. Hospitals require efficient heating, ventilation and air conditioning (HVAC) systems to maintain good indoor air quality (IAQ), aseptic conditions, and to secure healthy, safe and suitable indoor thermal conditions (i.e. temperature, humidity, air quality and airflow) for the hospital personnel and the patients[1] There are also remarkable differences between infection isolation practices in different countries and even within different regions of countries[2] Factors such as low ventilation rate, inadequacy of building HVAC systems, use of certain building materials and overcrowding, may result in indoor air pollution[3] Estimates show that as much as 70% of the energy lost through mechanical ventilation (balanced or extract) can be recovered by the use of ventilation heat recovery systems[4] Given the rapid advancement of new cooling technologies and management techniques in recent years, it is important to remember that there is no one, all-encompassing technology or approach that can achieve the lowest kW per R ton. A combination of many of these technologies or methods is frequently required. In order to meet new cooling energy-efficiency objectives, a comprehensive strategy is required. Increased energy expenses are necessary to maintain desirable interior conditions due to the loss of thermal energy in the ventilation process. A device that can transfer heat from discharged interior air to fresh outdoor air is necessary to reduce the loss. Heat wheels or periodic-flow exchangers have traditionally been used in such applications. Ambertson [5] performed a detailed numerical analysis of a rotary heat exchanger's efficacy and discussed flaws in the finite difference model. He identified a few non-dimensional factors impacting effectiveness from the data. It was claimed that the computation of effectiveness can be simplified for appropriate results within a rotary heat exchanger's real working range. In a computational analysis of a rotating heat exchanger, Bahnke and Howard [6] took into account heat conduction in the flow direction. Within the normal working ranges of gas turbine

regenerators, the performance of the heat exchanger as well as the impacts of longitudinal heat conduction were examined for six non-dimensional factors. Buyukalaca and Yilmaz [7] investigated the effect of rotational speed on the performance of a rotary heat exchanger, focusing on the low-speed zone. They created an analytical model and compared it to a numerical model for the limiting situation of zero rotation speed. They presented a low-rotating-speed empirical correlation and compared it to empirical correlations proposed by Kays and London [8] and Worsoe– Schmidt [9]. Skiepko and Shah [10] compared experimental data from a 5.3 m-diameter rotary regenerator (air preheater) in a coal-fired boiler to a theoretical model. The model was created using Bahnke and Howard's [6] analytical solution to the specification. They compared the results to efficacy data from Kays and London [8] as well as experimental data, concluding that the disparities were due to gas leakage uncertainty.

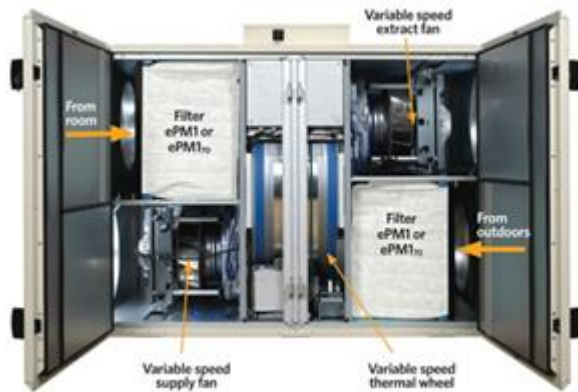


Figure 1

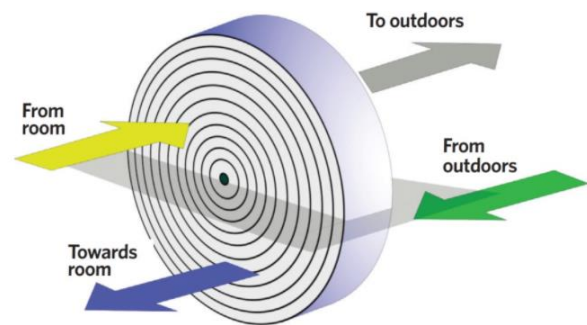


Figure 2

The thermal wheel also known as a heat wheel, (Figure 1) rotary heat exchanger, or energy or enthalpy wheel, depending on its primary function is built around a rotating cylinder that is packed with a material fabricated in such a way that continuous air channels pass from one side of the cylinder to the other. The packing material, which is usually aluminum, has a high surface area that allows heat to be transferred between it and the passing airstream. The wheel is housed in a casing so that half of it is exposed to an airstream usually outside air while the other split half is in a counter flowing airstream that is being extra heated. A horizontal plate separates the two sections, with a crucial, robust seal against the wheel preventing leakage between the two air pathways. The seal will either be a brush-type contact seal, which is less expensive but more vulnerable to leaking as the pressure difference rises; or a precisely fitting, shaped, non-contact wiper seal that uses air vortices to maintain a seal, depending on the manufacturer. When used for 'winter' operation, a simpler wheel – depicted in Figure 1 – would suck air from a warm and humid environment, reducing the temperature and, possibly, the absolute humidity as it travels through the cold packing. The heat is then transferred to the entering colder, drier outside air when the wheel spins into the supply airstream.

The focus of our study in this paper is the performance analysis and of the heat recovery wheel. we will analysis the temperature distribution and its variations in time and will investigate how the airflow, temperature and rotational speed of the wheel influence upon the dynamic response. Our discussion is centered around a comprehensive model for the analysis of the heat wheel with high energy efficiency which constitutes a fundamental block of the temperature control system design.

$Q_1$  = Amount of heat energy rejected by the fresh air rate

$m_i$  = Fresh air Mass flow

$Q_2$  = Amount of heat energy rejected by the cooling coil rate

$\dot{m}_2$  = Return air mass flow

$Q_{max}$  = Maximum heat energy between two streams

$h_i$  = Inlet Enthalpy

$\epsilon_R$  = Effectiveness of rotation wheel

$h_o$  = Outlet Enthalpy

$\epsilon_h$  = Effectiveness heating coil

$w_s$  = Energy saved

$\epsilon_c$  = Effectiveness of cooling coil

$COP$  = Coefficient of

performance

## DISCUSSION

Considering the air-conditioning room of a hospital isolated room in the months of January to June taking the average condition of each month. The paper analyzed the working and performance of the rotary desiccant wheel in the hybrid air conditioning system with chiller unit and cooling tower.

Station name	WMO#	Lat	Long	Elev	StdP	Hours +/- UTC	Time zone code	Period
1a	1b	1c	1d	1e	1f	1g	1h	1i
THIRUVANANTHAPURAM	433710	8.48N	76.95E	64	100.56	5.50	IND	8201

**Table 1** According to ASHFRAE standard , the effective temperature of the dry bulb temperature of different month is taken

MONTH	JAN	FEB	MAR	APR	MAY	JUNE
Average drybulb temp °C	31.5	31.2	32.3	32.0	32.1	32.7
Average wetbulb temp °C	25.3	25.0	25.3	25.2	25.9	24.0
AverageRelative Humidity %	59.0	62	63	65	68	70.0

**Table 2**

Table 1 and Table 2 indicates the design conditions of Trivandrum district keral India from Asharae design book. Other designing conditions as follows atmospheric pressure 101325 Pa. The ratio of the cooling load and the moisture load of the air conditioned room (enthalpy humidity ratio) = 1000. The temperature difference between the air supply temperature and the return air temperature = 6. Mass flow of air supply = 1.17 kg/s. Since the outdoor condition of the place is varying the experiment carried out in the range of temperature as outdoor condition from 28 to 35 and the relative humidity is varied from the 40% to 70%. The ratio of fresh air volume and total air supply volume of air conditioning system is 20 % and the atmospheric pressure is 101325 Pa. The selected heat recovery wheel is IGH heat recovery unit System air IGH-1000 Air flow rate 1000 m<sup>3</sup>/h outside duct pressure 100 Pa voltage 220 v Motor power 92 x 2 pieces frequency 50 Hz from the catalogue.

The energy saving potential and simple payback period (SPP) of rotating heated wheels in different environmental conditions and given applications must be understood separately. The rotating heat wheels must be placed in front of the air handling unit (AHU) of the central air conditioning system. According to ASHRAE standards, commercial office buildings must provide at least 20% fresh air to maintain the required indoor air quality. The study was performed in the hospital implementation department, so 100% fresh air needs to be treated. The cooling fan coil capacity changes with outdoor temperature and humidity, and the power consumption of the cooling coil also changes to represent them. The experiment was performed ignoring the purge effect and the increase in power of the thermal wheel. Due to high external temperatures and humidity levels, the AHU's cooling coil capacity increases dramatically as the fresh air requirement rises. As a result, the chiller's energy demand increases. The energy saving potential of a rotational thermal wheel has been calculated as a result of the observation under various operating situations. The calculations were done using the following assumptions: fresh air relative humidity (percent RH) of 70%, heat recovery wheel effectiveness of 0.55, return air temperatures of 25°C and 50% RH, and chiller COP of 3.5. It can be seen that when the fresh air temperature rises, the energy saving potential rises as well.

Heat exchange between the two air streams in the rotary thermal wheel (for Steady State (S.S.) conditions) is,

$$Q_1 = Q_2 \quad (1)$$

$$Q_1 = \epsilon_R \cdot Q_{max} \quad (2)$$

$$\dot{m}_1 [h_i - h_0] = \epsilon_R \cdot \dot{m}_2 \quad (3)$$

$$Q_2 = \epsilon_c Q_{Rc} \quad (4)$$

$$Q_{Rc} = \epsilon_h \cdot Q_{RE} \quad (5)$$

$$w_s = \frac{1}{COP} \left[ \frac{Q_{RE}}{\epsilon_h} \right] \quad (6)$$



## RESULTS

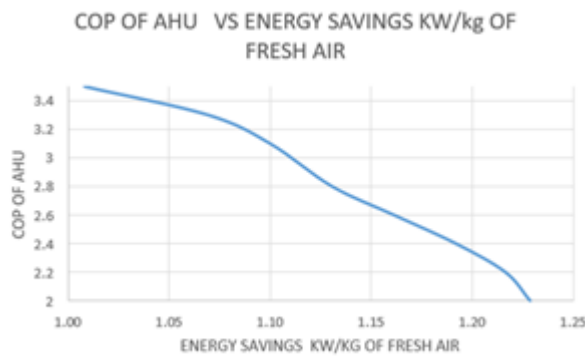


Figure 3

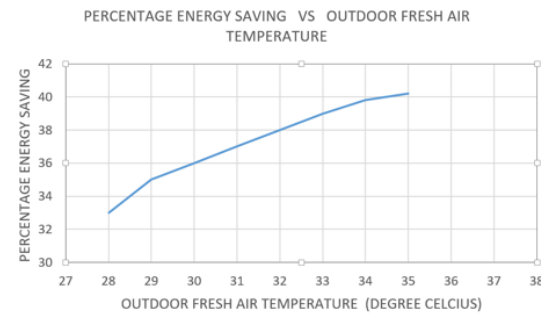


Figure 4

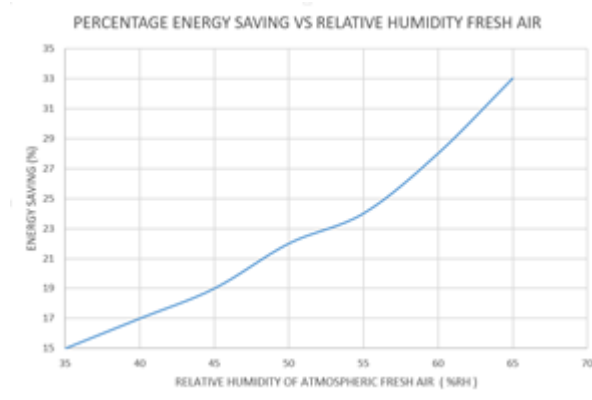


Figure 5

Figures indicate that installing a rotating thermal wheel before the AHU of the central air conditioning system may considerably lower the amount of power consumed by the chiller's compressor. The findings of the energy and economic analyses of rotary thermal wheels are summarized. Figure 3 shows that raising the external fresh air temperature at the time of installing the thermal rotating wheel increases the percentage of energy savings in the compressor. The calculations were done using the following assumptions: fresh air relative humidity (percent RH) of 70%, heat recovery wheel efficiency of 0.55, return air temperatures of 25°C and 50% RH, and chiller COP of 3.5. It can be observed that the energy saving potential improves while raising the fresh air temperatures.

Figure 4 shows how the energy savings potential changes as the chiller's performance changes, with a lower COP indicating a higher saving potential. Energy recovery wheels should always be used, regardless of the chiller's performance. However, the results show that implementing the energy recovery wheel for low-efficiency chillers can result in greater energy recovery benefits and a shorter payback period. As previously stated, central air conditioning systems that use inefficient chillers in hot and humid regions are strongly urged to include energy recovery wheels. Figure 5 shows that relative humidity is a function of energy saving potential, with energy saving potential increasing noticeably as relative humidity increases. Furthermore, it was discovered that as the percentage of fresh air delivered to a facility grows, so does the system's energy recovery potential. Further, it has demonstrated that when the fresh air temperature and relative humidity increases, the chance to recover the heat using a thermal wheel also increases.

## CONCLUSION

The effect of installing an energy recovery wheel in a centralized air conditioning system was investigated, with the results indicating that the inclusion of a heat recovery unit increases the air conditioning system's efficiency by 20% to 30% over a standard one. The thermal wheel's performance has an impact on the metrics fresh air temperature, fresh air humidity, and chiller COP. The thermal wheel is suitable for chillers with low COP levels because the energy recovery potential improves as the fresh air temperature and humidity rises.

## FUTURE WORK

Certain softwares may be used to analyze the thermal wheel in an efficient manner. To examine the potential to improve heat exchange rate, an energy wheel will be modeled using existing computational fluid dynamics (CFD) tools. The modeling study will be expanded to determine the key parameters of the rotating thermal

wheels, after which efficient energy will be developed, produced, and tested. Finally, based on the needed fresh air mass flow rates and climatic circumstances, designers' guidelines will be developed to pick the appropriate energy recovery wheel.

**REFERENCES**

- [1] Kalliokoski, P., P. Luscuere, and A. Streifel. 2003. Indoor Air Quality in Hospitals and Other Health Care Facilities. ISIAQ task force reports, International Society of Indoor Air Quality and Climate.
- [2] Humphreys, H., H. Grundmann, R. Skov, J. C. Lucet, and R. Cauda. 2009. "Prevention and Control of Methicillin-Resistant *Staphylococcus Aureus*." *Clin Microbiol Infect* 15 (2): 120 –124.
- [3] Yocum, J. E., W. A. Cote, and F. B. Benson. 1977. "Effects of Indoor Air Quality." In *Air pollution VII* edited by A. E. Stern, 3rd ed., 117–157. New York, USA: Academic Press.
- [4] M.W. Liddament, *A Guide to Energy Efficient Ventilation*, Air Infiltration and Ventilation Center, 1996
- [5] T.J. Lamberston, Performance factor of a periodic-flow heat exchanger, *Trans. ASME* 80 (1958) 586–592.
- [6] G.D. Bahnke, C.P. Howard, The effect of longitudinal heat conduction on periodic-flow heat exchanger performance, *J. Eng. Gas Turbines Power* 86 (2) (1964) 105–117.
- [7] O. Buyukalaca, T. Yilmaz, Influence of rotational speed on effectiveness of rotary-type heat exchanger, *Heat Mass Transf.* 38 (2002) 441–447.
- [8] W.M. Kays, A.L. London, *Compact Heat Exchanger*, third ed., McGraw-Hill, New York, 1984.
- [9] P. Worsoe-Schmidt, Effect of fresh air purging on the efficiency of energy recovery from exhaust air in rotary regenerators, *Int. J. Refrig.* 14 (1991) 233– 239.
- [10] T. Skiepko, R.K. Shah, A comparison of rotary regenerator theory and experimental results for an air preheater for a thermal power plant, *Exp. Therm Fluid Sci.* 28 (2004) 257–264.



## SKIN DISEASE LOCALIZATION USING IMAGE SEGMENTATION ALGORITHMS

Vijay B<sup>1</sup>, Nayanashri M<sup>2</sup>, Dr. Joshi Manisha S<sup>3</sup> and Dr. Sumana R<sup>4</sup><sup>1,2,3</sup>Department of Medical Electronics, BMS College of Engineering, Bengaluru - 560085, India<sup>4</sup>Velammal Medical College Hospital, Madurai- 625009, India**ABSTRACT**

*Skin diseases are the most common diseases and their clinical diagnosis methods are expensive and time consuming. This work presents comparative analysis of image segmentation algorithms such as Watershed algorithm, Level Set algorithm, K-means Clustering algorithm, Otsu Thresholding algorithm, GrabCut algorithm and K-means Clustering with Addition algorithm used to localize Atopic Dermatitis, Lichen Planus, Pityriasis Rosea and Psoriasis lesions. The dataset of 400 images from the DERMNET is used for this study. Further, the performance of the algorithms has been evaluated using Full Reference method based on four evaluation parameters – PSNR, UQI, SSIM and MSE. K-means Clustering with Addition algorithm has shown good performance compared to other segmentation techniques with UQI and SSIM values of 0.846 and 0.625 respectively.*

*Keywords – Atopic Dermatitis, Lichen Planus, Pityriasis Rosea, Psoriasis, Image pre-processing, Image Segmentation, Watershed Marker-Based, Level Set, K-means Clustering, Otsu Thresholding, GrabCut, K-means Clustering with Addition, Qualitative Analysis*

**I. INTRODUCTION**

Skin diseases are the most common diseases and are classified as infectious, inflammatory and malignancy. Some of these types can be fatal if not diagnosed and treated at an early stage. Skin disease diagnosis is extremely difficult because of its complexities of skin tone, color, textures, presence of hair. Dermatologists sometimes find it difficult to diagnose & classify the disease which leads to improper medications. Available methods for diagnosis are found to be expensive and time consuming. There is a lack of facilities for diagnosis in Remote and Rural Areas. On consultation with expert dermatologist skin diseases considered are – Atopic Dermatitis, Lichen Planus, Psoriasis and Pityriasis Rosea. Most people in India are commonly affected by these skin diseases. Atopic Dermatitis (AD) is a common inflammatory disease, Pityriasis rosea is a form of infectious disease which is usually a large circular or oval spot found on chest, abdomen or back. Fig. 1. shows the sample images used for this work.



**Fig. 1.** Sample skin disease images of Atopic dermatitis, Lichen planus, Pityriasis rosea, Psoriasis.

**II. LITERATURE SURVEY**

The main purpose of this survey was to understand the existing methods, their results and analysis and also to help us propose a unique methodology.

In paper [1] the methodology proposed includes two stages namely the image processing stage and machine learning stage. The pre-processing techniques such as grey scale conversion, the sharpening filter was used to increase the contrast of the edge mask and a noise reduction filter like the median filter and smoothing filter is used. For the image segmentation, multilevel thresholding using Otsu method is performed. The drawback of this method is thresholding values vary from image to image. In paper [2] author proposed The features from the enhanced images were extracted using the HSV histogram and SURF Feature. SURF feature is a local feature descriptor and is used for tasks such as object recognition, image registration, classification, or 3D reconstruction. KNN classifier was used to classify as normal skin, burnt skin, cancer and allergic reaction. In paper [3] the author presented segmentation techniques to extract the skin lesions based on statistical and texture properties. The paper [4] discussed the different algorithms used for segmenting skin images like Edge detector algorithm, region-based segmentation and watershed algorithm. In edge detector algorithm - sobel edge detector, prewitt edge detector, laplacian edge detector, roberts edge detector and canny edge detector are used. The paper [5] mentioned a comparative study on image segmentation algorithms with. region split & merge, thresholding, level set, fuzzy based and watershed algorithm. In paper [6] the authors described a method to detect and remove the hair from dermoscopy images and lesion border detection using image analysis. The hair detection algorithm is tested for PH<sup>2</sup> images. For segmentation thresholding methods, colour-based segmentation and adaptive thresholding have been used. In paper [7] the image quality assessment for

image segmentation algorithms in terms of qualitative and quantitative analyses is carried out. Three segmentation algorithms such as k-means clustering, thresholding and watershed transform were used and compared with each other and the evaluation result is based on the image quality assessment. In paper [8] The GLCM method has been used for feature engineering and SVM classifier accuracy was 85% for herpes, 90% for paederus dermatitis and for psoriasis 95%. The authors of paper [9] proposed a computer aided method for detection of skin cancer. In paper [10] authors proposed an Unsupervised Transition Based Skin Lesion Segmentation. The results obtained are 83.9 for specificity, 99.8 for sensitivity and accuracy of 96.8. From the above-mentioned papers we were able to understand the different types of pre-processing and, segmentation algorithms. Based on the inputs from the skin disease diagnosis expert, we have selected 4 different skin diseases which are very commonly seen in the Indian population as mentioned in section I and implemented the proposed methodology as discussed in section III.

### III. METHODOLOGY

The proposed method involves skin disease image taken as input from the image dataset gathered through the Dermnet website. The dataset comprises of images of skin diseases, namely a) Atopic dermatitis b) Lichen planus c) Pityriasis rosea and d) Psoriasis. The image dataset consists of 400 images which includes 100 images from each skin disease type. Fig.2 represents the flow of our proposed system which consists of several modules in its overall architecture of methodology.

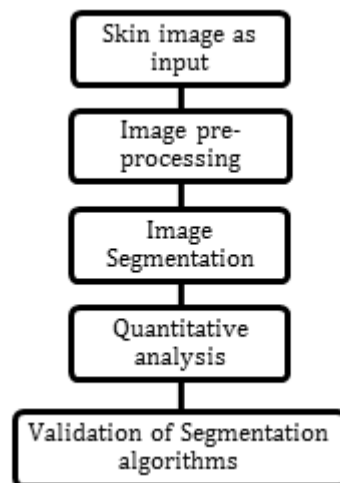


Fig. 2. The proposed system block diagram.

The input skin image is first subjected to image pre-processing techniques to bring it to suitable condition for carrying out segmentation. After pre-processing the skin disease image is segmented to efficiently localize the infected region using different image segmentation algorithms. In order to find the effective and efficient algorithm out of different segmentation algorithms, Quantitative analysis on Evaluation parameters is carried out on segmented skin images and their respective original input images from the dataset. The several modules in the proposed methodology are discussed in coming subsections.

#### A. Image pre-processing

Before taking the skin disease image for processing, it is checked for the presence of watermarks in it and if present, it is removed through watermark removal software which uses in-paint filtering to do so. Then the image undergoes pre-processing involving grayscale conversion, hair removal using bottom-hat filtering and histogram equalization as shown in the Fig. 3. The input image is a color image (RGB format) and converted to grayscale image in order to retain only the luminance. If hair artifacts are present in the converted grayscale image, they are removed by applying morphological Black-hat transformations. Black-hat is a morphological transformation in image processing which is given as the difference between the closing operation performed on the input image and the respective input image. It is also called bottom-hat filtering.

The closing operation is dilation followed by erosion, given by

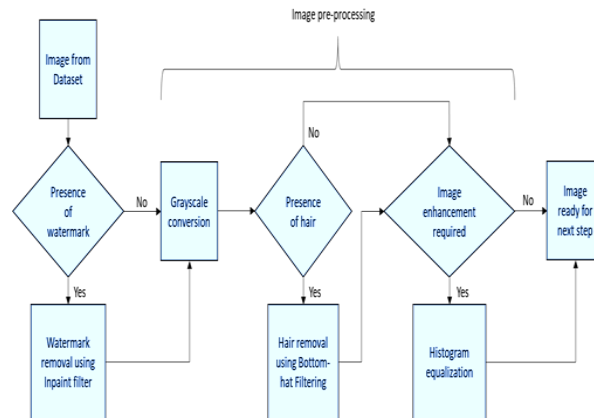
$$A \bullet B = (A \oplus B) \ominus B \quad (1)$$

Where  $A$  is binary image,  $B$  is structuring element,  $\oplus$  denotes dilation and  $\ominus$  denotes erosion. Experimentally, we have selected the kernel as cross-shaped structuring element with size (17, 17). Then black-hat filtering was performed on the grayscale image to find the hair contours which are then intensified and in-painting algorithm is applied on the image to fill in the hair-removed pixel regions.

After hair removal, image contrast enhancement is done by stretching out the intensity range using histogram equalization technique. For the histogram  $H(i)$ , its cumulative distribution function  $H'(i)$  is given by

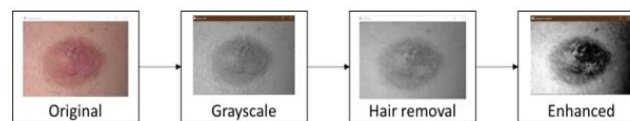
$$H'(i) = \sum_{0 \leq j < i} H(j) \quad (2)$$

By remapping the cumulative distribution function, equalization is attained.  $H'(i)$  is normalized such that the maximum value is 255, in order to use the cumulative distribution function as a remapping function.

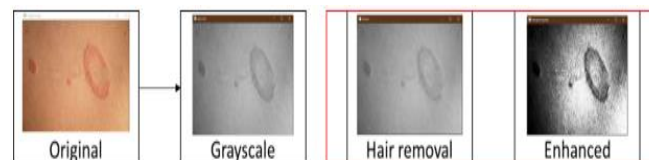


**Fig. 3. The flowchart of the Image pre-processing module.**

Hair removal is done only when the input image has hair artifacts and histogram equalization is used to enhance contrast in the input image only if needed and not otherwise as explained in the flowchart, Fig. 3. The results of image pre-processing step are shown in Fig. 4. and Fig. 5.



**Fig. 4. Image pre-processing result where hair removal and contrast enhancement is necessary.**



**Fig. 5. Image pre-processing result with only grayscale conversion.**

## B. Image Segmentation

After pre-processing, several image segmentation algorithms are proposed to localize the infected region from normal skin. The implementation of these algorithms is discussed in the below given section.

### a) Watershed Marker-based

Marker-based watershed algorithm is an interactive image segmentation algorithm used to segment images. In this segmentation algorithm, labelling of the known regions (which are foreground or background) and unknown regions can be done using markers.

Labelling can be done using one colour or intensity for the region which is foreground, using another colour or intensity for the background and finally the region which is not known is labelled with 0, that is the marker. Watershed algorithm is then applied, where the marker gets updated with the given labels and the object boundaries will have a value of -1.

The marker based watershed algorithm follows the steps given –

1. Thresholding the pre-processed input image using Otsu's binarization.
2. Noise removal in the image using morphological operations, using opening operation to remove small white noises and closing operation to remove small holes.
3. Finding the sure background using dilation.
4. Applying distance transform and thresholding to image in order to find sure foreground.

5. Finding the unknown region by subtracting sure background and sure foreground.
6. Marking the unknown region with 0 labelled markers.
7. Finally, watershed algorithm is applied.

Otsu binarization is a thresholding method that finds the threshold of an image that minimizes the weighted within class variance by assuming that the image has got only two pixel classes – foreground and background. The weighted within class variance is given by

$$\sigma_w^2(t) = w_1(t)\sigma_1^2(t) + w_2(t)\sigma_2^2(t) \quad (3)$$

$w_1$  and  $w_2$  are the weight probabilities of the two classes separated by a threshold  $t$  whereas  $\sigma_1^2$  and  $\sigma_2^2$  are variances of the two classes.

The opening operation is nothing but erosion followed by dilation and is given by

$$A \circ B = (A \ominus B) \oplus B \quad (4)$$

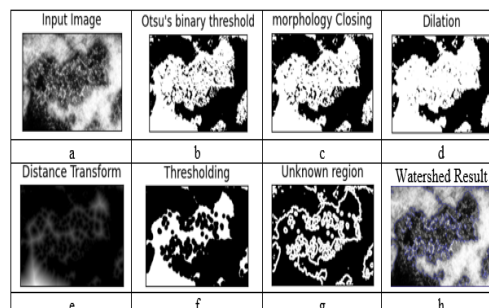
Where  $A$  is binary image,  $B$  is structuring element,  $\oplus$  denotes dilation and  $\ominus$  denotes erosion. The closing operation is given by (1)

Erosion is a morphological operation in which a pixel in the image will be 1 only if all the pixels under the kernel is 1, otherwise it is made to zero. Dilation is a morphological operation opposite to erosion, in which a pixel in the image will be 1 if at least one pixel under the kernel is 1. It is used to increase the object boundary to background.

Distance transform is a metric used to measure the separation of points/pixels in the image by mapping labels of each pixel with the distance to the nearest boundary pixel.

Watershed algorithm is applied by using the markers

The watershed result obtained after algorithm implementation including intermediate results of various steps involved, starting from pre-processed input image are showed in sequence from (a) to (h) in Fig. 6.



**Fig. 6.** Results for localization of the skin disease using Watershed algorithm with (a) input image (b) Otsu's binary threshold (c) Closing operation (d) Dilation (e) distance transform (f) thresholding (g) unknown region (h) watershed result.

#### b) Level Set method

Basically, in Level Set method, the surface intersecting the object plane gives contours with segmentation. When this approach is applied to the image segmentation, the surface is nothing but the updated forces derived from the image.

Level-set equation is a partial differential equation given by

$$\phi' = \phi + \Delta t F \parallel \nabla \phi \parallel \quad (5)$$

$F$  is a force (vector field) which at every point, gives the direction and magnitude of movement of the surface  $\phi$ .

Geodesic Active Contour level set function is a level set segmentation filter which is used to segment structures in images based on the edge potential map. This filter need two inputs – initial level set, an original image consisting of initial contour or surface and the edge potential map which has values close to 0 near the edges and values close to 1 inside the region or shape.

Edge detection is done by taking the gradients of the image, given by

$$g(I) = \frac{1}{(1+|(\nabla * G)(I)|)} \quad (6)$$

$$g(I) = \exp^{-|(\nabla * G)(I)|} \quad (7)$$

Where  $I$  is the image intensity and  $(\nabla * G)$  is the derivative of Gaussian operator.

Two morphological snakes are used in the proposed Level Set method - Morphological Active Contours without Edges (ACWE) and Morphological Geodesic Active Contours (GAC).

Active Contours without Edges (ACWE) is used to segment objects or regions in images without well-defined borders. Geodesic Active Contours (GAC) is used to segment objects or regions with visible but noisy or cluttered boundaries.

The partial differential equation for the Active Contours without Edges (ACWE) is given by

$$\frac{\partial \phi}{\partial t} = |\nabla \phi| \left( \mu \operatorname{div} \left( \frac{\nabla \phi}{|\nabla \phi|} \right) - v - \lambda_1 (I - c_1)^2 + \lambda_2 (I - c_2)^2 \right) \quad (8)$$

$\lambda_1$  and  $\lambda_2$  are the weight parameters for the inner region and outer region respectively.

The partial differential equation for the Geodesic Active Contours (GAC) is given by

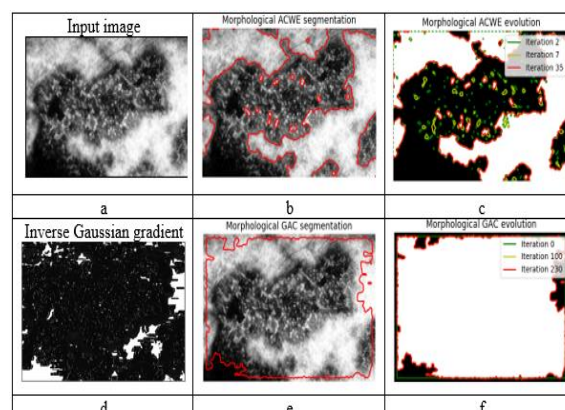
$$\frac{\partial \phi}{\partial t} = g(I) \parallel \nabla \phi \parallel \operatorname{div} \left( \frac{\nabla \phi}{\parallel \nabla \phi \parallel} \right) + g(I) \parallel \nabla \phi \parallel v + \nabla g(I) \cdot \nabla \phi \quad (9)$$

This partial differential equation is the sum of three terms, the first term is the smoothing term – it moves the curve into the curvature's direction, the second term is the balloon term – it controls the speed of curve propagation with parameter  $v$ , the third term is the image attachment term – it converges the curve.

The Level Set method follows –

1. Checkerboard with binary values in the level set are created.
2. Morphological Active Contours without Edges Segmentation is implemented.
3. Gradient magnitude of image is inversed, which computes the magnitude of the gradients in the image and the result is inverted in the range  $[0, 1]$ . Flat areas or regions are assigned values close to 1, and areas or regions close to the boundaries or borders are assigned values close to 0.
4. Morphological Geodesic Active Contour segmentation is then implemented.

Proposed Level set algorithm results are shown in Fig. 7.



**Fig. 7.** Level Set algorithm result with (a) input image (b) ACWE – (Active Contours without Edges) segmentation (c) Evolution of ACWE segmentation (d) Inverse Gaussian gradient (e) GAC – (Geodesic Active Contour) segmentation and (f) Evolution of GAC segmentation.

### c) K-means Clustering Algorithm

K-means clustering is an unsupervised machine learning algorithm that is used to partition or segment  $N$  observations into  $K$  different clusters or groups in which each observation belongs to the cluster with the nearest mean.

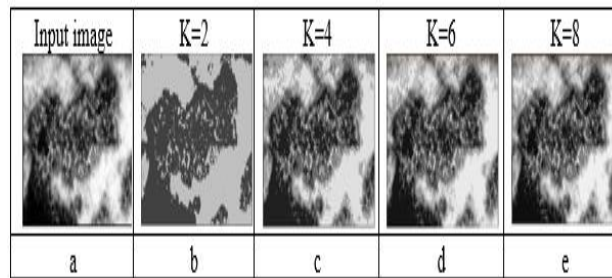
The algorithm consists of two stages, first - it calculates the K centroid and second - it groups each point to the cluster which has nearest centroid from the respective point.

The process of segmenting the input image into different clusters using K-means Clustering follows the steps given below-

1. Number of clusters K is to be initialized.
2. Euclidean distance  $d$  is calculated between the center (centroid) and each pixel of the input image using the relation:  $d = ||P(x, y) - C_k||$  (10) Where  $P(x, y)$  – pixels of the input image and  $C_k$  – the centroid.
3. Then all the pixels are assigned to the nearest center based on the distance  $d$ .
4. After assigning all the pixels, new position of the centroid is calculated using the relation:  

$$C_k = \frac{1}{k} \sum_{y \in C_k} \sum_{x \in C_k} P(x, y)$$
 (11)
5. The process is repeated until it satisfies the tolerance.
6. Finally, cluster pixels are reshaped into image (clustered image).

K-means Clustering algorithm results are shown in Fig. 8. It can be inferred from the results that as the cluster value K increases the segmented output image becomes more similar to the input image.



**Fig. 8.** K-means Clustering algorithm result for different cluster values K with (a) input skin image, (b) to (e) segmented results for different cluster values K=2, 4, 6 and 8.

#### d) Otsu Thresholding Algorithm

Otsu's thresholding method determines the optimal threshold value from the respective histogram of the image. Otsu's segmentation assumes that the image has only two pixel classes – foreground and background with bimodal histogram.

Otsu thresholding method finds the threshold (t) of an image that minimizes the weighted within-class variance which is given by (3)

The class probabilities are estimated as given below:

$$w_1(t) = \sum_{i=1}^t P(i) \text{ and } w_2(t) = \sum_{i=t+1}^I P(i) \quad (12)$$

The class means are given by

$$\mu_1(t) = \sum_{i=1}^t \frac{iP(i)}{w_1(t)} \text{ and } \mu_2(t) = \sum_{i=t+1}^I \frac{iP(i)}{w_2(t)} \quad (13)$$

$$\sigma_1^2(t) = \sum_{i=1}^t [i - \mu_1(t)]^2 \frac{P(i)}{w_1(t)} \text{ and } \sigma_2^2(t) = \sum_{i=t+1}^I [i - \mu_2(t)]^2 \frac{P(i)}{w_2(t)} \quad (14)$$

The threshold (t) can also be found by maximizing the inter-class variance which is given by

$$\sigma_b^2(t) = w_1(t)w_2(t)[\mu_1(t) - \mu_2(t)]^2 \quad (15)$$

The total variance is the sum of within class variance and between class (inter-class) variance which is shown in the relation:

$$\sigma^2 = \sigma_w^2(t) + \sigma_b^2(t) \quad (16)$$

Otsu's thresholding algorithm steps are as follows:

1. Input image is processed if required (like noise removal using Gaussian blur).



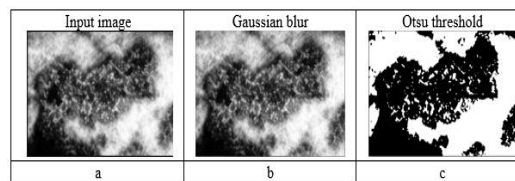
2. Image histogram is obtained, that is the distribution of pixels in the image.
3. Centres of histogram bins are calculated and iterated over all thresholds.
4. Obtain the class probabilities and class means.
5. Computing the optimal threshold value by maximizing the inter-class variance.
6. Applying Otsu threshold.

Gaussian blur is an image-blurring filter which uses the Gaussian function given by

$$G(x, y) = \frac{1}{2\pi\sigma^2} e^{-\frac{x^2+y^2}{2\sigma^2}} \quad (17)$$

where  $x$  is the distance from the origin in the horizontal axis,  $y$  is the distance from the origin in the vertical axis and  $\sigma$  is the standard deviation of the Gaussian distribution.

Fig. 9. shows the results obtained for Otsu thresholding algorithm with experimentally obtained threshold value of 130.



**Fig. 9.** Otsu thresholding results with (a) input image (b) Gaussian blur (c) Otsu threshold.

#### e) Grab Cut Algorithm

Grab Cut is a method of image segmentation based on the graph cuts. It is used in the binary segmentation of images which follow the notations given below:

Input image:  $x \in \{R, G, B\}^N$

Output image:  $S \in R^N$  for soft segmentation and  $S \in \left\{0 \text{ for background}, 1 \text{ for } \frac{\text{foreground}}{\text{object}} \text{ to be detected}\right\}^N$

Energy function is given by the relation:

$$E(x, S, C, \lambda) = E_{color} + E_{coherence} \quad (18)$$

where  $C$  is color parameter and  $\lambda$  is coherence parameter.

And the image segmentation optimization is estimated as a global minimum over  $S$  given by

$$\arg \min_S E(x, S, C, \lambda)$$

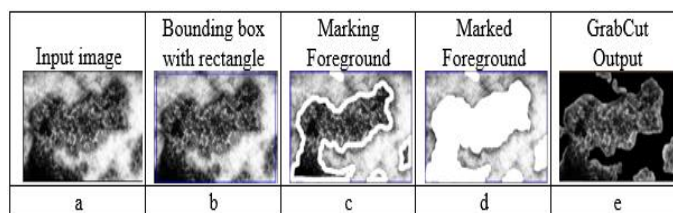
Gaussian Mixture model involves two models to separate foreground and background regions, one is bgdmodel – it is a temporary array used by GrabCut to model the background and another fgdmodel – it is a temporary array used by GrabCut to model the foreground.

Grab Cut algorithm works as follows-

1. The input image taken is specified by a bounding box (mask).
2. Rectangle is drawn inside the mask to specify the foreground region.
3. Foreground and background are specified which is considered as hard labelling.
4. Foreground and background distributions are modelled using Gaussian mixture model.
5. Markov random field is constructed over the foreground and background pixel labels (that is a graph is built from the foreground and background pixel distributions)
6. Finally, segmentation is done by applying graph cut optimization.

Graph cut optimization cuts the graph into two separating nodes – one is source node to which every foreground pixel is connected and the other is sink node to which every background pixel is connected.

GrabCut algorithm results are shown in sequence in Fig. 10.



**Fig. 10.** Grab Cut method implementation results with (a) input image (b) intermediate results for drawing rectangle bounding box to specify foreground, marking foreground and marked foreground regions in (c) and (d) respectively.

#### f) K-means Clustering with Addition

It is the K-means Clustering algorithm which is discussed previously only with certain modifications in obtaining the final segmentation of the input image. Modifications include,

- Disabling the required cluster in the input image which turns out the pixels into black in the disabled cluster.
- Then image addition is performed to add the Clustered or segmented image obtained from K-means Clustering and the Cluster disabled image of the input. By doing so, the final segmentation of the input image is obtained.

In addition of the two input images, corresponding pixel values of the output image is given by

$$Q(i, j) = P_1(i, j) + P_2(i, j) \quad (19)$$

where  $P_1(i, j)$  and  $P_2(i, j)$  are the pixel values of the two input images respectively.

In K-means clustering, cluster value is experimentally chosen as  $K = 2$  or  $3$  only as required. Then cluster to be disabled in the input image is either  $1$  or  $2$ , when cluster value  $K$  is either  $2$  or  $3$  respectively (that is when an image is partitioned into  $K = 3$  clusters, then the image will have  $3$  clusters which are cluster  $0$ , cluster  $1$  and cluster  $2$ ).

The process of K-means Clustering with Addition to segment the input image follow the steps given below-

1. Number of clusters  $K$  is to be initialized.
2. Euclidean distance  $d$  is calculated between the center (centroid) and each pixel of the input image using (10)
3. Then all the pixels are assigned to the nearest center based on the distance  $d$ .
4. After assigning all the pixels, new position of the centroid is calculated using (11)
5. The process is repeated until it satisfies the tolerance.
6. Cluster pixels are reshaped into image (clustered image).
7. Disabling required cluster in the input image taken (that is non infected skin region – background) by turning out the pixels into black in the disabled cluster or group.
8. Final image segmentation output is obtained by the addition of the clustered (segmented) image from step 6 and cluster disabled image of the input from the step 7.

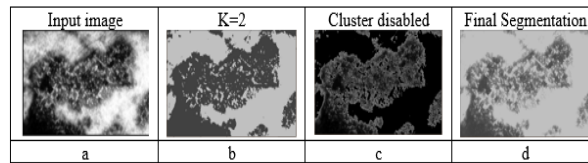
To highlight the borders in the final image segmentation obtained, contours is used. Contours is a trace or a curve that joins all the continuous points (here pixels) which are having the same intensity.

Border highlighting using contours follow the steps given:

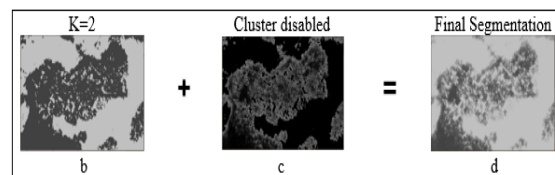
1. Final segmentation image is taken as input and background of the input image is filled with black colour using floodfill.
2. Image is converted into Grayscale.
3. Binary thresholding is applied.
4. Finding the contours in the binarized image.
5. Finally, contours are drawn in the Final segmentation image (input).



K-means Clustering with Addition implementation results are shown in Fig. 11. where the input image (a) is clustered by initializing K=2 as shown in image (b). Cluster 1 is disabled in the input image (a) which is shown in image (c) and the final image segmentation of the input image (a) is obtained by the addition of images (b) and (c) whose result is shown as Final Segmentation (d). And the addition operation is shown in Fig. 12.

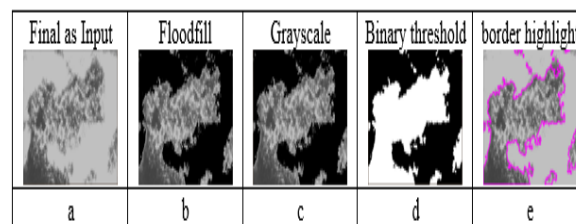


**Fig. 11.** K-means Clustering with Addition method implementation result with (a) input image (b) segmented image for cluster value K=2 (c) cluster disabled image of the input (d) Final segmentation image.



**Fig. 12.** Addition operation of two images (b) result for cluster value K=2 and (c) cluster disabled image, to get the Final Segmentation image (d).

Highlighting the borders in the final image segmentation obtained from K-means with Addition, using the contours is shown in sequence from input (final segmentation) image (a) to highlighted border (e), including the intermediate results, in Fig. 13.



**Fig. 13.** Results for Border Highlighting with (a) input image (Final Segmentation) (b) flood fill operation (c) grayscale image (d) binary threshold and (e) Highlighted border image.

### C. Quantitative Analysis

One can try many segmentation algorithms for segmenting an image, but there is need to find as which algorithm is effective and efficient for use. Using different segmentation techniques on an image can produce different results, which may or may not be having the similar characteristic property (quality or features) as the Original image, which becomes important need and plays a vital role in many image processing, video processing applications and even in real-time monitoring applications. Full Reference method is one of the Image Quality Assessment techniques (objective) used to determine the characteristic property of an image. In Full Reference method, the quality of the test image is assessed by comparing it with a reference image. For image segmentation, test image is a segmented image which is compared with a reference image – the original image (which carries true image properties).

The parameters or metrics used from the Full Reference method for the evaluation of performance analysis of the different segmentation algorithms used in the proposed system are as follows –

1. Peak Signal to Noise Ratio (PSNR) – It is the ratio of maximum possible power of an image to the noise power which is affecting the quality of the image. It is measured in decibels and is expressed as:

$$PSNR = 20 \log_{10} \left( \frac{255}{\sqrt{MSE}} \right) \quad (20)$$

Where MSE – Mean Square Error and 255 is the maximum pixel value of the image. Higher the PSNR value, higher the quality of the segmented image.

2. Universal Image Quality Index (UQI) – It relatively measures the image distortion (or quality) to the reference image in terms of loss of correlation, contrast distortion and luminance distortion. It has a value range from 0 to 1, where 1 describes that reference image (original image) and test image (final or segmented image) are same in quality. It is expressed as:

$$UQI = \frac{(4\mu_x\mu_y)(\sigma_{xy})}{(\mu_x^2 + \mu_y^2)(\sigma_x^2 + \sigma_y^2)} \quad (21)$$

Where  $\mu_x$  and  $\mu_y$  are the local means,  $\sigma_x$  and  $\sigma_y$  are the standard deviations and  $\sigma_{xy}$  is the cross-covariance for images  $x$  and  $y$  respectively.

3. Structural Similarity Index Measure (SSIM) – It is a parameter used to measure quality of the segmented image with original image as reference based on the similarity in the structural information between two images. It is based on the measurements of luminance, contrast and structure. It values between 0 to 1, where 1 means that the original image and segmented image are same in terms of structural information. SSIM is expressed as:

$$SSIM = \frac{(2\mu_x\mu_y + C_1)(2\sigma_{xy}C_2)}{(\mu_x^2 + \mu_y^2 + C_1)(\sigma_x^2 + \sigma_y^2 + C_2)} \quad (22)$$

Where  $\mu_x$  and  $\mu_y$  are the local means,  $\sigma_x$  and  $\sigma_y$  are the standard deviations and  $\sigma_{xy}$  is the covariance for images  $x$  and  $y$  respectively.  $C_1$  and  $C_2$  are constants to avoid instability of the measure.

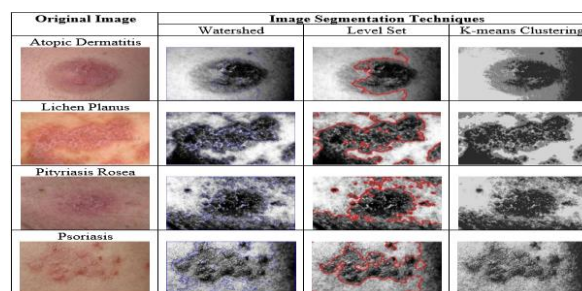
4. Mean Square Error (MSE) – It is the average of the squared intensity differences between the segmented image and the original image pixels. Lower the MSE value, better the image quality of the segmented image. It is given by the relation:

$$MSE = \frac{1}{MN} \sum_{i=1}^M \sum_{j=1}^N \{x(i,j) - y(i,j)\}^2 \quad (23)$$

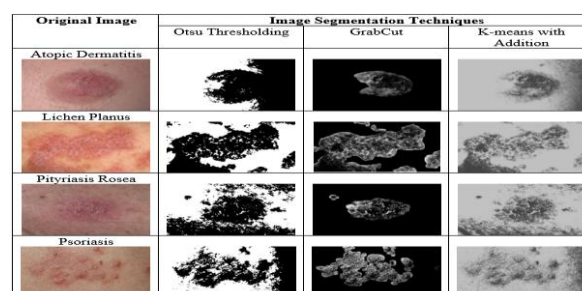
Where  $M$  and  $N$  are the height and width of the image and  $x(i,j)$  is the original image and  $y(i,j)$  is the segmented image. In order to find the image segmentation performance analysis, sample images from each skin disease type are considered and segmented using the different segmentation algorithms mentioned in the proposed system and evaluation of the quality parameters are carried and found between each segmented image as test image and their respective original image (from the image dataset) as reference image. Then based on the evaluated data for the above mentioned four parameters, the performance of the different image segmentation algorithms is validated.

#### IV. RESULTS AND DISCUSSION

Images from the 4 types of skin disease are taken from the image dataset which are pre-processed and segmented using the different image segmentation algorithms. The segmented skin disease images along with their respective original images are shown in Fig. 14. for Watershed, Level Set and K-means Clustering algorithms and in Fig. 15. for Otsu thresholding, GrabCut and K-means Clustering with Addition algorithms respectively.



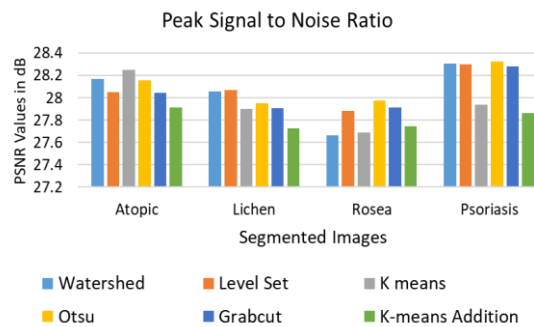
**Fig.14.** The result of Image Segmentation for Watershed, Level Set and K-means Clustering for 4 types of skin diseases.



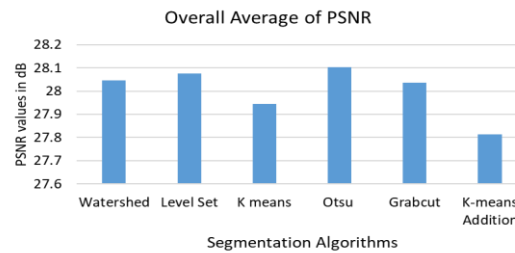
**Fig.15.** The result of Image Segmentation for Otsu thresholding, GrabCut and K-means Clustering with Addition for 4 types of skin diseases.

**TABLE I.** PSNR Quantitative Evaluation

Peak Signal to Noise Ratio Evaluation						
Skin Disease Images	Watershed	Level Set	K-means Clustering	Otsu Thresholding	Grabcut	K-means Clustering with Addition
Atopic dermatitis	28.16853	28.0505	28.25091	28.15946	28.04732	27.91519
Lichen planus	28.055	28.0672	27.90162	27.95239	27.90951	27.72938
Pityriasis rosea	27.66091	27.88229	27.69095	27.97802	27.91325	27.74593
Psoriasis	28.30472	28.29967	27.93624	28.32606	28.27899	27.86514
Overall Average	28.04729	28.07492	27.94493	28.10398	28.03727	27.81391



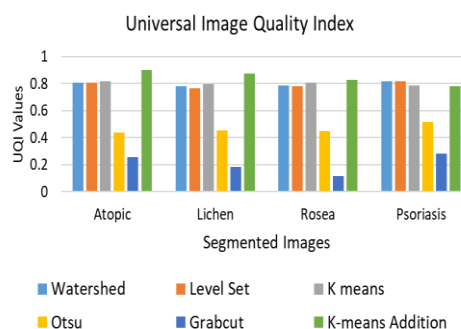
**Fig. 16.** Graphical Representation of PSNR values.



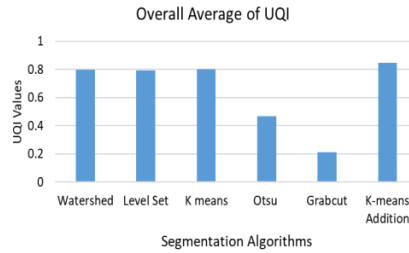
**Fig. 16.1.** Graphical representation of the Overall Average of PSNR values.

**TABLE II.** UQI Quantitative Evaluation

Universal Image Quality Index Evaluation						
Skin Disease Images	Watershed	Level Set	K-means Clustering	Otsu Thresholding	Grabcut	K-means Clustering with Addition
Atopic dermatitis	0.806933	0.806777	0.820392	0.440415	0.255628	0.902197
Lichen planus	0.779624	0.764996	0.798181	0.455938	0.184695	0.874915
Pityriasis rosea	0.787769	0.780458	0.807145	0.449511	0.113712	0.826957
Psoriasis	0.819074	0.817378	0.785108	0.516377	0.28487	0.780596
Overall Average	0.79835	0.792402	0.802707	0.46556	0.209726	0.846166



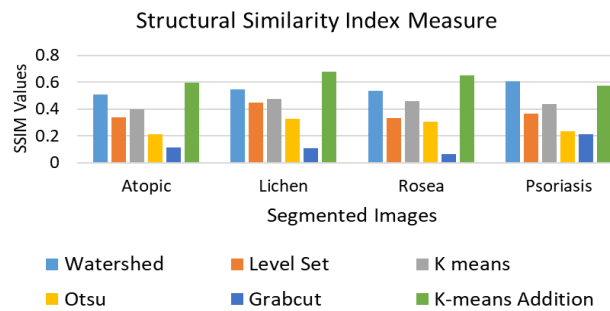
**Fig. 17.** Graphical Representation of UQI values.



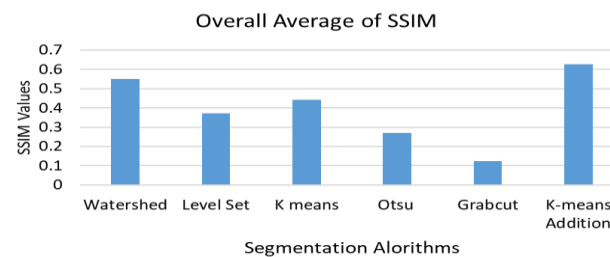
**Fig. 17.1.** Graphical representation of the Overall Average of UQI values.

**TABLE III.** SSIM Quantitative Evaluation

Structural Similarity Index Measure Evaluation						
Skin Disease Images	Watershed	Level Set	K-means Clustering	Otsu Thresholding	Grabcut	K-means Clustering with Addition
Atopic dermatitis	0.507023	0.339145	0.395887	0.210785	0.115268	0.593525
Lichen planus	0.547375	0.44704	0.473609	0.324274	0.106348	0.679739
Pityriasis rosea	0.53662	0.331167	0.456668	0.305478	0.062073	0.652759
Psoriasis	0.606671	0.366875	0.437524	0.234245	0.213397	0.576133
Overall Average	0.549422	0.371057	0.440922	0.268695	0.124272	0.625539



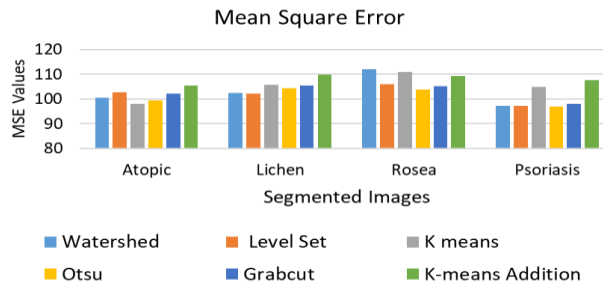
**Fig. 18.** Graphical Representation of SSIM values.



**Fig. 18.1.** Graphical representation of the Overall Average of SSIM values.

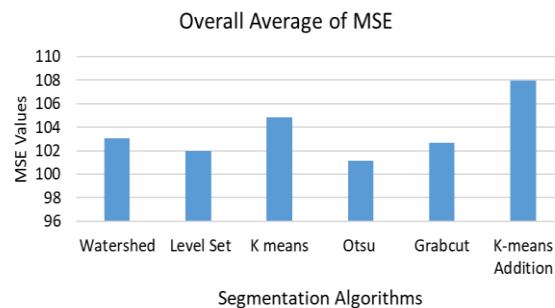
**TABLE IV.** MSE Quantitative Evaluation

Mean Square Error Evaluation						
Skin Disease Images	Watershed	Level Set	K-means Clustering	Otsu Thresholding	Grabcut	K-means Clustering with Addition
Atopic dermatitis	100.5318	102.6191	97.89903	99.4941	102.0322	105.3339
Lichen planus	102.2931	102.1448	105.8087	104.3136	105.3324	109.7809
Pityriasis rosea	112.1153	105.9094	110.7759	103.6774	105.2142	109.3427
Psoriasis	97.15905	97.17168	104.7821	96.97894	98.05261	107.4679
Overall Average	103.0248	101.9612	104.8164	101.116	102.6578	107.9814



**Fig. 19.** Graphical Representation of MSE values

The overall average values of each Evaluation parameters for all the segmentation algorithms are summarized in Table V. From the Table V, it can be observed that the algorithm K-means Clustering with Addition have excellent overall average values of UQI and SSIM which are (0.8461) and (0.6255) respectively and the values are higher and almost close to 1, compared to other segmentation algorithms. It can also be observed that PSNR and MSE values do not really differ much for different Image segmentation algorithms in the evaluated data.



**Fig. 19.1.** Graphical representation of the Overall Average of MSE values.

**TABLE V.** Overall Summarized Quantitative Evaluation (for a total of 24 images per Segmentation Algorithm per Evaluation Metric)

Evaluation Metrics	Image Segmentation Algorithms					
	Watershed	Level Set	K-means Clustering	Otsu Thresholding	Grabcut	K-means Clustering with Addition
PSNR	28.04729	28.07492	27.94493	28.10398	28.03727	27.81391
UQI	0.79835	0.792402	0.802707	0.46556	0.209726	0.846166
SSIM	0.549422	0.371057	0.440922	0.268695	0.124272	0.625539
MSE	103.0248	101.9612	104.8164	101.116	102.6578	107.9814

With the UQI and SSIM values for K-means Clustering with Addition algorithm, it shows that the segmented image and the original image are more similar in terms of structural information and which indicates that the characteristic properties like luminance, contrast and structure of both the segmented image and original image have similar values with least loss compared to other segmentation algorithms.

## V. CONCLUSION

In this research work efforts are made to localize skin disease regions on the skin disease images from the 4 skin disease types namely - Atopic dermatitis, Lichen planus, Pityriasis rosea and Psoriasis using different image segmentation algorithms mentioned in the proposed system.

Different skin disease images are taken from the image dataset which are pre-processed and segmented accordingly. From the segmented image results it can be observed that K-means Clustering with Addition algorithm segments only the infected skin regions from the image and not the normal or healthy skin surface.

After completing the Quantitative analysis, the comparative study of different segmentation algorithms based on the parametric evaluation data show that the algorithm K-means Clustering with Addition represented very good performance analysis compared to other segmentation techniques and stands out from all other algorithms with satisfactory UQI and SSIM values, closer to 1 and are higher than others. After implementing different image segmentation algorithms, it is observed that the algorithms do not work satisfactorily for all images in each type of skin disease considered, which means that not all images have been effectively segmented by the algorithms. Different algorithms have their own effectiveness in segmenting different variety of images in which some has got infected regions/lesion regions concentrated and some other has got wide spread infected/lesion regions all over the skin surface. This work is carried out by trying different images having different varieties based on infected (lesion) regions which differ in terms of spreading/concentration and depth. The results of K-means Clustering with Addition are effective for almost all images from the large dataset except for very few images where segmentation results are better with initial K-means Clustering rather than with final addition of segmented ones and Cluster disabled input images. It is due to limitation that only one cluster could be disabled in the input image and other non-required clusters or regions could not be disabled altogether.

There also exist limitations with respect to the dataset that is gathered from the dermatoscopic images which are captured by different clinical examiners depending on their experience and also those images are captured under different illuminations with different devices, which also act as a cause for the ineffectiveness or limitations in output results obtained with different image processing and segmentation techniques.

From all the above mentioned considerations, K-means Clustering with Addition segmentation algorithm acts as an efficient algorithm which yields better results without any over and under segmentation.

## **VI. SCOPE FOR FUTURE WORK**

Improvements in the present proposed methodology can be considered as future work. Implementation using different types of skin diseases other than the mentioned 4 skin disease types can be taken further in the research where a common proposed system works for all major types of skin diseases.

Works relating to the methods in the field of automatic image acquisition, identification, feature extraction and classification which makes the overall skin disease diagnosis as an automated system should be carried out.

## **REFERENCES**

1. G. Rajasekaran, N. Aishwarya, R. Keerthana "Skin Disease Identification Using Image Processing and Machine Learning Techniques" in International Research Journal of Engineering and Technology (IRJET), Volume 07 Issue: 03, Mar.2020 <https://www.irjet.net/archives/V7/i3/IRJET-V7I3265.pdf>
2. Suneel kumar and Ajit singh "Image processing for recognition of skin diseases" in International Journal of Computer Applications (0975-8887) volume 149–No.3, Sept.016, [online] Available: [https://www.researchgate.net/publication/308179913\\_Image\\_Processing\\_for\\_Recognition\\_of\\_Skin\\_Diseases](https://www.researchgate.net/publication/308179913_Image_Processing_for_Recognition_of_Skin_Diseases)
3. Ranichitra, D. Seethalakshmi "A Comparative Analysis of Segmentation Techniques to Extract Skin Lesion Regions" in International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-6 Issue-6, August 2017
4. Kongkham Gobindchandra, Santhosh Kumar K.L "Analysis of Image Segmentation Techniques" in International Research Journal of Computer Science (IRJCS) ISSN: 2393-9842 Issue 6, Volume 2 (June 2015) Microsoft Word - 09. JNCS10090 (irjcs.com)
5. G. Evelin Suji , Y.V.S. Lakshmi , G. Wiselin Jiji " Comparative Study on Image Segmentation Algorithms" in International Journal of Advanced Computer Research (ISSN (print): 2249-7277 ISSN (online): 2277-7970) Volume-3 Number-3 Issue-11 September-2013 <https://www.accentjournals.org/PaperDirectory/Conference/ICETTR-2013/70.pdf>
6. Julie Ann Salido, Conrado Ruiz Jr "Hair Artifact Removal And Skin Lesion Segmentation of Dermoscopy Images" in Asian Journal of Pharmaceutical and Clinical Research Vol 11, Special issue 3, 2018 [https://www.researchgate.net/publication/328123291\\_Hair\\_artifact\\_removal\\_and\\_skin\\_lesion\\_segmentation\\_of\\_dermoscopy\\_images](https://www.researchgate.net/publication/328123291_Hair_artifact_removal_and_skin_lesion_segmentation_of_dermoscopy_images)
7. Syed Zakwan et al. "Image Quality Assessment for Image Segmentation Algorithms: Qualitative and Quantitative Analyses" in 9th IEEE International Conference on Control System, Computing and Engineering (ICCSCE), 29 Nov.–1 Dec. 2019

8. Li-sheng Wei , Quan Gan, and Tao Ji “Skin Disease Recognition Method Based on Image Colour and Texture Features” in Hindawi Computational and Mathematical Methods in Medicine Volume 2018, Article ID 8145713, 10, 26 August 2018 [online] <https://www.hindawi.com/journals/cmmm/2018/8145713>
9. L.Sai Vineela, G.Tarun Ravi Sankar, K.Nohan Prasanth, K.Vamsidhar “Skin Cancer Detection Using Region Based Segmentation” in IJISSET - International Journal of Innovative Science, Engineering & Technology, Vol. 6 Issue 4, April 2019 IJISSET\_V6\_I4\_06.pdf
10. Ranjita Rout, Priyadarsan Parida “ Transition Region Based Approach For Skin Lesion Segmentation” in Third International Conference on Computing and Network Communications (CoCoNet'19) Procedia Computer Science 171 (2020) 379–388 [Online] Available: Transition region based approach for skin lesion segmentation - ScienceDirect
11. Nawal Soliman ALKolifi ALenezi, “A Method of Skin Disease Detection Using Image Processing And Machine Learning” in 16th International Learning & Technology Conference Procedia Computer Science 163 (2019) 85–92 Available: <https://www.sciencedirect.com/science/article/pii/S1877050919321295/pdf>
12. Sourav Kumar Patnaik, Mansher Singh Sidhu, Yaagyanika Gehlot, Bhairvi Sharma and P Muthu “Automated Skin Disease Identification using Deep Learning Algorithm” in Biomedical & Pharmacology Journal, September 2018. Vol. 11(3), p. 1429-1436 [online] <https://dx.doi.org/10.13005/bpj/1507>
13. Mrs. Jayashree Hajgude, Aishwarya Bhavsar, Harsha Achara, Nisha Khubchandani “Skin Disease Detection Using Image Processing with Data Mining and Deep Learning” in International Research Journal of Engineering and Technology Volume: 06 , 4, 2019 <https://www.irjet.net/archives/V6/i4/IRJET-V6I4954.pdf>
14. Er.Shrinidhi Gindhi, Ansari Nausheen, Ansari Zoya, Shaikh Ruhin “An Innovative Approach for Skin Disease Detection Using Image Processing and Data Mining” in International Journal of Innovative Research in Computer and Communication Engineering ,Vol. 5, Issue 4, April 2017 [http://www.ijircce.com/upload/2017/april/99\\_23\\_An.pdf](http://www.ijircce.com/upload/2017/april/99_23_An.pdf)
15. Mrs. S.Kalaiarasi, Harsh Kumar, Sourav Patra “Dermatological Disease Detection using Image Processing and Neural Networks” in International Journal of Computer Science and Mobile Applications, Vol.6 Issue. 4, April- 2018 <http://paper.researchbib.com/view/issn/2321-8363/6/4>
16. V. Pugazhenth, Sagar Naik, Amruta Joshi, Shreya Manerkar, Vinita Nagvekar, Kalpita Naik, Chinmay Palekar, K Sagar “Skin Disease Detection And Classification” in international journal of Advanced Engineering Research and Science (IJAERS), 2019, 6 (5), pp.396-400. 10.22161/ijaers.6.5.53 <https://ijaers.com/detail/skin-disease-detection-and-classification>
17. V.R. Balaji, S.T. Suganthi, R. Rajadevi, V. Krishna Kumar, B. Saravana Balaji, Sanjeevi Pandiyan “Skin disease detection and segmentation using dynamic graph cut algorithm and classification through Naive Bayes classifier” in Elsevier journal measurement Volume 163, 15 October 2020, 107922. <https://doi.org/10.1016/j.measurement.2020.107922>



## SYNTHESIS AND BIOLOGICAL EVALUATION OF NICOTINIC ACID DERIVATIVES FOR ANTIMICROBIAL AND ANTIOXIDANT ACTIVITIES

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## ABSTRACT

A series of novel *N*-{(1*E*)-3-oxo-1-phenyl-3-[2-(pyridin-3-carbonyl)hydrazinyl]prop-1-en-2-yl}benzamides (**3a-3m**) were synthesized by reaction of 4-benzylidene-2-(substituted phenyl)oxazol-5-one derivatives with nicotinic acid hydrazides. Structures of synthesized nicotinic acid derivatives were confirmed by using FT-IR, <sup>13</sup>C-NMR, <sup>1</sup>H-NMR and Mass spectra. All the title compounds were evaluated for their antimicrobial activity by cup plate method, and antioxidant activity by in vitro methods such as DPPH and nitric oxide radical scavenging assays. Molecular properties, Bioactivity scores, druglikeness and toxicities of final compounds were predicted by Molinspiration and OSIRIS online tools respectively. Out of all the derivatives, compounds **3l**, **3m** and **3f** exhibited appreciable antimicrobial activity against tested bacteria and fungi when compared to that of standard drugs amoxicillin, streptomycin, and fluconazole. Among all the compounds screened, **3k** and **3m** derivatives exhibited equipotent activity with that of standard antioxidant ascorbic acid in both DPPH and Nitric oxide scavenging methods. In silico studies indicated that all the final compounds followed the Lipinski's rule indicating compounds oral bioavailability, free from toxicity and have good drug likeness score. Among the series, compound **3m** exhibited good antimicrobial and antioxidant properties which need further study to market as potential drug molecule.

Keywords: Antimicrobial activity, antioxidant activity, nicotinic hydrazide, lipinski rule, molinspiration.

## INTRODUCTION

From the past few decades research is more and more focused on heterocyclic compounds. Among the heterocycles, pyridine heterocycle was reported to possess various biological activities including anticonvulsant<sup>1</sup>, antiparkinsonism<sup>2</sup>, antitubercular<sup>3</sup>, antiinflammatory<sup>4</sup>, antitumor<sup>5</sup>, fungicidal, antibacterial<sup>6</sup> activities etc. Various compounds containing hydrazine in their structures were reported to possess antimicrobial activity.<sup>7</sup> Benzamide derivatives were also reported to possess antibacterial activities.<sup>8</sup> On the other hand multi drug resistant (MDR) microorganisms are very hard to treat with existing antibiotics<sup>9</sup> and cases of infection with MDR microorganisms are highly increasing.<sup>10-11</sup> Prompted by above observations, it was planned to synthesize newer nicotinic acid derivatives with enhanced biological activities and to evaluate the title compounds for their antibacterial and antioxidant activities. Further the study was continued by computing the molecular properties by Molinspiration and Osiris program to predict oral bioavailability, drug likeness score and toxicity profile of title compounds.

## MATERIALS AND METHODS

The chemicals were purchased from Hi media, Sigma Aldrich. All the melting points reported in this study were determined in open capillaries using Tempco melting point apparatus. Precoated silica gel plates were used for the TLC and spots were visualized by iodine/ UV chamber. IR spectra were recorded on Bruker apex FT-IR spectrophotometer using KBr pellets technique, <sup>13</sup>C-NMR and <sup>1</sup>H-NMR spectra were recorded on Jeol resonance MHz Nuclear Magnetic Resonance spectrometer using dimethylsulfoxide (DMSO) as solvent. Mass spectra were recorded on Apex mass spectrometer.

## Experimental

Synthesis of 4-benzylidene-2-substituted phenyloxazol-5-one (**2a-m**)

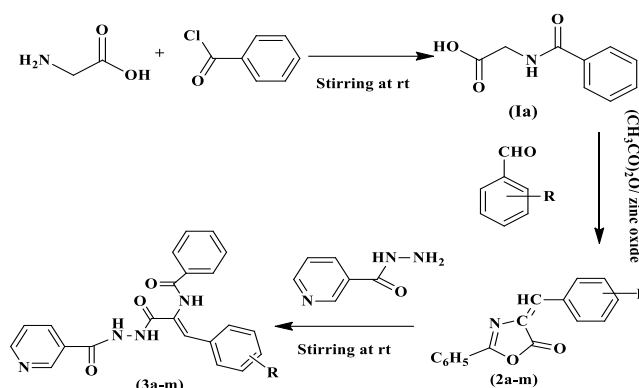
Synthesis of 4-benzylidene-2-substituted phenyloxazol-5-ones (**2a-m**) was done accordance with the previously reported method<sup>12</sup>.

Synthesis of *N*-{(1*E*)-3-oxo-1-phenyl-3-[2-pyridin-3-ylcarbonyl]hydrazinyl}prop-1-en-2-yl}benzamide (**3a-m**)

4-benzylidene-2-substituted phenyloxazol-5-ones (0.03mol) were stirred with a solution of a nicotinic acid hydrazide (0.06mole) in ethanol (25 ml). The deep yellow color of oxazol-5-one changed to light yellow colour and solidified. Then the obtained solid was filtered, washed and recrystallized from ethanol.<sup>13</sup> (Fig 1)



Figure 1. Scheme for synthesis of title compounds (3a-m)

**N-((1E)-3-oxo-1-phenyl-3-[2-pyridin-3-ylcarbonyl]hydrazinyl)prop-1-en-2-yl}benzamide, 3a**

Yellow solid; Yield: 74%; MP: 196-198°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3431 (NH), 3013 (Ar-CH), 1648 (C=O);  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 7.11 (s, 1H, C=CH), 7.24-8.79 (m, 10H, Ar-H), 8.0 (d, 1H, CH of pyridine), 8.5 (d, 1H, CH of pyridine), 7.45 (t, 1H, CH of pyridine), 8.95 (s, 1H, CH of pyridine), 10.10 (s, 1H, NHCO-Ph), 10.53 (s, 1H, -NHCO-C=CH), 11.04 (s, 1H, NHCO-C<sub>5</sub>H<sub>4</sub>N).  $^{13}\text{C NMR}$  (100 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 122.5, 124.9, 126.8, 127.3, 127.2, 128.3, 128.2, 128.9, 130.5, 132.6, 135.0, 135.6, 138.4, 148.7, 153.1, 163.3, 164.3, 165.2. MS ( $m/z$ ): 387 [M+1].

**N-((1E)-1-(4-dimethylaminophenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl]hydrazinyl)prop-1-en-2-yl}benzamide, 3b**

Yellow solid; Yied: 85%; MP: 210-212°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3461(NH), 3034 (Ar-CH), 1659 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 2.9 ; 3.0 (s, 6H, N(CH<sub>3</sub>)<sub>2</sub>), 7.19 (s, 1H, C=CH), 6.74-8.10 (m, 9H, Ar-H), 7.95 (d, 1H, CH of pyridine), 8.25 (d, 1H, CH of pyridine), 7.49 (t, 1H, CH of pyridine), 8.58 (s, 1H, CH of pyridine), 10.02 (s, 1H, NHCO-Ph), 10.39 (s, 1H, NHCO-C=CH), 11.12(s, 1H, NHCO-C<sub>5</sub>H<sub>4</sub>N). MS ( $m/z$ ): 430 [M+1].

**N-((1E)-1-(3,4-dimethoxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl) prop-1-en-2-yl} benzamide, 3c**

Yellow solid; Yield: 80%; MP: 199-201°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3431 (NH), 3021 (Ar-CH), 1648 (C=O).

**N-((1E)-1-(4-methylphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl) prop-1-en-2-yl} benzamide, 3d**

Yellow solid; Yield: 75%; MP: 120-122°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3440 (NH), 3068 (Ar-CH), 1653 (C=O).

**N-((1E)-1-(4-bromophenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl) prop-1-en-2-yl} benzamide, 3e**

Yellow solid; Yield: 71%, MP: 120-121°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3397 (NH), 3055 (Ar-CH), 1663 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 7.08 (s, 1H, C=CH), 7.19-7.95 (m, 9H, Ar-H), 8.10 (d, 1H, CH of pyridine), 8.28 (d, 1H, CH of pyridine), 7.69 (t, 1H, CH of pyridine), 8.78 (s, 1H, CH of pyridine), 10.07 (s, 1H, NHCO-Ph), 10.52 (s, 1H, NHCO-C=CH), 10.99 (s, 1H, NH-CO-C<sub>5</sub>H<sub>4</sub>N).

**N-((1E)-1-(4-chlorophenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl) prop-1-en-2-yl} benzamide, 3f**

Yellow solid; Yield: 78%; MP: 130-132°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3428 (NH), 3057 (Ar-CH), 1643 (C=O).

**N-((1E)-1-(4-carboxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl) prop-1-en-2-yl} benzamide, 3g**

Yellow solid; Yield: 70%; MP: 104-105°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3420 (NH), 3006 (Ar-CH), 1644 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 7.20 (s, 1H, C=CH), 7.44-8.79 (m, 9H, Ar-H), 7.95 (d, 1H, CH of pyridine), 8.46 (d, 1H, CH of pyridine), 7.25 (t, 1H, CH of pyridine), 8.86 (s, 1H, CH of pyridine), 10.09 (s, 1H, NH-CO-Ph), 10.47 (s, 1H, NHCO-C=CH), 11.11 (s, 1H, NHCO-C<sub>5</sub>H<sub>4</sub>N), 11.15 (s, 1H, COOH).

**N-((1E)-1-(4-nitrophenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl) prop-1-en-2-yl} benzamide, 3h**

Yellow solid; Yield: 80%; MP: 140-142°C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3400 (NH), 3071 (Ar-CH), 1632 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 7.76 (s, 1H, C=CH), 7.10-8.29 (m, 9H, Ar-H), 8.15 (d, 1H, CH of pyridine), 8.48 (d, 1H, CH of pyridine), 7.23 (t, 1H, CH of pyridine), 8.62 (s, 1H, CH of pyridine), 10.21 (s, 1H, NHCO-Ph), 10.77 (s, 1H, NHCO-C=CH), 11.24 (s, 1H, NHCO-C<sub>5</sub>H<sub>4</sub>N).

**N-((1E)-1-(4-methoxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl] prop-1-en-2-yl} benzamide, 3i**

Yellow solid; Yield: 75%; MP: 180-181 °C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3440 (NH), 3011 (Ar-CH), 1643 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 3.72 (s, 3H,  $\text{OCH}_3$ ), 7.26 (s, 1H, C=CH), 7.18-8.31 (m, 9H, Ar-H), 8.21 (d, 1H, CH of pyridine), 8.48 (d, 1H, CH of pyridine), 7.23 (t, 1H, CH of pyridine), 8.49 (s, 1H, CH of pyridine), 10.09 (s, 1H,  $\text{NHCO-Ph}$ ), 10.49 (s, 1H,  $\text{NHCO-C=CH}$ ), 10.97 (s, 1H,  $\text{NHCO-C}_5\text{H}_4\text{N}$ ). MS( $m/z$ ): 417.63 [M+1].

**N-((1E)-1-(3-hydroxy,4-methoxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl]hydrazinyl]prop-1-en-2-yl} benzamide, 3j**

Yellow solid; Yield: 82%; MP: 130-133 °C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3462 (NH), 3008 (Ar-CH), 1685 (C=O).

**N-((1E)-1-(4-hydroxy,3,5-dimethoxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl]hydrazinyl] prop-1-en-2-yl} benzamide, 3k**

Yellow solid; Yield: 81%; MP: 198-200 °C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3454 (NH), 3020 (Ar-CH), 1691 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 3.71 & 3.73 (s, 6H,  $(\text{OCH}_3)_2$ ), 7.10 (s, 1H, C=CH), 6.69-8.59 (m, 7H, Ar-H), 8.0 (d, 1H, CH of pyridine), 8.5 (d, 1H, CH of pyridine), 7.45 (t, 1H, CH of pyridine), 8.95 (s, 1H, CH of pyridine), 9.41 (s, 1H, OH), 10.19 (s, 1H,  $\text{NHCO-Ph}$ ), 10.58 (s, 1H,  $\text{NHCO-C=CH}$ ), 11.11 (s, 1H,  $\text{NHCO-C}_5\text{H}_4\text{N}$ ). MS( $m/z$ ): 463.78 [M+1].

**N-((1E)-1-(4-hydroxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl] prop-1-en-2-yl} benzamide, 3l**

Yellow solid; Yield: 78%; MP: 168-170 °C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3431 (NH), 3013 (Ar-CH), 1650 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 7.01 (s, 1H, C=CH), 7.14-8.56 (m, 9H, Ar-H), 8.10 (d, 1H, CH of pyridine), 8.36 (d, 1H, CH of pyridine), 7.75 (t, 1H, CH of pyridine), 8.78 (s, 1H, CH of pyridine), 9.41 (s, 1H, OH), 10.13 (s, 1H,  $\text{NHCO-Ph}$ ), 10.70 (s, 1H,  $\text{NHCO-C=CH}$ ), 11.06 (s, 1H,  $\text{NHCO-C}_5\text{H}_4\text{N}$ ).  $^{13}\text{C-NMR}$  (100 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 116.5, 122.7, 125.7, 126.8, 127.1, 128.2, 131.0, 132.8, 134.6, 138.3, 148.4, 153.5, 156.1, 163.2, 164.1, 166.2; MS( $m/z$ ): 403.79 [M+1].

**N-((1E)-1-(4-hydroxy,3-methoxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl] hydrazinyl] prop-1-en-2-yl} benzamide, 3m**

Yellow solid; Yield: 75%; MP: 165-167 °C; IR ( $V_{\max}$ ,  $\text{cm}^{-1}$ ): 3473 (NH), 3038 (Ar-CH), 1685 (C=O).  $^1\text{H-NMR}$  (400 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 3.72 (s, 3H,  $\text{OCH}_3$ ), 5.55 (s, 1H, OH), 7.25 (s, 1H, C=CH), 6.6-8.88 (m, 8H, Ar-H), 7.98 (d, 1H, CH of pyridine), 8.18 (d, 1H, CH of pyridine), 7.39 (t, 1H, CH of pyridine), 8.85 (s, 1H, CH of pyridine), 10.24 (s, 1H,  $\text{NHCO-Ph}$ ), 10.64 (s, 1H,  $\text{NHCO-C=CH}$ ), 10.95 (s, 1H,  $\text{NHCO-C}_5\text{H}_4\text{N}$ ).  $^{13}\text{C-NMR}$  (100 MHz,  $\text{DMSO-}d_6$ ,  $\delta$  in ppm): 56.5, 112.2, 117.2, 121.3, 122.7, 125.6, 127.1, 127.0, 128.5, 128.3, 131.2, 132.7, 134.8, 137.9, 145.1, 148.7, 151.4, 153.9, 164.3, 165.2, 165.1. Ms ( $m/z$ ): 433 [M+1].

**Antimicrobial activity**

All the final compounds were evaluated for their Antimicrobial activity against gram-positive bacterial strains *Staphylococcus aureus* (ATCC 29213), *Bacillus subtilis* (ATCC 530); gram-negative strains *Pseudomonas aeruginosa* (ATCC 27853), *Escherichia coli* (ATCC 25922); and fungal strains *Aspergillus niger* (ATCC 16404), *Candida albicans* (ATCC 10231) by cup plate method at a concentration of 100  $\mu\text{g/ml}$ . Streptomycin, Amoxicillin and Fluconazole were used as standard drugs. Nutrient agar was used as culture medium for bacterial strains. Sabouraud dextrose agar was used as culture medium for fungi. DMSO was used as solvent control. Microbial (bacterial and fungal) inoculum prepared by transferring the stock culture into the nutrient broth in a conical flask and incubated at 34-37 °C for 24 hours before experimentation. Laminar airflow bench was swapped with 70% alcohol, UV lamp was switched on for 30 minutes. Then all the glassware, inoculums, media and reagents were placed in sterilized laminar airflow cabinet following all aseptic conditions. 25ml of sterile hot agar medium was poured in each plate and allowed to harden. The agar plates were inoculated with test inoculums by streaking in all directions over the entire surface of the plate. Cups of 6 mm diameter were made with a sterile cork borer in the agar plate, once the inoculums were dried. All final derivatives were added to these cups with micropipette and incubated at a temperature of 37 °C for 24 hrs and 48 hrs for bacterial and fungal strains respectively. Zone of inhibition was measured using mm scale.<sup>14</sup>

**Antioxidant Assays****Reduction of Stable free radical DPPH**

Antioxidant activity of title compounds was determined by DPPH scavenging assay. DPPH solution was prepared freshly, kept in dark place. 2ml of 100  $\mu\text{M}$  final compounds or standard were added to 2ml of DPPH (100  $\mu\text{M}$ ) ethanolic solution. 2 ml of ethanol was added to 2ml of 100  $\mu\text{M}$  DPPH ethanolic solution, treated as negative control. The tubes were covered with aluminum foil to protect from light and kept at an ambient

temperature for 30 min. Then, the absorbance was read at 517 nm using ethanol as blank.<sup>15</sup> Results were expressed as means of triplicate and mean  $\pm$  SD (standard deviation) were calculated. The % inhibition of DPPH was calculated using the formula.

$$\% \text{inhibition} = (\text{Absorbance of control} - \text{Absorbance of test} / \text{Absorbance of control}) \times 100$$

#### Nitric Oxide (NO) Scavenging activity

10 $\mu$ M Sodium nitroprusside in phosphate buffer pH7.4 and 100 $\mu$ M concentrations of title compounds/standard dissolved in methanol were incubated for 120 minutes at 25°C. Control experiment also carried out in the same manner (without test compound). After incubation, 2 mL of solution was removed and diluted with Griess reagent (2ml). The absorbance of pink colour chromophore which is formed by diazotization and coupling reaction involved in this assay was measured at 546nm.<sup>16</sup> Results were expressed as means of triplicate and mean  $\pm$  SD (standard deviation) were calculated. Nitric oxide scavenging activity was calculated by using the following formula.

$$\% \text{inhibition} = (\text{Absorbance of control} - \text{Absorbance of test} / \text{Absorbance of control}) \times 100$$

#### In silico studies

Molecular properties of final derivatives were predicted by Molinspiration, the drug likeness score and toxicity profile were calculated by using OSIRIS online tool.<sup>17</sup>

### RESULTS AND DISCUSSION

All the title compounds N-{(1E)-3-oxo-1-phenyl-3-[2-pyridin-3ylcarbonyl] hydrazinyl} prop-1-en-2-yl}benzamide (**3a-m**) were synthesized by the ring opening reactions of substituted oxazol-5-one with the nicotinic acid hydrazide as shown in the scheme. The intermediates (**2a-m**) were synthesized by stirring of different aromatic aldehydes with hippuric acid in presence of zinc oxide and acetic anhydride. IR Spectra of final compounds indicated appearance of band at 1632-1691cm<sup>-1</sup> due to -C=O and 3397-3473 cm<sup>-1</sup> due to the -NH groups. A band at 3006-3071 cm<sup>-1</sup> indicates the presence of Ar C-H groups. The proton NMR spectral data revealed that a singlet at  $\delta$ 10.02-10.24; 10.39-10.77 and 10.91-11.27 due to the -NH protons of C<sub>6</sub>H<sub>5</sub>-CO-NH; -NH-COCH= and NH-COC<sub>6</sub>H<sub>4</sub>N respectively. Appearance of multiplet at  $\delta$  6.79-9.11 due to aromatic protons and a singlet around  $\delta$  7 due to the vinylic proton. Moreover, peaks at  $\delta$  163.2-166.2 and 112.2- 156.1 due to the carbonyl and aromatic carbons respectively which clearly indicates the formation of title compounds. Mass spectra of title compounds were in accordance with their molecular weights.

#### Antimicrobial activity

Table 1. Antimicrobial activities of compounds (**3a-m**) at 100  $\mu$ g/ ml

Compound	R	Zone of Inhibition in millimetre					
		Gram positive		Gram negative		Antifungal	
		B.S	S.A	E.C	P.A	C.A	A.N
<b>3a</b>	H	17	12	13	09	10	08
<b>3b</b>	4-N(CH <sub>3</sub> ) <sub>2</sub>	14	13	08	09	12	09
<b>3c</b>	3, 4-(OCH <sub>3</sub> ) <sub>2</sub>	09	10	11	10	08	09
<b>3d</b>	4- CH <sub>3</sub>	13	11	12	18	12	10
<b>3e</b>	4-Br	09	11	08	10	19	17
<b>3f</b>	4-Cl	13	10	12	11	21	18
<b>3g</b>	4-COOH	11	13	10	10	13	11
<b>3h</b>	4-NO <sub>2</sub>	16	12	13	12	15	08
<b>3i</b>	4-OCH <sub>3</sub>	17	15	14	14	15	13
<b>3j</b>	3-OH, 4-OCH <sub>3</sub>	12	10	08	10	09	08
<b>3k</b>	4-OH,3,5(OCH <sub>3</sub> ) <sub>2</sub>	20	17	19	15	11	13
<b>3l</b>	4-OH	24	18	23	21	14	16
<b>3m</b>	4-OH,3-OCH <sub>3</sub>	23	17	24	22	16	19
Std	Amoxicillin	26	19	-	-	-	-
	Streptomycin	-	-	24	23	-	-
	Fluconazole	-	-	-	-	23	21
-: Not tested							

\*B.S- *Bacillus subtilis*; S.A- *Staphylococcus aureus*; E.C- *Escherichia coli*; P.A- *Pseudomonas aeruginosa*; C.A- *Candida albicans*; A.N- *Aspergillus niger*.

All the title compounds (100 µg/ml) were evaluated for their Antimicrobial activity against six strains (two gram-positive; two gram-negative and two fungal strains) by cup plate method and zone of inhibition was summarized in Table 1. Among all, compound **3l** (24 and 18 mm) exhibited good activity which is comparable with that of standard drug amoxycillin (26 and 19 mm) against *Bacillus subtilis* and *Staphylococcus aureus* respectively. The highest activity might be due to the presence of hydroxyl moiety on the phenyl ring at the vinylic end and it is correlated with the previous findings<sup>18</sup>. Compound **3m** (23 and 17 mm) showed significant activity and compounds **3k**, **3a**, **3h** and **3i** exhibited moderate activity against Gram positive organisms. Compounds **3m** (24 and 22 mm) and **3l** (23 and 21 mm) showed significant activity compared to the standard drug streptomycin (24 and 23 mm) against *Escherichia coli* and *Pseudomonas aeruginosa* respectively. This result was similar to the previous observations of Xiao *et al*<sup>19</sup>. Xiao *et al* reported that the contribution of vanillinyl motif towards the antimicrobial activity of vanillic acyl hydrazone frame work. Further compounds **3k** and **3i** displayed considerable activity against the gram negative strains. Moreover, the results clearly indicated that the electron donating groups enhances the activity than other substitution against tested bacterial strains. Compounds **3f** (21 and 18 mm) displayed comparable activity with that of standard drug fluconazole (23 and 21 mm) against *Candida albicans*, *Aspergillus niger* respectively. It might be due to the presence of halogen which elevates the log P value resulting in significant antifungal activity. This result was in agreement with the findings of Daniela *et al*<sup>20</sup> and Soujanya *et al*<sup>21</sup>.

### Antioxidant activity

**Table 2. Antioxidant activities of compounds (3a-m) at 100 µM**

Compound	R	Interaction with stable free radical DPPH	Nitric Oxide (NO) Scavenging assay
		% inhibition	% inhibition
<b>3a</b>	H	26	20
<b>3b</b>	4-N(CH <sub>3</sub> ) <sub>2</sub>	45	51
<b>3c</b>	3, 4-(OCH <sub>3</sub> ) <sub>2</sub>	35	29
<b>3d</b>	4- CH <sub>3</sub>	52	56
<b>3e</b>	4-Br	35	60
<b>3f</b>	4-Cl	40	47
<b>3g</b>	4-COOH	38	25
<b>3h</b>	4-NO <sub>2</sub>	27	38
<b>3i</b>	4-OCH <sub>3</sub>	36	42
<b>3j</b>	3-OH, 4-OCH <sub>3</sub>	28	22
<b>3k</b>	4-OH,3,5(OCH <sub>3</sub> ) <sub>2</sub>	55	62
<b>3l</b>	4-OH	46	51
<b>3m</b>	4-OH,3-OCH <sub>3</sub>	53	60
Standard	Ascorbic acid	52	60

### Reduction of Stable free radical DPPH

Table 2 shows the antioxidant ability of test compounds at 100 µM concentration. Among all, compound **3k** showed highest free radical scavenging capacity assessed by DPPH method. Compounds **3d** (54%) and **3m** (53%) exhibited significant activities compared to that of standard antioxidant agent ascorbic acid (52%). The highest antioxidant activity of these derivatives might be resulted due to the presence of electron donating groups on the aromatic ring. It is interesting to note that, 4-hydroxy derivatives exhibited appreciable activity and this is further elevated due to presence of adjacent alkoxy groups (compound **3k** (4-hydroxy,3,5-dimethoxy) > **3m** (4-hydroxy,3-methoxy) > **3l** (4-hydroxy)). This is further supported by previous results revealed that electron-donating substituents, like alkyl/alkoxy groups at 2, 4, 6 positions, increase the primary antioxidant activities of phenols.<sup>22</sup> In addition to this the type of substitution alters the activity such as compounds with electron donating groups enhance the antioxidant activity than electron withdrawing groups as substitution (**3b**>**3h**).<sup>23</sup> It is important to note that the position of substitution also alters the activity. Compound **3m** (3-methoxy, 4-hydroxy) showed superior activity than compound **3j** (3-hydroxy, 4-methoxy) and this finding was in accordance with the previous report.<sup>24</sup> Halogenated derivatives displayed moderate activity when compared with the standard.

### Nitric Oxide Scavenging Assay

Antioxidant activity of title compounds was evaluated by nitric oxide (NO) scavenging assay at 100 µM concentration and tabulated (Table 2). Compound **3k** exhibited highest activity (62%), it might be to the

substitutions which enhance the electron density on the aromatic ring and the result was similar to the previous findings.<sup>25</sup> Compounds **3m** and **3e** showed equal contribution as that of standard (60%). Compound **3b** and **3f** exhibited moderate activities (51% and 47% respectively).

### Molecular property Prediction

**Table 3. Molecular properties of compounds (3a-m)**

Com	R	MW	Log P	Log S	% abs	TPSA A	n-atom	n-HBA	n-HBD	n-ROTB	n-VIO
<b>3a</b>	H	386	2.2	-4.2	74.5	100	29	7	3	6	0
<b>3b</b>	4-N(CH <sub>3</sub> ) <sub>2</sub>	429	2.3	-4.2	73.4	103	32	8	3	7	0
<b>3c</b>	3, 4-(OCH <sub>3</sub> ) <sub>2</sub>	446	1.9	-4.2	68.2	118	33	9	3	8	0
<b>3d</b>	4- CH <sub>3</sub>	400	2.7	-4.6	74.5	100	30	7	3	6	0
<b>3e</b>	4-Br	465	3.0	-5.0	74.5	100	30	7	3	6	0
<b>3f</b>	4-Cl	420	2.9	-4.9	74.5	100	30	7	3	6	0
<b>3g</b>	4-COOH	430	2.1	-4.2	61.7	137	32	9	4	7	0
<b>3h</b>	4-NO <sub>2</sub>	431	2.2	-4.7	58.6	146	32	10	3	7	0
<b>3i</b>	4-OCH <sub>3</sub>	416	2.3	-4.2	71.3	109	31	8	3	7	0
<b>3j</b>	3-OH, 4-OCH <sub>3</sub>	432	1.5	-3.9	64.4	129	32	9	4	7	0
<b>3k</b>	4-OH,3,5 (OCH <sub>3</sub> ) <sub>2</sub>	462	1.6	-3.6	61.3	138	34	10	4	8	0
<b>3l</b>	4-OH	402	1.7	-3.9	67.6	120	30	8	4	6	0
<b>3m</b>	4-OH,3-OCH <sub>3</sub>	432	1.5	-3.9	64.4	129	32	9	4	7	0

\*MW: Molecular weight; Log P: Lipophilicity; Log S: Solubility; % abs: % of oral absorption; TPSA: Total polar surface area; n-atom: No. of atoms; n-HBA: No of hydrogen bond acceptors; n-HBD: No of hydrogen bond donors; n-ROTB: No of rotatable bonds; n-VIO: n-Violations.

**Table 4. Toxicity profile and drug likeliness score of title compounds (3a-m)**

Com	R	M	T	R	I	DL
<b>3a</b>	H	N	N	N	N	4.2
<b>3b</b>	4-N(CH <sub>3</sub> ) <sub>2</sub>	N	N	N	N	4.9
<b>3c</b>	3, 4-(OCH <sub>3</sub> ) <sub>2</sub>	N	N	N	N	4.2
<b>3d</b>	4- CH <sub>3</sub>	N	N	N	N	4.1
<b>3e</b>	4-Br	N	N	N	N	2.4
<b>3f</b>	4-Cl	N	N	N	N	4.2
<b>3g</b>	4-COOH	N	N	N	N	4.0
<b>3h</b>	4-NO <sub>2</sub>	N	N	N	N	0.8
<b>3i</b>	4-OCH <sub>3</sub>	N	N	N	N	4.2
<b>3j</b>	3-OH, 4-OCH <sub>3</sub>	N	N	N	N	4.2
<b>3k</b>	4-OH,3,5 (OCH <sub>3</sub> ) <sub>2</sub>	N	N	Y	N	4.2
<b>3l</b>	4-OH	N	N	N	N	4.2
<b>3m</b>	4-OH,3-OCH <sub>3</sub>	N	N	N	N	4.2

\*M: Mutagenic; T: Tumorigenic; I: Irritant; R: Reproductive effect; DL: Drug-likeness score; N: No Risk; Y: High Risk.

Further the study was continued by *in silico* screening. Molecular properties and toxicities of the title compounds were assessed by using Molinspiration and OSIRIS tools and the results were summarized in Table 3 & 4. All final compounds in the series followed Lipinski rule which explains the oral bioavailability of drug. All the compounds displayed satisfactory log P (1.5-3.0), log S (-3.6- -5.0), TPSA (100-146), molecular weight (386-465) and possess good percentage of oral bioavailability (58.6-74.5%). On the other hand toxicity also one of the important barriers to market the active compounds as drugs. Toxicity of title compounds was predicted by the OSIRIS tool and all the derivatives free from major toxicity except compound **3k** and displayed good drug likeness scores (0.86-4.98).

### CONCLUSION

Novel series of Nicotinic Acid Derivatives were synthesized and structural elucidation of final compounds was done by spectrometric methods. *In silico* studies indicated that these derivatives very likely to have druglike properties with less toxicity profile. Biological evaluation revealed that title compounds have significant

antioxidant and antibacterial activities comparable to that of standard. Among the series, compound N-{(1E)-1-(4-hydroxy,3-methoxyphenyl)-3-oxo-3[2-pyridin-3-ylcarbonyl]hydrazinyl} prop-1-en-2-yl} benzamide (**3m**) exhibited appreciable antioxidant and antibacterial activities. This may give new path for exploring the pharmacologically significant derivatives for the upcoming researchers.

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#### CONFLICTS OF INTEREST

Authors declare no conflicts of interest.

#### REFERENCES

1. Reema S, Sara UVS, Khosa RL, James S, Jainendra J. Nicotinic acid hydrazones: a novel anticonvulsant pharmacophore. *Med Chem Res.* 2011; 20(9): 1499-1504.
2. Al-Omar MA, Amr AG, Al-Salahi. Anti-inflammatory, Analgesic, Anticonvulsant and Antiparkinsonian Activities of Some Pyridine Derivatives Using 2,6-Disubstituted Isonicotinic Acid Hydrazides. *Archiv der Pharmazie.* 2010; 343(11-12): 648-656.
3. Eldehna WM, Fares M, Abdel-Aziz MM, Abdel-Aziz HA. Design, Synthesis and Antitubercular Activity of Certain Nicotinic Acid Hydrazides. *Molecules.* 2015; 20(5): 8800-8815.
4. Navidpour L, Shafaroodi H, Saeedi GM, Shafiee A. Synthesis, anti-inflammatory and analgesic activities of arylidene-2-(3-chloroanilino)nicotinic acid hydrazides. *Med Chem Res.* 2014; 23: 2793-2802.
5. Salwa E, Nadia AK, Ahmed EM, Emam SH. New 3-Substituted-2-(4-hydroxyanilino)pyridine Derivatives: Synthesis, Antitumor Activity, and Tubulin Polymerization Inhibition. *Arch Pharm.* 2017; 350(2): 1600256.
6. Rakesh N, Balasubramanian N, Sunil S, Dharmarajan S, Yogeewari P, Erik C, Christophe P, Jan B. Synthesis, antimycobacterial, antiviral, antimicrobial activities, and QSAR studies of nicotinic acid benzylidene hydrazide derivatives. *Med Chem Res.* 2012; 21(8): 1557-1576.
7. Mohamed SA El-Gaby, Jehane A Micky, Nadia M Taha, Marwa AM Sh El-Sharief. Antimicrobial Activity of Some Novel Thiourea, Hydrazine, Fused Pyrimidine and 2-(4-Substituted)anilinobenzoazole Derivatives Containing Sulfonamido Moieties. *J Chinese Chem. Soc.* 2013; 49(3): 407-414
8. Kozłowski H, Misra H, Sapari S, Rahman T, Ibrahim N, AU - Yamin B M, Hasbullah SA. Evaluation of Novel N-Dibenzylcarbamothioyl)benzamide Derivatives as Antibacterial Agents by Using DFT and Drug-Likeness Assessment. *J. Chem.* 2018; 9176280.
9. Alex B, Marie V, Oliver K, Michael E H. Back to the future: evolving bacteriophages to increase their effectiveness against the pathogen *Pseudomonas aeruginosa* PAO1. *Evol Appl.* 2013; 6(7): 1054-1063.
10. Levy SB, Marshall B. Antibacterial resistance worldwide: causes, challenges and responses. *Nat Med.* 2004; 10: S122-129.
11. Meryem T, Ozlem TA, Fatma KO, Suzan O. Synthesis and antimicrobial evaluation of novel 5-substituted-2-(p-tert-butylphenyl)benzoxazoles. *Indian J Chem.* 2018; 57B:385-389.
12. Soujanya M, Narayana M, Devi T, Anusha S, Rajitha G. Microwave assisted rapid, efficient synthesis and screening of acyl hydrazone derivatives for antibacterial activity. *Int J Pharm Technol.* 2014; 6(1): 6193-6202.
13. Rajitha G, Soujanya M. Microwave Assisted Synthesis, Characterization, Molecular Docking, Antiinflammatory and Analgesic Activity of Acylhydrazones Bearing Thiophene Moiety. *Asian J Chem.* 2017; 29 (11): 2479-2484.
14. Swapna D, Rajitha G, Umamaheswari A, Sudheer K. Synthesis, molecular docking studies and antimicrobial activity of mannich bases of thiazolidine-2,4-diones. *Int Res J Pharm.* 2018; 9 (11): 138-144.
15. Gulcin I. The antioxidant and radical scavenging activities of black pepper (*Piper nigrum*) seeds. *Int J Food Sci Nutr.* 2005; 56(7): 491-499.

16. Marcocci L, Maguire J J, Droy-Lefaix M T, Packer L. The nitric oxide-scavenging properties of Ginkgo biloba extract EGb 761. *Biochem Biophys Res Commun.* 1994; 201(2): 748-755.
17. Soujanya M, Ramakrishna AVLS, Pushya ragini Ch, Jyothsna V. Microwave Assisted Synthesis, Characterization, Molecular Docking and Antiinflammatory Activity of p-Methoxy Cinnamic Acid Derivatives. *Asian J Chem.* 2018; 30(8): 1781-1786.
18. Rajitha G, Soujanya M. Microwave Assisted Synthesis, Characterization, Molecular Docking and Antimicrobial Evaluation of 4-Nitrocinnamide Analogues. *Int J Pharm Sci Res.* 2017; 8(9): 3786-94.
19. Wang XL, Zhang YB, Tang JF, Yang YS, Chen RQ, Zhang F, Zhu HL. Design, synthesis and antibacterial activities of vanillic acylhydrazone derivatives as potential  $\beta$ -ketoacyl-acyl carrier protein synthase III (FabH) inhibitors. *Eur J Med Chem.* 2012; 57: 373-382.
20. Secci D, Bizzarri B, Bolasco A, Carradori S, D'Ascenzio M, Rivanera D, Mari E, Polletta L, Zicari A. Synthesis, anti-*Candida* activity, and cytotoxicity of new (4-(4-iodophenyl)thiazol-2-yl)hydrazine derivatives. *Eur J Med Chem.* 2012; 53: 246-253.
21. Soujanya M, Rajitha G. Synthesis, Characterization, Molecular Docking and Antimicrobial Activity of Nicotinic Acid Derived N-acylhydrazones. *Der Pharma Chem.* 2017; 9(17): 10-15.
22. Kajiyama T, Ohkatsu Y. Effect of Para-substituents of Phenolic Antioxidants. *Polym Degrad Stab.* 2001; 71: 445-452.
23. Soujanya M, Rajitha G, Umamaheswari A, Sudheer Kumar K. **Synthesis, Biological Evaluation and Docking Studies of N-(2-benzamido feruloyl) Aryl Hydrazone Analogues.** *Lett. Drug Des. Disc.* 2018; 15(8): 875-886.
24. Sai deepa N, Rajitha G, Praneetha P. Synthesis and evaluation of N-( $\alpha$ -benzamido cinnamoyl) aryl hydrazone derivatives for anti-inflammatory and antioxidant activities. *Indian J Chem.* 2011; 50B: 729-733.
25. Prasad KVS R, Rajitha G, Bharathi K. Synthesis and Biological Evaluation of 3-Amino Pyrazolones. *Asian J Chem.* 2011; 23(2): 684-686.

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**THE CULTURAL CONCEPTUALIZATION OF MANGGARAI SOCIETY ON SOCIAL CONFLICT  
IN FAMILY REALM**

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**Fransiskus Bustan, Frans Gana and Yohanis S. Sarong**

**ABSTRACT**

*This study investigates cultural conceptualization of Manggarai society on social conflict in family realm, as reflected in forms and meanings of linguistic phenomena used in traditional expressions in Manggarai language as the mirror of Manggarai culture. The study is descriptive. The theoretical framework is cultural linguistics. The results of study show that nature of social conflict in family realm is an internal problem in household and, as such, there is no need to involve external parties to solve it and solution mechanism is win-win solution as both parties are declared right. Clan chief is declared wrong as he is negligent in doing precautions to prevent conflict. As they are of same clan, clan chief is difficult to determine which party is right or wrong. The solution mechanism is through local-democratic model aimed at maintaining social harmony between the members of wa'u as a patrilineal-genealogic clan. Theoretically, the study is beneficial to contribute significance of cultural linguistics as a new paradigm in cognitive linguistics and, practically, the study is beneficial to preserve traditional expressions of Manggarai language as the contents are local wisdoms for Manggarai society.*

*Key words: cultural conceptualization, Manggarai society, social conflict, familyrealm*

**INTRODUCTION**

It has been widely acknowledged that there is no society living and even surviving without culture because culture is one of the prominent features that functions not only as a sense of identity identifying a society as members of a social group but also as a symbol of identity differentiating them from those of other social groups (Ochs, 1988; Koentjaraningrat, 2004). The function of culture as the distinctive feature between societies finds its reflection in languages they employ. The reason is understandable that language in its use as the means for communication among members of a social group is the mirror of their culture (Cassirer, 1987; Suriasumantri, 2001). This comes closest to the conception of Brown (1994) that culture is deeply ingrained part of the very fiber of our being, but language as the means for communication among members of a culture is the most visible and available expression of that culture (Wierzbicka, 1991; Kramsch, 2001).

The relationship of both language and culture belonging to a society as members of a social group is manifested in conceptualization ascribed in their cognitive map that contains a bulk of linguistic and cultural knowledge as the sources of reference for them in viewing the world (Foley, 1997). As Wardaugh (2011) pointed out, when a society as members of a social group value certain things and do them in a certain way, they come to use their language in ways that reflect what they value and what they do (Wierzbicka, 1991; Goodenough, 1964). The use of language as the mirror of culture as a source of conceptualization ascribed in the cognitive map of a society as members of a social group is reflected in the forms and meanings of the linguistic phenomena they employ in such cultural texts as folksongs, folktales, and traditional expressions (Bustan, 2005).

Bearing the matters stated above in minds, in general, in this study we investigate the relationship of Manggarai language and Manggarai culture belonging to Manggarai society as the members of Manggarai ethnic group living in the land of Manggarai in the island of Flores, the province of East Nusa Tenggara, Indonesia (Bagul, 1997; Erb, 1999; Bustan, 2005; Bustan, 2006; Bustan, et al., 2017). As the relationship is so complex that the study focuses on the conceptualization of Manggarai society on social conflict in family realm with special reference to the forms and meanings of the linguistic phenomena they employ in the traditional expressions of Manggarai language along with its function as the mirror of Manggarai culture and the window of the world for Manggarai society. As the term family can be defined differently, the term family used in the study refers to extended family which is known as *wa'u* as a patrilineal-genealogic clan in Manggarai society (Verheijen, 1991; Erb, 1999; Bustan, 2005; Bustan, 2006).

We are interested in conducting the study for the reason that the forms and meanings of the linguistic phenomena Manggarai society employ in the traditional expressions of Manggarai language are specific to Manggarai culture designating the cultural conceptualization ascribed in their cognitive map on the nature and solution mechanism of social conflict in family realm. The meanings stored in the forms of the linguistic phenomena used in the traditional expressions reveal local wisdoms inherited from the ancestors of Manggarai society that function as the sources of reference for them in solving social conflict occurring in family realm. However, along with the dynamic of Manggarai society that changes their ways in viewing the world, they tend



to ignore the significances of the traditional expressions as the sources of reference for them in understanding dan solving the social conflicts in family realm. Many facts occurring in the last few decades show that they prefer to take formal legal channels through the judiciary institutions in solving the social conflicts in family realm even though they exactly know that they have to spend a lot of time and money.

### **OBJECTIVES**

In general, the objective of the study is to describe the cultural conceptualization relationship of Manggarai society on social conflict in family realm with special reference to its nature and solution mechanism, as reflected in the forms and meanings of the linguistic phenomena they employ in the traditional expressions of Manggarai language. In accordance with the scope of discussion, therefore, the specific objectives of the study are of twofold, that is (1) to describe the cultural conceptualization of Manggarai society on the nature of social conflict in family realm and (1) to describe the cultural conceptualization of Manggarai society on the solution mechanism of social conflict in family realm.

### **METHOD**

This is a descriptive study as it describes the cultural conceptualization of Manggarai society on the nature and solution mechanism of social conflict in family realm, as reflected in the forms and meanings of the linguistic phenomena they employ in the traditional expressions of Manggarai language. The study was based on two kinds of data involving primary and secondary data. In line with the ways of acquiring the data, the procedures of research done were field and library research. The field research was aimed at collecting the primary data in Manggarai region, especially in Ruteng as the main location of research. The methods of data collection were interview and focused-group discussion. The techniques of data collection were recording, elicitation, and note-taking. The sources of data were the members of the Manggarai society, especially those residing in Ruteng as the main location of research represented by five key informants selected on the basis of ideal criteria proposed by Sudikan (2001), Bungin (2007) and Afrizal (2014). The library research was aimed at collecting the secondary data. The method of data collection was documentary study. The kinds of documents used as the sources of reference were general documents (books) and special documents (articles, papers and research result) available both in the printed forms and in the electronic forms (Bungin, 2007). The collected data were then analyzed by using inductive method in the sense that the process and mechanism of analysis was started from the data to the concept or theory, that is the concept or theory (Sudikan, 2001), describing the cultural conceptualization of Manggarai society on social conflict in family realm in terms of its nature and solution mechanism.

### **FRAMEWORK**

This is viewed from cultural linguistics, one of the new theoretical perspectives in cognitive linguistics exploring the relationship of language, culture, and conceptualization belonging to society as members of a social group in viewing the world. Cultural linguistics is regarded as a new paradigm or model in cognitive linguistics as it draws on the combined resource of anthropological linguistics and cognitive linguistics (Palmer and Sharifian, 2007; Palmer, 1996) in providing an account of the communicative behavior of a society as the members of a social group (Malcolm, 2007). Added to this, in the perspective of cultural linguistics, language is explored through the prism of culture aimed at uncovering the conceptualization of its speakers in viewing the world (Goodenough, 1964). The aim is based on assumption that language in its use as the means of communication among members of a social group is a window into their minds or cognitions (Yu, 2007; Langacker, 1999; Whorf, 2001).

As every language has its own way in viewing the world, cultural linguistics is also defined as an approach to identifying the differences between languages which are due to the cultural differences (Occhi, 2007; Cassirer, 1987). As Humboldt argued, the diversity of languages is not the diversity of signs and sounds but the diversity of cultures (Miller, 1968). The conception comes closest to the theory of linguistic relativity proposed in the hypothesis of Sapir and Whorf that the varying cultural concepts and categories inherent in different languages affect the cognitive classification of the experienced world in such a way that speakers of different languages think and behave differently. Therefore, the basic principles that we should take into account are as follows: (a) we perceive the world in terms of categories and distinctions found in our native language and (b) what is found in our language may not be found in another language due to cultural differences (Sapir, 1949; Miller, 1968; Richards, et al., 1992; Palmer, 1996; Bilal and Erdogan, 2005; Cakir, 2006).

The basic concepts of cultural linguistics, as its definition implies, are language, culture, and conceptualization. As language can be defined differently, in the perspective of cultural linguistics, language is defined as a cultural activity and, at the same time, as an instrument for organizing other cultural domains. This is based on the fact that language is shaped not only by the special and general innate potentials of its speakers as human beings, but also by physical and sociocultural experiences in their contexts of living together as members of a

social group for years (Palmer and Sharifian, 2007). Similar to language, as culture may mean different things for different society (Kaplan and Manners, 1999), in the perspective of cultural linguistics, culture is defined as a source of conceptualization of experience (Palmer and Sharifian, 2007; Palmer, 1996; Wallace, 1981). In line with this, Foley (1997) defines culture as a cognitive map shared together by a society as members of a social group in viewing the world (Goodenough, 1964). Culture in this light serves as a display illustrating how they organize their ways of thinking about items, behaviors, and beliefs or events in cultural domain (Palmer and Sharifian, 2007; Palmer, 1996).

Along with the conception that cultural concepts are embedded in language, the relationship of both language and culture belonging to a society as members of social group is manifested in their conceptualization which refers to fundamental cognitive processes which naturally lead to the development of schemas, categories, metaphors, and scripts. The ways a society as members of a social group conceptualize their experiences in cultural domains are called cultural conceptualizations that, in terms of the contents stored, imply such cultural aspects as beliefs, norms, customs, traditions, and values. As cultural conceptualizations and language are two intrinsic aspects of cultural cognition, it is a truism that the cultural conceptualizations have conceptual existence and linguistic encoding. Language in this regard is defined as a central aspect of cultural cognition that functions as collective memory bank for cultural conceptualizations, past and present. This is because language is shaped by cultural conceptualizations that have prevailed at different stages in the story of it speakers and these different stages can leave their traces in current linguistic practices. Language in this light is also viewed as one of the primary mechanisms to store and communicate cultural conceptualizations (Palmer and Sharifian, 2007). In line with this, Sharifian (2007) propounded that language is a collective memory bank functioning as a fluid vehicle for the retransmission of the socioculturally embodied cultural conceptualizations shared by a society as members of a social group.

As cultural conceptualization is the result of interaction between members of a culture through continuous process of negotiation and renegotiation through time, space, and even across generations, language functions as a means for communicating and embodying cultural conceptualization because language serves as the vehicle for expressing the cultural identity of a society as members of a social group. The cultural conceptualizations distributed across the minds of a society that represent their cognition at the cultural level are called linguistic imagery. The linguistic imagery is not related to how they speak about objective reality, but it deals with how they speak about the world that they themselves imagine. Nevertheless, the linguistic imagery can be examined from the physical forms of language used considered along with the situational context of speech event and the sociocultural context of the speakers of that language (Palmer, 1996; Palmer and Sharifian, 2007; Sharifian, 2007).

## FINDINGS AND DISCUSSION

### Findings

The results of study show that there is a close relationship between Manggarai language and Manggarai culture belonging to Manggarai society. The manifestation of such relationship can be seen in the cultural conceptualization of Manggarai society on the nature and solution mechanism of social conflict occurring in family realm, especially in their contexts of living together as members of the *wa'u* as a patrilineal-genealogic clan. Along with the function of Manggarai language as the mirror of Manggarai culture, their cultural conceptualization on the nature and solution mechanism of social conflict in family realm is reflected in the features, that is pairing of forms and meanings, of Manggarai language they employ in the traditional expressions inherited from their ancestors. The forms and meanings of the linguistic phenomena they employ in the traditional expressions are specific to Manggarai culture designating the cultural conceptualization ascribed in their cognitive map on the nature and solution mechanism of social conflict in family realm, especially in their contexts of living together as the members of the *wa'u* as a patrilineal-genealogic clan.

## DISCUSSION

Referring to the findings provided above, this part discusses in more depth the cultural conceptualization of Manggarai society on the nature and solution mechanism of social conflict in family realm, as reflected in the forms and meanings of the linguistic phenomena used in the traditional expressions of Manggarai language along with its function as the mirror of Manggarai culture and the window of the world for Manggarai society as members of Manggarai ethnic group.

### Nature of social conflict in family realm

The cultural conceptualization of Manggarai society on the nature of social conflict in family realm is reflected in the traditional expression, *rintuk tau lewing agu kebor* 'mutual collision of pot and food scoop made from coconut shell' in Manggarai language. As can be seen in the physical forms of the linguistic phenomena used,

the traditional expression appears as a nominal phrase made up of two nominal phrases as its component parts involving *rintuk tau* 'mutual collision' and *lewing agu kebor* 'pot and food scoop'. The component parts of the nominal phrase *rintuk tau* 'mutual collision' are the word (noun) *rintuk* 'collision' as the head or core word and the word (adjective) *tau* 'mutual' as its modifier or attribute. The component parts of the nominal phrase *lewing agu kebor* 'pot and food scoop' are the word (noun) *lewing* 'pot' and the word (noun) *kebor* 'food scoop' linked by the word (function word) *agu* 'and' as the coordinative conjunction constructing a polysyndeton structure.

The traditional expression appears as a nominal metaphor using household furnitures, namely *lewing* 'pot' and *kebor* 'food scoop', as the symbolic materials of indirect comparison in describing the close relationship of kinship in family realm in Manggarai society. As conceptualized in the cognitive map or cultural knowledge of Manggarai society, the two household furnitures, that is *lewing* 'pot' and *kebor* 'food scoop', are used as the symbolic materials of indirect comparison because, in the past, the members of the *wa'u* as a patrilineal-genealogic clan lived together in the same house, used the same furnace, cooked food using the same pot, and ate together using the same food scoop. As they come from one main house as their origin house, the *wa'u* as a patrilineal-genealogic clan is also understood as a house based-community. It is worth noting that the term house here refers to the traditional house of Manggarai society which is known as *mbaru gendang* 'drum house' in Manggarai language. The house is called *mbaru gendang* 'drum house' because in the house is stored a set of drums that are believed by them as the sacred drums representing the self-images of the ancestors as the originators of the *wa'u* as a patrilineal-genealogic clan who owns the traditional house.

Along with the contents stored in the physical forms of the linguistic phenomena used, the traditional expression of Manggarai language, *rintuk tau lewing agu kebor*, implies meaning that, in the cultural conceptualization of Manggarai society, the nature of social conflict in family realm is an internal problem in a household. This is because the social conflict occurs between siblings who come from the same father's blood as the members of the *wa'u* as a patrilineal-genealogic clan. As such, there is no need to involve other parties or external parties to solve the social conflict occurring in their family realm. Moreover, they have their solution mechanism inherited from their ancestors towards the social conflict occurring in family realm.

#### **Solution mechanism of social conflict in family realm**

Realizing that the nature of social conflict occurring in family realm is an internal problem in a household, the mechanism of solution is carried out through win-win solution approach which is known as *hambor* in Manggarai language. The aim of implementing the win-win approach is of twofold, that is to keep peaceful situation between the two parties involved in the social conflict and to maintain social harmony in their contexts of living together as members of the *wa'u* as a patrilineal-genealogic. As its name implies, in the win-win solution approach (*hambor*), neither party is declared wrong, or in other words, the two parties involved in the social conflict are declared right. As conceptualized in the cultural knowledge of Manggarai society, the party who is declared wrong is *tu'a wa'u* as the clan chief or clan leader because he is negligent in doing precautions so that the social conflict in family realm does not occur. The mechanism of solution approach is known *anggom* in Manggarai language as the *tu'a wa'u* as the clan chief or clan leader is declared wrong while the two parties involved in the social conflict are declared right.

The implementation of the *anggom*, as mentioned earlier, is aimed at keeping peaceful situation between the two parties involved in the social conflict and maintaining social harmony in their context of living together as the members of the *wa'u* as a patrilineal-genealogic. The aim is reflected in the traditional expression, *Anggom pele awo, ambet pele sale* 'Embrace those are in the east, embrace those are in the west' in Manggarai language. This traditional expression is the basic principle that should be taken into account by the *tu'a wa'u* as the clan chief or clan leader in solving the social conflict occurring in family realm so that the members of the *wa'u* as a patrilineal clan always live in unity for good in accordance with the expectations of their ancestors.

As the two parties involved in the social conflict are of the same *wa'u* as a patrilineal-genealogic, it is not surprising that the *tu'a wa'u* as clan chief or clan leader is difficult to determine which party is declared right and which party is declared wrong, as reflected in the traditional expression of Manggarai language, *Paki cala wa'i, tuku cala tu'us* 'Cut off the legs, cut off the knees'. As can be seen in the physical forms of the linguistic phenomena used, the traditional expression is a compound sentence made up of two independent clauses or complete sentences as its component parts. The two independent clauses or complete sentences as its component parts are *Paki cala wa'i* 'Cut off the legs' and *Tuku cala tu'us* 'Cut off the knees'. The forms of the linguistic phenomena used imply meaning that the members of the *wa'u* as a patrilineal-genealogic clan are likened to the organs of a human body who are related to one another. The two parties involved in the social conflict are likened as *wa'i* 'legs' and *tu'us* 'knees', while the clan chief is likened as *ulu* 'head' who is in charge of leading the whole members of the *wa'u* as a patrilineal-genealogic clan. Being aware of his obligation

and responsibility as the clan chief, as has been mentioned earlier, he is declared wrong because he is negligent in doing precautions so that the social conflict in family realm does not occur. The use of win-win approach as the solution mechanism of social conflict occurring in family realm is aimed at maintaining a sense of unity and social harmony in their contexts of living together as the members of the *wa'u* as a patrilineal-genealogic clan.

According to the habits that have been applied traditionally since the ancestors of Manggarai society, the mechanism of solution is carried out through a sit-down event known as *lonto leok* 'a circular seated formation' in the traditional house known as *mbaru gendang* 'drum house' as the origin house of the *wa'u* as a patrilineal-genealogic clan (Erb, 1999). The ways of solving the social conflict in family realm through the *lonto leok* are reflected in such traditional expressions as *Padir wa'i, rentu sa'i* 'Stick out feet, gather heads' and *Nai ca anggit, tuka ca leleng* 'Hearts bound one, stomachs bound one'.

As can be seen in the physical forms of the linguistic phenomena used, the traditional expression, *Padir wa'i, rentu sa'i* 'Stick out feet, gather heads', is a compound sentence made up of two independent clauses or complete sentences as its component parts involving *Padir wa'i* 'Stick out feet' and *Rentu sa'i* 'Gather heads'. The combination of the two independent clauses or complete sentences constructs an asyndeton structure as it is not linked by coordinating conjunction *agu* 'and'. The component parts making up the independent clause or complete sentence, *Padir wa'i* 'Stick out feet', are the word (verb) *padir* 'stick out' as the predicate and the word (noun) *wa'i* 'feet' as the subject. The component parts making up the independent clause or complete sentence, *Rentu sa'i* 'Gather heads', are the word (verb) *rentu* 'gather' as the predicate and the word (noun) *sa'i* 'heads' as the subject.

As can be seen in the physical forms of the linguistic phenomena used, the traditional expression, *Nai ca anggit, tuka ca leleng* 'Hearts bound one, stomachs bound one', is a compound sentence made up of two independent clauses or complete sentences as its component parts involving *Nai ca anggit* 'Hearts bound one' and *Tuka ca leleng* 'Hearts 'Stomachs bound one'. The combination of the two independent clauses or complete sentences constructs an asyndeton structure as it is not linked by the coordinating conjunction *agu* 'and' as a lexical cohesion device. The component parts making up the independent clause or complete sentence, *Nai ca anggit* 'Hearts bound one', are the word (noun) *nai* 'hearts' as the subject and the word (verbal phrase) *ca anggit* 'bound one' as the predicate. The component parts making up the independent clause or complete sentence, *Tuka ca leleng* 'Hearts 'Stomachs bound one', are the word (noun) *tuka* 'stomachs' as the subject and the word (verbal noun) *ca leleng* 'bound one' as the predicate.

The traditional expressions imply meanings that, if they are involved in social conflicts in family realm, they have to sit together in the circular seated formation in *mbaru gendang* 'drum house' as the traditional house of Manggarai society. The aim of sitting together in the formation of the *lonto leok* is to maintain their senses of togetherness as brothers who come from the same descents, have the same blood line, and share the same origin structure. The traditional expression is one of the cultural texts of ancestor heritages containing local wisdom that functions as moral and ethical guideline for Manggarai society in solving the social conflicts occurring in family realm, especially in their contexts of living together as the members of the *wa'u* as a patrilineal-genealogic clan.

## CONCLUSION

Both Manggarai language and Manggarai culture are closely related and the relationship is manifested in the cultural conceptualization of Manggarai society on the nature and solution mechanism of social conflict in family realm, as reflected in the forms and meanings of the linguistic phenomena used in the traditional expressions of Manggarai language. In the cultural conceptualization of Manggarai society, the social conflict occurring in family realm is defined as the internal problem in the household and, as such, there is no need to involve external parties to solve it. The approach used as the solution mechanism is win-win solution as both parties involved in the social conflict are declared right, while the clan chief and clan leader is declared wrong because he is negligent in doing precautions so that the social conflict in family realm does not occur. As the two parties involved in the social conflict are of the same *wa'u* as a patrilineal-genealogic, the clan chief or clan leader is difficult to determine which party is declared right or wrong. The win-win approach is implemented through the a circular seated formation in the traditional house in favor of keeping peaceful life and maintaining social harmony in their context of living together as the members the *wa'u* as a patrilineal-genealogic clan. Theoretically, the result of the study is beneficial to contribute the significance of cultural linguistics as a new paradigm in cognitive linguistics. Practically, the result of the study is beneficial for preserving the local wisdoms of Manggarai society to stay alive and develop in the present and in the future.

## REFERENCES

- Afrizal. (2014). METODE PENELITIAN KUALITATIF: SEBUAH UPAYA MENDUKUNG PENGGUNAAN PENELITIAN KUALITATIF DALAM BERBAGAI DISIPLIN ILMU. Jakarta: Raja Grafindo Persada.
- Bagul, A. B. (1997). KEBUDAYAAN MANGGARAI SEBAGAI SALAH SATU KHASANAH KEBUDAYAAN NASIONAL. Surabaya: Ubhara Press.
- Bilal, G. and Bada, E. (2005). "Culture in language learning and teaching". THE READING MATRIX. Vol. 5, No. 1, April 2005.
- Brown, H. D. (1994). PRINCIPLES OF LANGUAGE LEARNING AND TEACHING. The USA: Prentice Hall Regents.
- Bungin, B. (2007). PENELITIAN KUALITATIF: KOMUNIKASI, EKONOMI, KEBIJAKAN PUBLIK DAN ILMU SOSIAL LAINNYA. Jakarta: Prenada Media.
- Bustan, F. (2005). "Wacana budaya *tudak* dalam ritual *penti* pada kelompok etnik Manggarai di Flores Barat: sebuah kajian linguistik budaya". DISERTASI. Denpasar: Program Doktor (S3) Linguistik Universitas Udayana.
- Bustan, F. (2006). ETNOGRAFI BUDAYA MANGGARAI SELAYANG PANDANG. Kupang: Publikasi Khusus LSM Agricola Kupang.
- Bustan, F., Semiun, A. and Bire, J. (2017). THE FEATURES OF ANTHROPOMORPHIC METAPHOR IN THE MANGGARAI LANGUAGE. Balti: LAP LAMBERT Academic Publishing.
- Cakir. I. (2006). "Developing cultural awareness in foreign language teaching". TURKISH ONLINE JOURNAL OF DISTANCE EDUCATION – TODJE. July, 2006, Volume: 7 Number: 3
- Cassirer, E. (1987). MANUSIA DAN KEBUDAYAAN: SEBUAH ESAI TENTANG MANUSIA. Diterjemahkan oleh Alois A. Nugroho. Jakarta: Gramedia.
- Casson, R. W. (1981). LANGUAGE, CULTURE AND COGNITION: ANTHROPOLOGICAL PERSPECTIVES. New York: Macmillan.
- Erb, M. (1999). THE MANGGARAIANS: A GUIDE TO TRADITIONAL LIFESTYLES. Singapore: Times Editions.
- Faisal, S. (1990). PENELITIAN KUALITATIF: DASAR-DASAR DAN APLIKASI. Malang: Yayasan Asih Asah Asuh (YA3).
- Foley, W. A. (1997). ANTHROPOLOGICAL LINGUISTICS: AN INTRODUCTION. Oxford: Blackwell.
- Geertz, C. (1973). THE INTERPRETATION OF CULTURE: SELECTED ESSAYS. New York: Basic Books
- Goodenough, W. H. (1964). "Cultural anthropology and linguistics. In LANGUAGE IN CULTURE AND SOCIETY: A READER IN LINGUISTICS AND ANTHROPOLOGY. New York: Harper & Row.
- Hasan, R. (1989). LINGUISTICS, LANGUAGE AND VERBAL ART. Victoria: Deakin University.
- Kaplan, D., dan Manners, A. A. (1999). TEORI BUDAYA. Diterjemahkan oleh L. Simatupang. Yogyakarta: Pusat Pelajar.
- Keesing, R. M. (1981). "Theories of culture." In LANGUAGE, CULTURE AND COGNITION: ANTHROPOLOGICAL PERSPECTIVES. Edited by Ronald W. Casson. New York: Macmilan.
- Koentjaraningrat. (2004). KEBUDAYAAN, MENTALITAS DAN PEMBANGUNAN. Jakarta: Gramedia.
- Kramsch, K. (2001). LANGUAGE AND CULTURE. Oxford: Oxford University Press.
- Langacker, R. (1999). "Assessing the cognitive linguistic enterprise". In *Cognitive Linguistics: Foundation, Scope and Methodology*. Edited by Janssen and G. Redeker. Berlin/New York: Mouton de Gruyter.

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- Malcolm, G. I. (2007). "Cultural linguistics and bidialectal education". In *APPLIED CULTURAL LINGUISTICS*. Edited by Farzad Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
  - Miller, R. L. (1968). *THE LINGUISTIC RELATIVITY PRINCIPLE AND HUMBOLDTIAN ETHNOLINGUISTICS: A HISTORY AND APPRAISAL*. Paris: The Hague
  - Muhadjir, N. (1995). *METODOLOGI PENELITIAN KUALITATIF: TELAAH POSITIVISTIK, RASIONALISTIK, PHENOMENOLOGIK, REALISME METAPHISIK*. Yogyakarta: Rake Sarasin.
  - Occi, D. J. (2007). "Using cultural linguistics to teach English language inferential schemas used in archeology to Japanese university students." In *APPLIED CULTURAL LINGUISTICS*. Edited by Farzad Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
  - Ochs, E. (1988). *CULTURE AND LANGUAGE DEVELOPMENT: LANGUAGE ACQUISITION AND LANGUAGE SOCIALIZATION IN SAMOAN LANGUAGE*. Cambridge: Cambridge University Press.
  - Palmer, G. B. (1996). *TOWARDS A THEORY OF CULTURAL LINGUISTICS*. Austin: The University of Texas Press.
  - Palmer, G. B., and Sharifian, F. (2007). "Applied cultural linguistics: an emerging paradigm." In *APPLIED CULTURAL LINGUISTICS*. Edited by Farzad Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
  - Richards, J. C., Platt, J., and Platt, H. (1992). *DICTIONARY OF LANGUAGE TEACHING & APPLIED LINGUISTICS*. Essex: Longman.
  - Sapir, E. (1949). *SELECTED WRITINGS IN LANGUAGE, CULTURE AND PERSONALITY*. D. Mandelbaum (ed.). Berkeley CA: University of California Press.
  - Sharifian, F. (2007). "L1 cultural conceptualization in L2 learning: the case of Persian-speaking learners of English". In *APPLIED CULTURAL LINGUISTICS*. Edited by Farzad Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
  - Stross, B. (1981). "Language, culture and cognition." In *LANGUAGE, CULTURE AND COGNITION: ANTHROPOLOGICAL PERSPECTIVES*. Edited by Ronald W. Casson. New York: Macmilan.
  - Sudikan, S. Y. (2001). *METODE PENELITIAN KEBUDAYAAN*. Surabaya: Unesa Unipress bekerjasama dengan Citra Wacana.
  - Suriasumantri, J. S. (2001). *FILSAFAT ILMU: SEBUAH PENGANTAR POPULER*. Jakarta: Pustaka Sinar Harapan.
  - Wallace, A. F. C. (1981). "Culture and cognition." Dalam *LANGUAGE, CULTURE, AND COGNITION: ANTHROPOLOGICAL PERSPECTIVES*. Edited by Ronald W. Casson. New York: Macmilan.
  - Wardaugh, R. (2011). *AN INTRODUCTION TO SOCIOLINGUISTICS*. New Jersey, United States: Wiley-Blackwell.
  - Whorf, B. L. (2001). "The relationship of habitual thought and behavior to language". In *LINGUISTIC ANTHROPOLOGY: A READER*. Edited by Alessandro Duranti. Massachusetts: Blackwell Publishers.
  - Wierzbicka, A. (1991). *CROSS-CULTURAL PRAGMATICS: THE SEMANTICS OF HUMAN INTERACTION*. New York: Mouton de Gruyter.
  - Verheijen, A. J. (1991). *MANGGARAI DAN WUJUD TERTINGGI*. Diterjemahkan oleh Alex Beding dan Marsel Beding. Jakarta: LIPI-RUL.
  - Yu, N. (2007). "The Chinese conceptualization of the heart and its cultural context: implications for second language learning". In *APPLIED CULTURAL LINGUISTICS*. Edited by Farzad Sharifian and Gary B. Palmer. Amsterdam: John Benjamin.
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**THE IMPACT OF COVID-19 ON PILGRIMAGES TOURISM IN VELLORE DISTRICT  
TAMILNADU DURING THE PANDEMIC PERIOD: AN EMPIRICAL STUDY**

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**Vidhya K and Dr. V. Selvam****ABSTRACT**

*During the pandemic of the Coronavirus, the pilgrims were unable to make their pilgrimages. Places with more temples remain without pilgrims. Five different temples, such as Sripuram Golden Temple, Jalakandeswarar Temple and Rathinagiri Balamurugan, have been empirically studied. There have also been collected data on tourism and pilgrimage. During the first six months of the pandemic, religious tourism and temple pilgrimage fell by 85-95 per cent. The temples in the Vellore district were closed for a couple of months at the time of the pandemic. The pandemic affects pilgrimage, so the number of pilgrims has decreased in the last fifty years. There have been further changes in the reasons for expeditions to the chosen temples. Temple Custodians and pilgrimage organisers ensure the safety of pilgrims and the temple itself. The temples of Vellore have encouraged pilgrims through online prayer services, spiritual pilgrimages and virtual pilgrimages to strengthen their link with the temples, which shows how pilgrimages and religious tourism developed.*

*Keywords: Empirical Study, Pilgrimages Tourism, Covid-19, impact, Vellore District.*

**1. INTRODUCTION**

Tourism is essential for the economic growth of many countries and is one of the biggest employers in the world (Chang et al., 2020). Tourism is one of the country's largest and fast-growing services industries and has significant socio-economic, cultural and environmental effects. India has a rich cultural heritage, ancient monuments, famous temples, masterpieces of architecture, the sanctuary of wild animals and scenic spots, and the country attracts tourism both internationally and nationally. Tamil Nadu is especially the world's pilgrimage paradise. The world-famous Hindu shrines attract millions of tourists from both within and outside the country. State pilgrimage tourism generates socio-economic benefits such as national integration, international understanding, direct and indirect job creation, foreign exchange, local development, national unity, and promotion of our culture at the national and international level (Kavitha et al., 2019)—one of the world's fastest-growing industries in the tourism industry. For many countries, tourism is the primary source of wealth. Tourism is also a significant contributor to India's economic growth. It has a unique environmental, economic, and sociocultural impact on this country (Prabhu et al., 2020). Religious tourism is considered one of the earliest forms of tourism, a critical sector in travel and tourism (Zamani et al., 2016). According to the literature, the religious journey has its origins in the evolution of religion (Ayorekire et al., 2020). One of the most effective forms of development on the planet is religious tourism. According to statistics from the world tourism organisation, approximately 330 million people visit major pilgrimage centres worldwide each year on spiritual, religious, and cognitive tours (Griffin et al., 2017). Religious tourism is motivated by an interactive and decision-making synthesis of cultural, traditional and spiritual values (Ayorekire et al., 2020). The desire to absorb new ideas and to create spiritual memories motivates tourists and religious aspirations (Griffin et al., 2007).

**2. REVIEW OF LITERATURE**

Concerning the economic, social, food, employment and religious consequences of COVID-19, the religious tourism sector is devastating. There stopped mass meetings and pilgrimages. We live at a time of most significant concern for religious tourism by governments worldwide (Raj et al., 2020). In response to the pandemic of Coronavirus, religious tourism and pillars around the world shifted dramatically: thousands were closed, and religious leaders urged their followers to abstain from pilgrimages and spiritual journeys that threaten their safety or that of others (Faris et al., 2020). India was the world's third-largest contributor on 7 August 2020 to COVID-19 cases. In mitigating COVID-19 evacuations caused by mouse plants, as well as returning migrants from India, and international returns, India also faces considerable challenges (www.mohfw.gov.in). The majority of the world's population is severely affected by COVID-19 and is locked.

Business activities are suspended in most countries to stop and minimise contamination and unprecedented suspension of air transport services. By April 2020, the travel restrictions due to the Coronavirus were implemented by 96 per cent of global destinations. COVID-19 is more infectious than any previous disease (Bai et al., 2020 and Rothe et al., 2020). The tourism industry is perhaps the world economy's largest division nowadays of around 9 per cent of the world's GDP and has generally added about 200 million jobs. The six hundred million who travel in India annually attract only 2.4 million visitors. Indian tourists would see 10 million each year, representing just 4% of international travel. In the case of religious tourism, pilgrimage as



tourism is very republican in India. Pilgrims visit mostly cultural events such as fine art, dance festivals, regional festivals or participate in them. Because of the active COVID-19 globally, every pilgrimage site has shut down due to this crisis, and the risk of tourism is high, and the economic situation is serious (Vidhya et al., 2021). The leaders of major faiths and congregations called their followers during the first pandemic week to maintain a distance from society, help those in need, avoid homes and participate in prayers and services. Numerous religious and cultural events got cancel within the shrines. It is a one-of-a-kind event following the war; nothing else, except the COVID 19 pandemic, has impacted tourism, including religious tourism and pilgrimages. This paper presents the findings of the SARS-Cov-2 pandemic on tourism and religious pilgrimages conducted in selected Hindu wilderness centres in Vellore District for seven months of research (January to July 2020).

The first signs of pilgrim reactivation at the analysed centres were observed in mid-January and are similar to an 'opening' report for Sripuram Golden Temple, Jalakandeswarar Temple, and Rathinagiri Balamurugan Temple. The information is concise. A significant research problem is an extent to which the COVID-19 pandemic has affected the pilgrimage area and the management of thousands of sacred sites worldwide. The unfortunate rapid advance of the COVID-19 pandemic in December 2020 is another important reason. The number of cases of Coronavirus diagnosed in a total global number of cases was unfortunately recorded in individual countries worldwide since the beginning of December 2020. This day exceeded 560,000 on 31 October 2020. Today's research results indicate that numerous research has taken into the impact of the COVID-19 pandemic on pilgrimages and religious tourism in the months of 2020 and 2021.

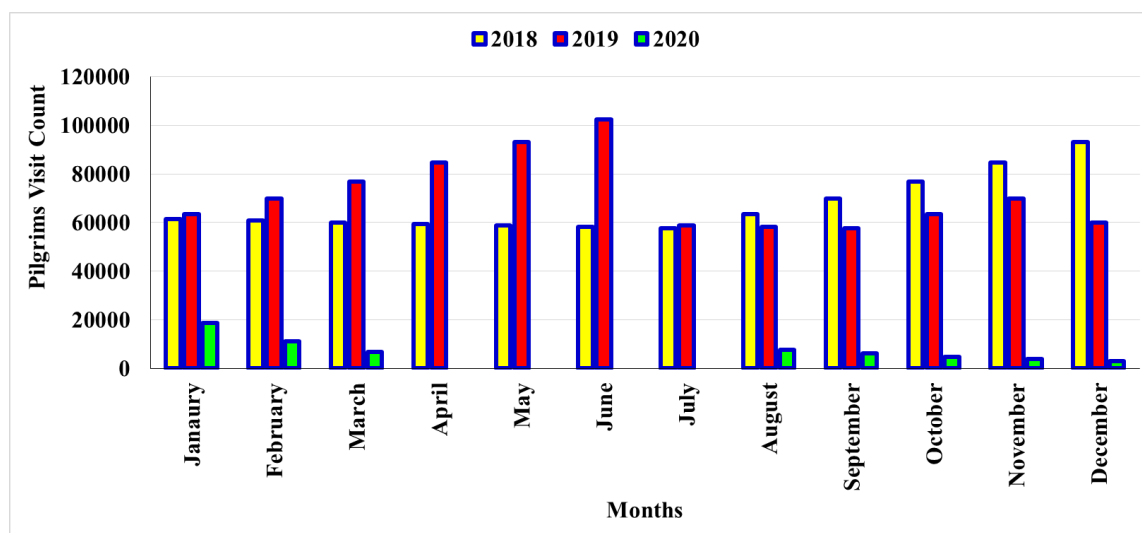
### **3. METHODOLOGY**

The empiric analysis encompasses the significant temples of the district of Vellore: the Sripuram Golden Temple, the Jalakandeswarar Temple and the Rathinagiri Balamurugan Temple. The most prominent and well-known pilgrimage sites in the Tamilnadu country are Sripuram Golden Temple, Jalakandeswarar Temple and Rathinagiri Balamurugan Temple. Every year, around one million people visit the above three temples before the COVID-19 pandemic. Every year, pilgrims or tourists from over five countries throughout the Indian country visit these places. During the first six months of the SARs-Cov-2 coronavirus pandemic (in which the author is most interested), detailed data on pilgrims have retrieved from the Tamilnadu Pilgrims' Office at the State Tourism Website and the Sripuram Golden Temple, Jalakandeswarar Temple, and Rathinagiri Balamurugan Temple, respectively. The statistical material collected was structured and systematised. The research results present the comparative method, descriptions, and analytical methods. For quantitative data processing, cartographic methods of presentation and graphic presentation methods used in this research framework, interviews made with custodians and workers of temples and pilgrims. The Sripuram Golden Temple and Jalakandeswarar Temple interviewed pilgrims. In the research field, namely in the Golden Temple of Sripuram, in the Temple of Jalakandeswar and the templed Balamurugan of Rathinagiri. An explanatory model was presented for pilgrimages and religious tourism in the Vellore area during the COVID 19 pandemic.

### **4. EMPIRICAL STUDY RESULTS**

#### **3.1 Pilgrimages visits the Sripuram golden temple during the first six months of the SARS-CoV-2 Pandemic**

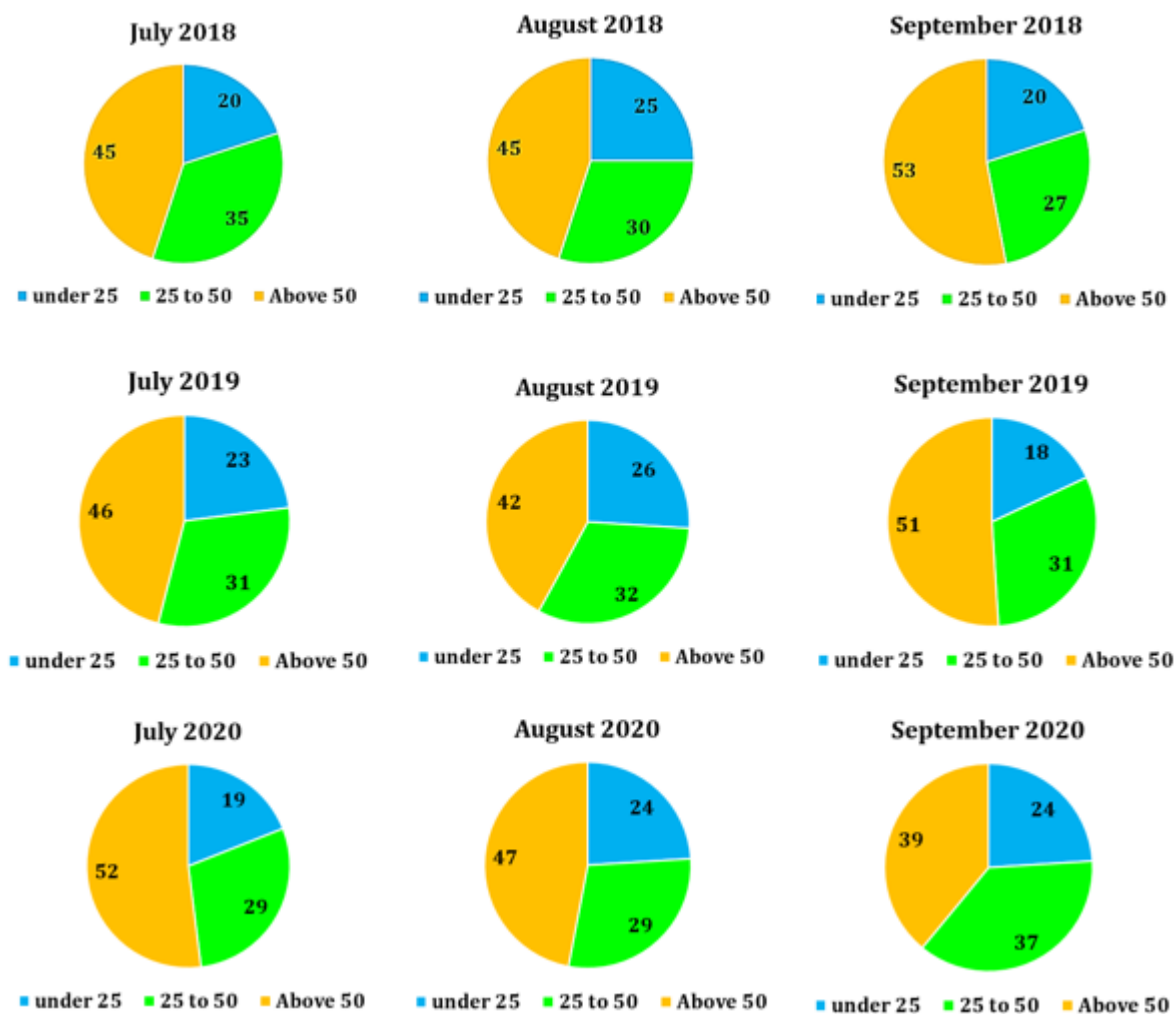
Sripuram, a spiritual oasis and an architectonic wonder, is the Golden Temple. Sripuram has organic, varied flora and fauna in the breathtaking landscape, creating a serene atmosphere and a natural ecosystem. In a luxuriant green countryside of 100 hectares in the centre of an altar-shaped trail, the Golden Temple absorbs the most incredible amount of energy from the environment, which gives enormous peace and relaxation to those who follow the star path. The Sri Lakshmi Narayani Golden Temple is the world's largest Golden Temple, and it is one of the most visited sacred shrines globally. More than 1,5 tonnes of gold in 15 layers were mounted on hand-held copper plates to build a traditionally Vedic temple architecture. In a short span of SEVEN years, Sripuram's golden temple make. It opened on 24 August 2007. Hundreds of thousands have come to the temple; often, it violates the 1 lakh mark on special occasions. The temple has changed the face of the village of Thirumalaikodi and the neighbouring town of Vellore. Sripuram is well known as the 'Spiritual Oasis,' drawing people from all walks of life worldwide to create peace and joy (<https://sripuram.org>).



**Figure 1. The number of pilgrim's visits recorded at Sripuram Golden Temple, Jalakandeswarar Temple, and Rathinagiri Balamurugan Temple from January to December 2018, 2019 and 2020. Source: Own study based on data made available by Temple Office.**

More than 50 Lakh pilgrims visited The Sripuram Golden Temple every year (before outbreaks of the pandemic of COVID-19) (56 lakhs in 2018 and 60 lakhs in 2019).

From April to June 2020, following the outbreak of the COVID-19 pandemic, the Sripuram Golden Temple was almost completely deserted. The figure shows how many pilgrims visit Sripuram Golden Temple, Jalakandeswarar Temple, Rathinagiri Balamurugan Temple from January to December 2018, 2019 and 2020. Figure 1 indicated that the number of pilgrims visiting the three various temples in 2019 was higher than in 2018. The first six months of the pandemic period are at zero due to the outbreak of the COVID-19. Pilgrims are at zero. However, it stresses that even during the most strict restrictions, the temple was not closed. Though the pilgrimage phenomenon sustains, the number of participants was considerably smaller. In March, April and May 2020, People of different ages have stopped their pilgrimage. Detailed statistics, particularly concerning expeditions of Sripuram Golden Temple, were not kept due to the restrictions imposed. Sripuram Golden Temple recorded 60 lakh pilgrimages in 2019. The Sripuram Golden Temple recorded approximately 50,000 expeditions during the 2020 COVID pilgrimage season. The majority of these pilgrimages were limited in size, with no more than 100 pilgrims permitted by temple officials (later to 200). Pilgrimages were organised by a system of relays or in groups with representatives of priests or guides. Very limited to the number of pilgrims allowed. Additionally, it noted that a significantly greater number of pilgrims participated in spiritual pilgrimages (than before the outbreak of the COVID-19 pandemic) and that some of them entered the Sripuram golden temple to complete their pilgrimage. Certain pilgrimages were age-restricted; only pilgrims between the ages of 18 and 60 were allowed to embark. The primary goal of pilgrimage organisers was to maintain safety; therefore, implement some rules: distance retention, mask use, temperature measurement, and disinfectant use. The figure illustrates the age-sensitive percentage of pilgrim visits recorded at the golden Sripuram temple from July, August and September between 2018 and 2020. 2. The figure has shown. 2, more pilgrims over the age of 50 visited Sripuram temple and visited Sripuram Golden Temple, pilgrims between 25-50. Pilgrims under the age of 25 ranked in the third category. In 2021, all the temples shut down for six months due to the outbreak of the second wave of COVID-19.



**Figure 2.** The age-wise percentage of pilgrim's visits was recorded at Sripuram golden temple in July, August, and September from 2018 to 2020. Source: Own study based on data made available by temple office.

### 3.2 During the first six months of the SARSCoV2 pandemic, pilgrimages visited the Jalakandeswarar Temple

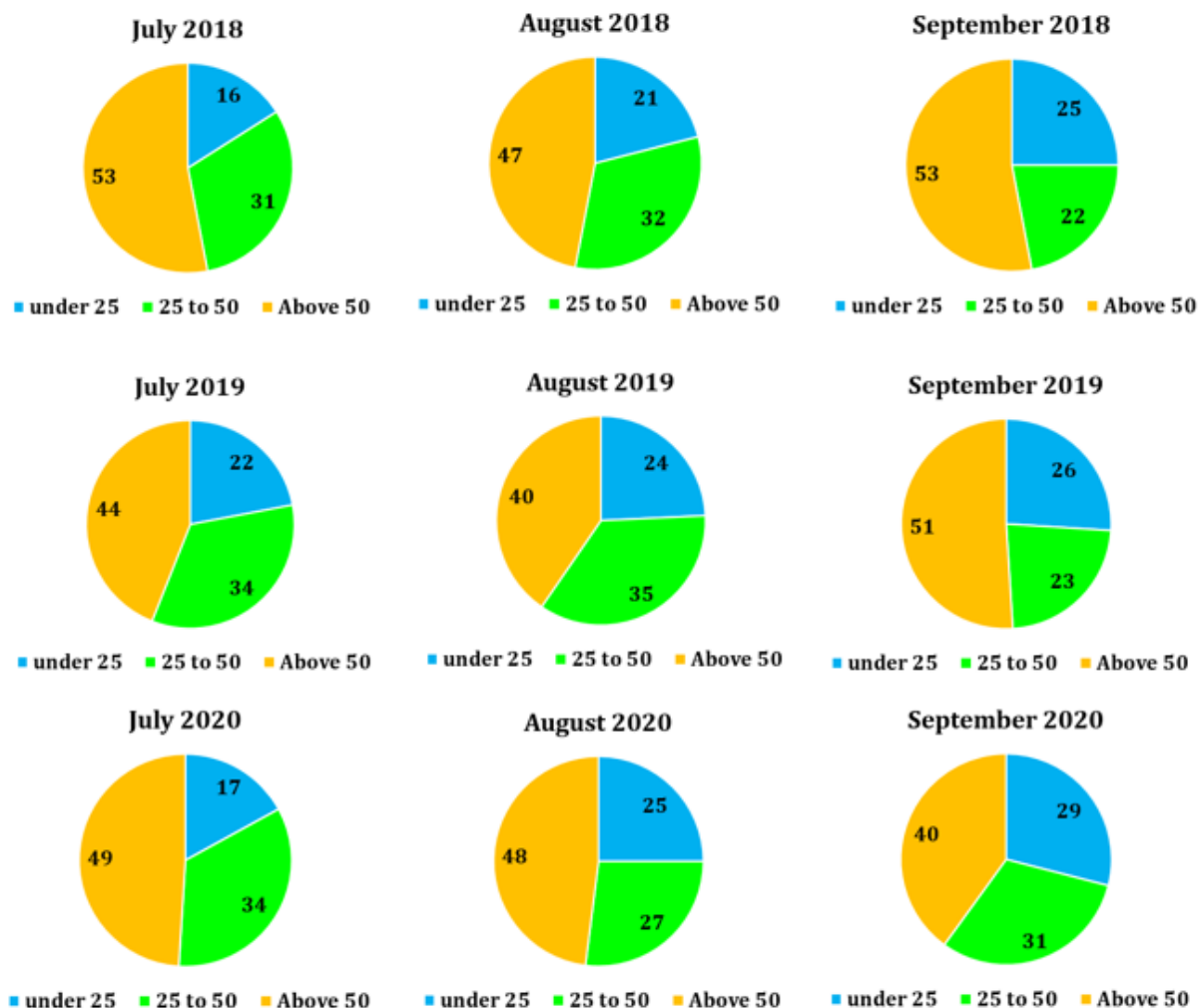
Jalakandeswarar is a rich heritage with a legendary temple. Situated in the heart of the Tamil Nadu Vellore fort, the church has rich structures and is the home of highly sculptured stone pillars, sculptures, buildings and more. The temple of Jalakandeswarar is well known and kept under the archaeological survey of India. A legendary storey supported by the temple said that a gigantic hill was once in the sanctuary. The temple was built in 1550, then known as Jalakandeswarar, as it is called in all parts of Tamil and surrounded by water. The temple richly constructed stone pillars, wooden doors, sculptures. The whole temple has supported by pillars of dragons and the statue of lions, etc. The temple is part of the Indian Archeological Survey (<https://www.gosahin.com>), which monitors and keeps the temple premises. Based on research carried out in the Jalakandeswarar Temple, it concluded that pilgrimages to Jalakandeswarar Temple decreased by more than 85% during the first six months of the pandemic. However, it emphasised that even under the most severe restrictions imposed by the Indian government, the Jalakandeswarar temple remained open. It recalled that the Tamilnadu Government declared the state of epidemic risk on 7 March 2020, according to the Minister of Health's Regulation. The Tamilnadu government imposed strict restrictions on the movement of people on 20 March 2020 due to the Coronavirus. It is including prohibitions on the activity of more than two people except for occupational duties or meeting vital daily life-related needs; there were also restrictions on movement via public transport and on foot, and participation in religious celebrations was limited to five people. These restrictions extended to the sanctuary and pilgrimages to the Jalakandeswarar Temple. Following 20 March 2020, the festival's final weeks saw the most severe impact of the COVID 19 pandemic. The festival is held in the Jalakandeswarar Temple on the second Saturday of the anniversary and has a unique character and meaning in Maha Shivratri in Jalakandeswarar. In recent years, it has brought the Jalakandeswarar temple about 100 thousand pilgrims. Due to the pandemic, the Maha Shivratri celebrated without the crowds of Pilgrims in Jalakandeswarar Temple.

According to the guidelines of the temple officials, only a few people participated in the Maha Shivratri in the Temple of Jalakandeswarar.

Until the pandemic broke over, more than 12 lakhs visit Jalakandeswarar Temple from various states. In the Jalakandeswarar temple, the largest pilgrimages were unable to do. Pilgrimages to the temple of Jalakandeswarar revived after 15 May 2020. The pilgrimages were, however, definitely individualised in the June and the holiday months. In August and September, organised all pilgrimages in the temple of Jalakandeswarar, but pilgrims attended the temple. Figure 3 depicts the percentage of pilgrims over the age of 50 who visit Jalakandeswarar in July, August, and September from 2018 to 2020.

### 3.3 Pilgrimages visits the Rathinagiri Balamurugan Temple during the first six months of the SARS-CoV-2 Pandemic

Rathinagiri Balan Murugan Temple, built in the 14th century, was an ordinary sand structure transformed into a stone shrine over time. Ancient Hindu scriptures say Lord Murugan lives as the all-powerful Deity everywhere on a hill. The poet Arunagirintha from the 14th century sang in this temple, 'Murugan, the God of the Devas, lives in Rathinagiri' This is Rathinakiri Vazh Murukane Ilaya Varamaralar Perumal. (<http://ratnagiri.org>).



**Figure 3. The age-wise percentage of pilgrim's visits recorded at Jalakandeswarar and Balamurugan Temple in July, August and September from 2018 to 2020. Source: Own study based on data made available by temple office.**

There were approximately 2 Lakhs, including other countries, the most significant number to visitors and pilots at the Rathinagiri Bala Murugan temple in 2018. The temple has noted more than two lakhs of visitors every year during the last three years (2018–2020), of which approximately 50 000 were state pilots from over five countries. For the town's jubilee and individual sacred several religious events have been planned. The Rathinagiri Balamurugan Temple was the most visited in the last decade in January and February 2020. The temple was closed on 14 March 2020, according to a Tamilnadu State Ministry of Health decision. The government cancelled the various planned religious activities due to the COVID-19 pandemic. On 21 July 2020,

the temple reopened. Compared with similar months in 2018 and 2019, the number of temple visitors counted from 1 July 2020 is significantly lower (Fig.1). It is due to the COVID-19 pandemic with the limitations imposed on visits. Only 100 pilgrims per day were allowed by the temple from 1 April to 30 July 2020 and 250 from 1 August 2020. (only individual visits are possible). About 2500 pilgrims visited the temple only in August 2020. (in January 2019, the number was around 4000). In September and October (4000 pilgrims in September and 5000 pilgrims in August), the pilgrimage to the Balamurugan temple grew considerably, but it was often lower than the previous year. In October 2020, 5000 people (about 20 per cent of the number of visitors in September 2019) attended the temple of Bala Murugan. From July, August and September 2018 to 2020, the age-wise percentage of pilgrim visits to the Balamurugan temple is in figures. 3.

## **5. DISCUSSIONS**

This article discusses the impact of the pandemic COVID-19 on religion and religious tourism and wanderings to selected temples in the district of Vellore, Tamilnadu, India. In the COVID-19 era, this was the first such study that exclusively focused on pilgrimage centres in the Vellore district. The results are potentially vast and informative for future research during the first six months of the COVID- 19 pandemic. The first wave of SARS-Cov-2 coronavirus developments occurred between March and September 2020, taking into account the release date. One could therefore speculate that it is groundbreaking research in the pilgrimage area of the District of Vellore. The research results presented in this paper served as models for the pandemic of temples and pilgrimages in COVID-19 sites. Development is possible when certain conditions need: security assurance, support and cooperation, increased human capital and innovation, and business activities. In the absence of the pandemic reduction, the shrines will struggle to develop without the assistance of temples, regional and national administrations and the cooperation of temple guards and tour operators organising tourists-in-community pilgrimages. Templar guardians and hosts benefit significantly from sharing experiences and collaboration with temples in cities and cities. The UN World Tourism Organization emphasises the importance of human capital in developing global tourism. The development of temples and tourism in pilgrimage centres, too, will require increased human resources. Therefore, there should be a more significant stress on pilgrimages and tourism experts who are highly motivated and keen to develop their skills and exhibit business attitudes. To achieve their aims, temple officials and pilgrimage centre's staff need to demonstrate their ability, reliability, and courage in decision-making in an era of constant change. Innovations and extensions, research for new inspirations, solutions and projects, and their implementation, observation and drawing of relevant findings, or preventive actions during the following 19 years, are critical to the development of the shrines.

## **6. CONCLUSIONS AND FUTURE RESEARCH**

Research shows that the pilgrimage centres' activities have dramatic or even tragic repercussions on the global pandemic, restricted mobility, and the isolation of hundreds of million people, as illustrated in Lourdes' examples. There have been significant changes in the traditional pilgrimage movement. In the six months following the pandemic of COVID-19 in the district of Vellore, the number of pilgrimages to the three selected churches was probably reduced by 85-95 per cent: Sripuram Golden Temple, Jalakandeswarar Temple, and Rathinagiri Balamurugan Temple. There have been significant changes in the pilgrimage space of three chosen temples because of the number of visitors and pilgrims' wise age structures and reasons for pilgrimages into temples. During the first six months of the pandemic, many temples were shut down (between mid-January and June). We have not seen a scale comparable to this in modern times due to any other epidemic. It is an unfathomable occurrence, and no other phenomenon comes close. In the first wave of the pandemic COVID-19, pilgrimages and religious tourism were also positive aspects. Individual visits and pilgrimages are becoming more and more popular to local, regional and national pilgrimage centres. With the desire to go on pilgrimages and visit sacred places, people came close together to show solidarity with ill people, support their favourite shrines, and plan pilgrimages in the years after the end of COVID19.

Additionally, a fascinating research subject is the diaries of virtual expeditions during the pandemic. Sharing experience in organising and serving temple pilgrimages established closer cooperation was between temple guards. The economic effects for pilgrimages to pilgrimage centres are significant for developing SARS-Cov-2 Coronavirus. It is essential to take into account. Further research on the impact of the COVID-19 pandemic should include local pilgrimage centres.

## **REFERENCES**

1. Chang, C.L., McAleer, M., & Ramos, V. (2020) A charter for sustainable tourism after COVID-19. *Sustainability*, 12(9), 1-4.
2. Dr.R.Kavitha, A.Sugapriya, Hindu Pilgrimage Tourism in Tamil Nadu – A Conceptual

3. Outlook, The International Journal of Analytical and Experimental Modal Analysis, Volume XI, Issue XII, December/2019, 430-442.
4. J.Prabhu, K.Ravindran Impact of Pilgrimage Tourism with Respect to Meenakshi Amman Temple in Madurai, Journal of Xi'an University of Architecture & Technology, Volume XII, Issue IV, 2020, 1930-1934.
5. Zamani-Farahani, H. & Eid, R. (2016) Muslim world: A study of tourism & pilgrimage among OIC Member States. *Tourism Management Perspectives*, 19, 144-149.
6. Ayorekire, J., Obua, J., Mugizi, F., & Byaruhanga, B. M. (2020) Opportunities and challenges of religious tourism development in Uganda: policy, planning and institutional perspectives. *International Journal of Religious Tourism and Pilgrimage*, 8(3).
7. Griffin, K., & Raj, R. (2017). The importance of religious tourism and pilgrimage: Reflecting on definitions, motives and data. *International Journal of Religious Tourism and Pilgrimage*, 5, 152.
8. Raj, R., & Griffin, K. A. (2020). Reflecting on the impact of COVID-19 on religious tourism and pilgrimage. *International Journal of Religious Tourism and Pilgrimage*, 8(7).
9. Faris, H. M., & Griffin, K. A. (2020). The impact of COVID-19 on religious tourism and pilgrimage to the holy city of Karbala. *International Journal of Religious Tourism and Pilgrimage*, 8(7).
10. Government of India. COVID-19 State-wise status. Ministry of Health and Family Welfare, available from <https://www.mohfw.gov.in/>
11. Bai, Y., Yao, L., Wei, T., Tian, F., Jin, D.-Y., Chen, L., & Wang, M. (2020). Presumed asymptomatic carrier transmission of COVID-19. *JAMA*, 323(14), 1406.
12. Rothe, C., Schunk, M., Sothmann, P., Bretzel, G., Froeschl, G., Wallrauch, C., Zimmer, T., Thiel, V., Janke, C., Guggemos, W., Seilmaier, M., Drosten, C., Vollmar, P., Zwirgmaier, K., Zange, S., Wölfel, R., & Hoelscher, M. (2020). Transmission of 2019-nCoV Infection from an Asymptomatic Contact in Germany. *New England Journal of Medicine*, 382(10), 970–971.
13. K.Vidhya, Dr.V.Selvam, Hospitality and Sustainable Development Related to Pilgrims towards COVID-19: A Literature Review, *Annals of R.S.C.B.*, Vol. 25, Issue 5, 2021, Pages. 3786 – 3795.
14. <https://sripuram.org>.
15. <https://www.gosahin.com>.
16. <http://ratnagiri.org>.

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**WASTE WATER TREATMENT METHODOLOGIES- A REVIEW**

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**ABSTRACT**

Wastewater is water whose physical, chemical or biological properties have been changed as a result of the introduction of certain substances which render it unsafe for some purposes such as drinking. The day to day activities of man is mainly water dependent and therefore discharge 'waste' into water. Some of the substances include body wastes (faeces and urine), hair shampoo, hair, food scraps, fat, laundry powder, fabric conditioners, toilet paper, chemicals, detergent, household cleaners, dirt, micro-organisms (germs) which can make people ill and damage the environment. It is known that much of water supplied ends up as wastewater which makes its treatment very important. Wastewater treatment is the process and technology that is used to remove most of the contaminants that are found in wastewater to ensure a sound environment and good public health. Wastewater Management therefore means handling wastewater to protect the environment to ensure public health, economic, social and political soundness

**OBJECTIVES**

Wastewater treatment is very necessary for the above-mentioned reasons. It is more vital for the:

**Reduction of biodegradable organic substances in the environment:** organic substances Such as carbon, nitrogen, phosphorus, sulphur in organic matter needs to be broken down By oxidation into gases which is either released or remains in solution.

**Reduction of nutrient concentration in the environment:** nutrients such as nitrogen and Phosphorous from wastewater in the environment enrich water bodies or render it Eutrophic leading to the growth of algae and other aquatic plants. These plants deplete Oxygen in waterbodies and this hampers aquatic life.

**Elimination of pathogens:** organisms that cause disease in plants, animals and humans are Called pathogens. They are also known as micro-organisms because they are very small to be Seen with the naked eye. Examples of micro-organisms include bacteria (e.g. vibro cholerae), Viruses (e.g. enterovirus, hepatitis A & E virus), fungi (e.g. candida albicans ), protozoa (e.g Entamoeba hystolitica, giardia lamblia) and helminthes (e.g. schistosoma mansoni, asaris

Lumbricoides). These micro-organisms are excreted in large quantities in faeces of infected Animals and humans .

**PHYSICAL PROPERTIES OF WASTE WATER**

Temperature: Temperature of sewage depends upon season. However temperature is slightly higher than that of ground water. High temperature of sewage is due to evolution of heat during decomposition of organic matter in sewage. Color: Color of sewage indicates its strength and age. Fresh domestic sewage is grey in color but septic sewage is dark in color When industrial effluent is mixed it give characteristic color to sewage. Odor: Fresh domestic sewage is almost odorless. Septic or stale sewage is putrid in odor which is due to generation of H<sub>2</sub>S during anaerobic decomposition of organic matters. When industrial effluent is mixed, it give characteristics odor to sewage. Turbidity: Sewage is highly turbid. Turbidity of sewage is due to dissolved substances, colloidal matters, suspended solids and microbial cells.

**CHEMICAL PROPERTIES OF WASTE WATER**

Organic matter: In general sewage contains large amount of organic matters. However amount of organic matter depends on types and condition of sewage. Organic matter in sewage may be found in the form of dissolved substances, colloidal matter, suspended or sedimented form. Chloride: Human beings discharge large amount (8-15gm/day) of chloride in the form of NaCl, especially through urine and sweat. So domestic sewage from toilet and bathroom contains higher level of chloride. Sulfite: In sewage sulfite in the form of H<sub>2</sub>S (hydrogen sulfite) is generated during anaerobic decomposition of organic matters by anaerobic bacteria. H<sub>2</sub>S gives putrid odor to sewage. Biological oxygen demand (BOD): Sewage usually have high BOD due to presence of large amount of organic matters. Value of BOD ranges from 100mg/ltr for very dilute sewage to 600mg/ltr or more for concentrated sewage containing industrial effluent mix. Dissolved oxygen (DO): Due to high level of microbial cells and biodegradable organic matters, sewage have very low level of dissolved oxygen. In some sewage, DO is completely absent. Level of DO depends on age and condition of sewage. Low level DO is also due to lower solubility of oxygen in sewage. Oxygen is only 95% soluble in sewage than in pure water). pH: sewage is

slightly alkaline in nature. Nitrogen: In sewage nitrogen is found in variety of form like organic nitrogen, ammonia, nitrite, nitrate etc. Fresh sewage mainly contains organic nitrogen and very little inorganic form of nitrogen. On the other hand organic septic sewage contains high inorganic nitrogen and low organic nitrogen. In sewage nitrite never accumulate in concentration greater than 1mg/l because it is intermediate product during conversion of ammonia into nitrate (NO<sub>3</sub>). In sewage treatment plant, NH<sub>3</sub> and NO<sub>2</sub> are finally converted to NO<sub>3</sub>. Oxidation-Reduction (O-R) potential: Oxidation-Reduction potential indicates energy state of sewage in terms of its oxidizing or reducing potential. O-R potential is very valuable index to monitor sewage treatment plant. In aerobic treatment process like trickling filters, positive OR potential of about +2—to +600 is needed. In anaerobic treatment process like sludge digestion, negative OR potential of about -100 to -200 is needed.

### BIOLOGICAL PROPERTIES OF WASTE WATER

**Bacteria:** Two types of bacteria are found in sewage. Intestinal bacteria: Non-pathogenic intestinal bacteria are normal flora of gastrointestinal tract of human and animals and enter into sewage together with stool. Examples; faecal coliform, faecal streptococci, Clostridium perfringens, Pathogenic intestinal bacteria such as Salmonella, Shigella, Vibrio cholera, Yersenia enterocolitica etc enter into sewage through stool of patients. Real sewage bacteria. The natural habitat of these bacteria is sewage. Both aerobic as well as anaerobic are found in sewage. Aerobic bacteria play important role in oxidation of organic matter during aerobic process. Common anaerobic bacteria includes Clostridium sporogens, Bifidobacterium, Peptococcus, Methanogenic bacteria like Methanobacterium, methanosarcina. Common aerobic bacteria includes; Zeoglaea ramigera, Noctidia, Flavobacterium, Achromobacter, Nitrosomonas. Zeoglaea ramigera is the main organism found in trickling filter. **Algae:** Some algae found in sewage includes Chlorella phormidium, Ulothrix etc. Algae are used in trickling filter in sewage treatment plant. **Fungi:** Fungi like Fusarium and Sporotrichum are found in sewage which play important role in trickling filter. **Virus:** Some viruses causing human disease such as Poliovirus, Rotavirus, Hepatitis A and E etc are found in sewage which get access through stool of patients. **Protozoa:** Some protozoa that cause disease of intestinal tract enter into sewage together with stool of patient. Examples: Entamoeba histolytica, Giardia, Balantidium coli etc are pathogenic protozoa. Few protozoa such as Vorticella and Opercularia are found in trickling filter.

### WASTE WATER TREATMENT METHODS

#### Conventional Methods

Examples of conventional wastewater treatment methods include activated sludge, trickling filter, rotating biological contactor methods. Trickling filters and Rotating Biological Contactors are temperature sensitive, remove less BOD, and trickling filters cost more to build than activated sludge systems. Activated sludge systems are much more expensive to operate because energy is needed to run pumps and blowers.

#### Non-conventional methods

These are low-cost, low-technology, less sophisticated in operation and maintenance biological treatment systems for municipal wastewater. Although these systems are land intensive by comparison with the conventional high-rate biological processes, they are often more effective in removing pathogens and do so reliably. Some of the non-conventional methods include stabilization ponds, constructed wetlands, oxidation ditch, soil aquifer treatment.

### LEVELS OF WASTE WATER TREATMENT

#### PRELIMINARY TREATMENT

Preliminary treatment removes coarse suspended and grits. These can be removed by screening, and grit chambers respectively. This enhances the operation and maintenance of subsequent treatment units. Flow measurement devices, often standing-wave flumes, are necessary at this treatment stage.

#### PRIMARY WASTEWATER TREATMENT

Primary treatment of wastewater involves sedimentation of solid waste within the water. This is done after filtering out larger contaminants within the water. Wastewater is passed through several tanks and filters that separate water from contaminants. The resulting "sludge" is then fed into a digester, in which further processing takes place. This primary batch of sludge contains nearly 50% of suspended solids within wastewater. **Bar screen**— Removes large objects such as wood, stones, rags, etc., prior to the grit chamber.

**Grit chamber**— Sedimentation tank designed to slow down the water flow in a wastewater treatment plant. Heavy solids, grit, and sand settle out in this chamber, preventing downstream damage to pumps, pipes, and other equipment.

**Primary clarifier**— Tank that provides long hydraulic retention time to provide a quiescent zone for solids to settle from an influent stream. Settled solids are removed from the tank and usually sent to anaerobic biological



treatment processes, while clarified wastewater is directed to secondary biological treatment. Often these clarifiers incorporate surface-skimming devices to remove oils and greases and other floating material.

**Centrifugation** – The use of centrifugal force to promote accelerated settling of particles in a solid-liquid mixture.

## SECONDARY WASTEWATER TREATMENT

Secondary treatment of wastewater makes use of oxidation to further purify wastewater. This can be done in one of three ways:

### Biofiltration

This method of secondary treatment of wastewater employs sand filters, contact filters, or trickling filters to ensure that additional sediment is removed from wastewater. Of the three filters, trickling filters are typically the most effective for small-batch wastewater treatment.

### Aeration

Aeration is a long, but effective process that entails mixing wastewater with a solution of microorganisms. The resulting mixture is then aerated for up to 30 hours at a time to ensure results. The three types of aeration devices are packed tower aerators, multi-stage diffused bubble aerators, and spray aerators.

### Oxidation Ponds

Oxidation ponds are typically used in warmer places. In addition, this method utilizes natural bodies of water like lagoons. Wastewater is allowed to pass through this body for a period of time and is then retained for two to three weeks.

**Aerobic** – Aerobic biological processes are common in municipal wastewater treatment. In an aerobic system, the organic contaminants are converted to carbon dioxide, water, additional microorganisms, and other end products.

**Aerobic lagoons** – Lagoons are typically large, shallow earthen basins that provide adequate residence time for the wastewater to be treated naturally by both bacteria and algae.

**Activated sludge** – A suspended-growth aerobic biological process in which microorganisms remove carbonaceous matter from wastewater in an aerobic environment.

**Rotating biological contactor** – An attached-growth process consisting of a series of closely spaced, parallel discs mounted on a rotating shaft which is partially submerged in the wastewater being treated. Microorganisms grow on the surface of the discs where aerobic biological degradation of the wastewater pollutants takes place.

**Trickling filter** – An attached-growth process where wastewater is distributed over a fixed bed of media such as rocks, gravel, plastic substrate, etc. The wastewater flows downward over the media surface where microorganisms form a layer of biomass and consume contaminants in the water.

**Anaerobic** – Anaerobic biological treatment processes employ organisms that function in the absence of molecular oxygen. Anaerobic processes convert organic contaminants to a biofuel gas comprising carbon dioxide, methane, and other end products. Anaerobic processes are generally used to treat high-strength wastewaters where it is impractical to utilize aerobic processes or where producing a biofuel gas is desired. Anaerobic processes also use considerably less energy than mechanical aeration processes. Anaerobic processes are loosely organized as either suspended or attached-growth systems.

## TERTIARY WASTEWATER TREATMENT

This third and last step in the basic wastewater management system is mostly comprised of removing phosphates and nitrates from the water supply. Substances like activated carbon and sand are among the most commonly used materials that assist in this process.

**Chlorination** – A water treatment method that destroys harmful bacteria, parasites, and other organisms. Chlorination also removes soluble iron, manganese, and hydrogen sulfide from the water.

**Ozonation** – A water treatment process that destroys harmful bacteria and other microorganisms through an infusion of ozone. Ozone (O<sub>3</sub>) is a gas created when oxygen molecules are subject to high electrical voltages.

**Ultraviolet radiation** – A disinfection process for water and wastewater treatment that involves passing Ultraviolet (UV) light through water. UV light destroys microorganisms and can reduce dissolved organic material.

**Activated carbon absorption**– A physical process that is typically applied as tertiary treatment to remove low concentrations of contaminants from water that are difficult to remove by other means. Activated carbon has been processed to make it extremely porous, thereby creating a very large surface area available for adsorption of contaminants. Activated carbon may have a surface area as great as 1500 m<sup>2</sup>/g (7.3 million ft<sup>2</sup>/lb).

**Ion exchange** – Ion exchange is a reversible chemical reaction used to remove ions from water and wastewater. An ion in solution, such as ammonium, copper, calcium, magnesium, and many others, is exchanged for a similarly charged ion attached to an immobile solid ion exchange particle. These solid ion exchange particles are either naturally occurring inorganic zeolites or synthetically produced organic resins.

**Thickening**: Thickening is done to increase the solids content of sludge by the reduction of the liquid content. An increase in solids content from 3 to about 6 per cent can decrease total sludge volume significantly by 50 per cent. Sludge thickening methods are usually physical in nature: they include gravity settling, flotation, centrifugation and gravity belts.

**Stabilization**: Sludge stabilization is aimed at reducing the pathogen content, eliminate offensive odours, and reduce or eliminate the potential for putrefaction. Some methods used for sludge stabilization include lime stabilization, heat treatment, anaerobic digestion, aerobic digestion and composting

### Chennai's latest steps

The latest project in Chennai adds another variant to the range of reuse solutions that have been deployed. It is based around CMWSSB's Koyambedu sewage treatment plant. Here, the utility is constructing a 45,000m<sup>3</sup>/day tertiary treatment plant to further treat the secondary effluent using technologies such as ultrafiltration and reverse osmosis. The project includes a 72km transmission pipeline, which will transfer the treated water for use by industries to the south-west of the city, in Irungattukottai, Sriperumbudur and Oragadam, particularly for use in the automotive sector. The new water reclamation plant is being built in Chennai through a contract with a consortium of VA Tech Wabag, as lead, and IDE Technologies. Award of the

€80m contract was announced in March 2016 and commissioning is due this April. Under the contract, the consortium will operate the plant for 15 years. An engineering, procurement and construction contract accounts for around €53m of the project total, with the O&M activity representing around €27m. The water reclamation plant includes the use of chlorine dioxide, direct membrane filtration, ultrafiltration, reverse osmosis, and ozone disinfection. The key parameter is for an inlet total dissolved solids of up to 1500mg/l, and with the treated water being up to 70mg/l total dissolved solids. The situation in Chennai illustrates the potential for industrial reuse to support water security. Use of secondary effluent in Chennai for industrial reuse was 36,000m<sup>3</sup>/day in 2016, rising to 81,000m<sup>3</sup>/day today to include the new Chennai project. This represents approximately 10% of the total quantity of sewage generated. While this is significantly higher than urban reuse, there is substantial scope for further expansion in what is a major water-stressed urban region.

### Challenges of wastewater management

Wastewater management though not technically difficult can sometimes be faced with socio-economic challenges. A few of the challenges are discussed below.

#### Infrastructure

Most often than not, wastewater infrastructure are not the priority of most politicians and therefore very little investment are made. It is however important to consider wastewater infrastructure as equally important as water treatment plant because almost all the water produced ends up as wastewater.

#### Pollution of water sources :

Effects of wastewater effluent on receiving water quality is enormous, it changes the aquatic environment thus interrupts with the aquatic ecosystem. The food we eat contains carbonaceous matter, nutrients, trace elements and salts and are contained in urine and faeces (black water). Medications (drugs), chemicals and in recent times hormones (contraceptives) are also discharged into the wastewater treatment plant. Discharge guidelines must be strictly adhered to. This will ensure sustainability of water sources for posterity. The precautionary and the polluter-pays principles which prevent or reduce pollution to the wastewater have proven to be very efficient in the industrialized countries and should be adapted in developing countries as well.

#### Choice of appropriate technology :

Because the economy of most developing countries is donor driven, funds for wastewater plants are mainly from donors. For this reason, they tend to propose the technology which should be adopted. For this reason, when the beneficiaries, take over the facility, its management of the operations and maintenance of parts become quite challenging as the technical expertise, power requirements etc are not sustainable.

**Sludge production :** Treatment of wastewater results in the production of sewage sludge. There must be a reliable disposal method. If it must be used in agriculture, then the risks involved must be taken into consideration. Due to the presence of heavy metals in wastewater, it is sometimes feared that agricultural use may lead to accumulation of heavy metals in soils thereby contaminating of yields.

**Reuse :** Effluents which meet discharge standards could be used for agricultural purposes such as aquaculture or for irrigation of farmlands. The challenge however is that if wastewater treatment plants are not managed and continuously monitored to ensure good effluent quality, reuse becomes risky.

## CONCLUSION

Wastewater is (or) will always be with us because we cannot survive without water. When water supplied is used for the numerous human activities, it becomes contaminated or its characteristics is changed and therefore become wastewater. Wastewater can and must be treated to ensure a safe environment and foster public health. There are conventional and non-conventional methods of wastewater treatment and the choice of a particular method should be based on factors such as characteristics of wastewater whether it from a municipality or industry (chemical, textile, pharmaceutical etc.), technical expertise for operation and maintenance, cost implications, power requirements among others. In most developing countries low-cost, low-technology methods such as waste stabilization ponds have been successful whilst conventional methods like trickling filters and activated sludge systems have broken down. Effluent which meets set discharge standards can be appropriately used for aquaculture and also irrigation. Though there are a few challenges in waste water management, they can be overcome if attention and the necessary financial support is given to it.

## REFERENCES :-

1. Rajasulochana P, Preethy V. Comparison on efficiency of various techniques in treatment of waste and sewage water - A comprehensive review, *Resource-Efficient Technologies*. 2016; 2:175-84. <https://doi.org/10.1016/j.reffit.2016.09.004>.
2. Marshall FM, Holden J, Ghose C, Chisala B, Kapungwe E, Volk J, et al. Contaminated Irrigation Water and Food Safety for the Urban and Peri-Urban Poor: Appropriate Measures for Monitoring and Control from Field Research in India and Zambia, Inception Report DFID Enkar R8160, SPRU, University of Sussex; 2007.
3. Prem Kumar Nair. Wastewater treatment issues must be taken seriously, *Malay Mail*. 13 October 2017. <https://www.malaymail.com/news/what-you-think/2017/10/13/wastewater-treatment-issues-must-be-taken-seriously-prem-kumar-nair/1486523>.
4. Adedayo A Badejo, David O Omole, Julius M Ndambuki. Municipal wastewater management using *Vetiveria zizanioides* planted in vertical flow constructed wetland, *Applied Water Science*. 2018; 8:110. <https://doi.org/10.1007/s13201-018-0756-0>.
5. Chang JJ, Wu SQ, Dai YR et al. Treatment performance of integrated vertical-flow constructed wetland plots for domestic wastewater, *Ecol. Eng.* 2012; 44:152–59. <https://doi.org/10.1016/j.ecoleng.2012.03.019>.
6. Abou-Elela SI, Golinielli G, Abou-Taleb EM et al. Municipal wastewater treatment in horizontal and vertical flows constructed wetlands, *Ecol. Eng.* 2013; 61:460–68. <https://doi.org/10.1016/j.ecoleng.2013.10.010>.
7. Vymazal J. Constructed wetlands for treatment of industrial wastewaters: A review. *Ecol. Eng.* 2014; 73:724–51. <https://doi.org/10.1016/j.ecoleng.2014.09.034>.
8. Wu H, Zhang J, Ngo HH. A review on the sustainability of constructed wetlands for wastewater treatment: design and operation, *Biores. Technol.* 2015; 175:594–601. <https://doi.org/10.1016/j.bior tech.2014.10.068>. PMID:25453440.
9. Pedro N. Carvalho, Carlos A. Arias, Hans Brix. Constructed Wetlands for Water Treatment: New Developments, *Water*. 2017; 9:397. <https://doi.org/10.3390/w9060397>. DOI: 10.3390/w9060397.
10. Suhad AAAN Almukhtar, Suhail N Abed, Miklas Scholz. Wetlands for wastewater treatment and subsequent recycling of treated effluent: A review, *Environmental Science and Pollution Research*. 2018; 25(24):235–95. <https://doi.org/10.1007/s11356-018-2629-3>. PMID: 29959736, PMCID: PMC6096557.
11. Miller JE (2003) Review of water resources and desalination technologies. Sandia National Labs Unlimited Release Report SAND-2003-0800.

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12. Hasan Z, Jeon J, Jung SH (2012) Adsorptive removal of naproxen and clofibric acid from water using metal-organic frameworks. *Journal of Hazardous Materials, Elsevier* 209-210: 151-157.
  13. Heberer T (2002) Occurrence, fate, and removal of pharmaceutical residues in the aquatic environment: a review of recent research data. *Toxicology Letters Elsevier* 131(1-2):5-17.
  14. Deegan AM, Shaik B, Nolan K, Urell K, Oelgemöller M, et al. (2011) Treatment options for wastewater effluents from pharmaceutical companies. *International Journal of Environmental Science & Technology, Springer* 8(3): 649-666.
  15. Ngah WSW, Teong LC, Hanafiah M (2011) Adsorption of dyes and heavy metal ions by chitosan composites: A review. *Carbohydrate Polymers, Elsevier* 83(4): 1446-1456.
  16. Holzer L, Münch B, Rizzi M, Wepf R, Marschall P, et al. (2010) 3D-microstructure analysis of hydrated bentonite with cryo-stabilized pore water. *Applied Clay Science, Elsevier* 47(3-4): 330-342.
  17. Chen S, Zou Y, Yan Z, Shen W, Shi S, et al. (2009) Carboxymethylated-bacterial cellulose for copper and lead ion removal. *Journal of Hazardous Materials, Elsevier* 161(2-3): 1355-1359.
  18. Chen Y, Pan B, Li H, Zhang W, Lv L, et al. (2010) Selective removal of Cu(II) ions by using cation-exchange resin-supported polyethyleneimine (PEI) nanoclusters. *Environmental Science & Technology, ACS Publications* 44(9): 3508-3513.
  19. Ivanov V, Tay JH, Tay ST, Jiang HL (2004) Removal of micro-particles by microbial granules used for aerobic wastewater treatment. *Water Science and Technology, IWA Publishing* 50(12): 147-154.
  20. Cheremisinoff NP (2002) *Handbook of Water and Wastewater Treatment Technologies*. Butterworth-Heinemann Boston.

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**WATER SUSTAINABILITY AND ECONOMIC INCENTIVES FOR URBAN HOUSEHOLD IN INDIA**

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*Water crises are alarming at a high rate which draws the attention of policy makers at international, national, and state level. According to the World Bank, Urban population of India accounts for 35 percent of the total population. The Government of India has initiated programs and schemes for the sustainable use of water for domestic, agriculture and industry. An attempt has been made in this paper to find out the economic incentives for urban water users for sustainable water use through the review of literature. The summation of literature review shows that India is missing economic incentives to encourage the efficient use of water by urban households.*

*(KEY WORDS- Water, Water Sustainability, Economic Incentive, Urban Household, Sustainable Use of Water)*

**INTRODUCTION**

‘Water’ is the key to human life. Water is the essence in every walk of life. The water is required for socio-economic development, for healthy ecosystems and for human survival. The absence of water from the planet earth will zero down on the life and existence of earth.

Water is everywhere in the air, on the surface, inside the earth, in the plants and all living beings. 96.5 percent of the world's water resource is found in the ocean and is saline. The freshwater forms only 2.5 percent of the total resources. 68.7 percent of the freshwater is locked into ice and glacier. Only 30.1 percent and 1.2 percent are Fresh groundwater and fresh surface water. Only 1.2 percent of the surface freshwater comes from the rivers, lakes, wells, and others, which is the key source of most of the water users. Thus, it makes water scarce. (Water Science, 1993)

**World and Water**

Water is essential to life and is a scarce resource with multiple uses. The world with expanded spells of famine, desertification and unequal access to water is continuously experiencing water stress. Access and availability of potable water is vital for human development. Water is vital for life and to attach its great significance, many civilizations have water gods and goddesses to represent lakes, rivers, other sources of water, and seas. It is central to ensure economic growth and enhance development. Access to safe water, its adequate availability for all, and its effective management is the most important indicator of development of a country. A developed country means a country that has, most effective institutions to manage its water resources. Anywhere, if water is easily and adequately available for people when they need it in their household, in farms or in industrial works-it means people enjoy democracy and human rights (Bhattarai, 2013). In 2000, the UN set eight Millennium Development Goals (MDGs) to uphold the principles of human dignity, quality, equity and to build a more peaceful and prosperous world. These goals are anticipated to be attained by 2015 (UNICEF, 2013).

‘Water’ is on a high priority list of the eight Millennium Development Goals. As it is more so subsequent to the deliberation that has surfaced in light of MDGs that pathway development of countries on various developmental indexes including access to water. The areas related to sanitation in India too have long been seen as a key gap in the sector (Achanta, 2017). Water is necessary for the continued existence and productivity of all life and ecosystems. Water is the priority of every nation and the world with the rapid increase in the demand for water and limited supply of water. Most of the country is under water stress as the population is growing fast and present practices will lead to the 40 percent shortage between forecast demand and available supply of water by 2030 (World Bank.) Looking at the present scenario of water consumption by the world, UN Water called for a high-level meeting to speed up the efforts towards the capacity development for water (High-Level Meeting on the Implementation of the Water-Related Goals, 2021). Focusing on availability and sustainable management of water, SDG 6, UN water has requested the member countries to submit the progress report on sustainable water management in 2023.

**India and Water**

India is the home of 17.7 percent of the world population by 2030 outpaces the demand of water availability by two times (Shekhawat, 2021).

“Water being the wealth of the people and its distribution being uncertain, the correct approach is not to complain against nature but to conserve water.”

At national level, the prime minister of India, honourable Prime Minister Narendra Modi with an intention to address the water crises, Ministry of Water Conservation and Management was established also known as the Ministry of Jal Shakti in 2019. In the directions of the UN, India has taken the initiative of “Water is Life Mission” (Jal Jeevan). Under this mission, the US\$ 50 billion project is proposed for providing safe and piped drinking water to every household by 2024 (Shekhawat, 2021).

To meet the SDG6, various efforts are made at the micro level and macro level. At the macro to micro level ministry of Jal Shakti is working on Swachh Bharat Mission and Jal Jeevan which covers individual households to national water resources.

### **Urban India and Water**

The reasons underlying the urbanization are primarily due to the expansion of cities and the migration of people from rural areas to urban areas. With increasing urbanization investments are made in various segments of the economy like housing, road network, urban transport, water supply, power-related infrastructures, smart cities, and other forms of urban management.

Urbanization can be defined as a process which reveals itself through temporal, spatial and sectoral changes in the demographic, social, economic, technological, and environmental aspects of life in a given society. Urbanization is a Progressive concentration of population in urban units (Kingsley Davis-1965).

With population growth over the years and increasing demand for water, today India is facing many challenges in the water sector. Water scarcity is already visible with the current population size of 1.3 billion which is projected to be increased to 1.6 billion by 2050. Along with this, with rising pollution levels and climate change, the water cycle is expected to undergo significant change all across the world. India consists of 16 percent of the world's population but with only 4 percent of the world's water resources. The total annual water available from precipitation in India is about 4,000 cubic km. Surface water and replenishable groundwater contribute to 1,869 cubic km but only 69 percent of this can be put to beneficial uses which means only 1,122 cubic km is a utilisable water resource in India (Prabhu, 2021). The finite water resources of the country are under pressure due to increasing population, urbanisation, industrialisation, water pollution, and inefficient use. Climate change poses an additional challenge (Kumar, 2021).

The water supply in India faces several issues and the water and wastewater management in the country needs to be improved. The government though has made initiatives to improve water supplies establishing projects for selected areas. Sewage and sanitation are also facing a dilemma in India at the moment. Nevertheless, projects to further improve this are currently a work in progress. (Krishna, 2021).

Urbanization and economic growth are considered to be the most striking features of the past century (McGranahan, 2006) India's urbanization levels currently estimated at about 30 percent are low compared to the international standards. The country has, however, witnessed rapid growth in its urban population over the years and is second only to China in total number of urban residents. India's urban sector also makes a disproportionately large contribution to the country's economy. The contribution of India's urban sector to the gross domestic product (GDP) is expected to increase from about 63 percent in 2007 to about 75 percent by 2021 (Planning Commission of India, 2007) The population residing in urban areas in India, according to the 1901 census, was 11.4 percent, increasing to 28.53 percent by the 2001 census, and is now currently 34 percent in 2017 according to The World Bank. According to a survey by the UN, in 2030 40.76 percent of the country's population is expected to reside in urban areas.

### **REVIEW OF THE LITERATURE**

The thrust area of the paper is to look into the available economic incentive for the sustainable use of water in the urban areas. The most closely related studies are covered for the review of literature to draw the conclusion.

Padhee (2020), as per the ongoing project by world bank “*Paani Bachao, Paise Kamao* ” (save water, earn money) draw attention towards future policy to address alarming water crises. Under this programme the incentives are provided for efficient use of water and should not be given free electricity as incentives which put pressure on sustainable use of water in irrigation. The policy framework is dedicated towards water sustainability and incentive for farmers in rural India. There is no incentive for urban households. According to pilot survey conducted by the Punjab State Power Corporation Limited (2018), in the year 2018 six of the state's 5900 rural power user, for calculating the incentive dedicated electric meter was installed on the tube well user and per month unit was fixed for kharif and rabi season and farmers was subsidised for every unit

saved @ Rs.4 per unit. findings of the study showed that farmers saved 1.75 lakh units and earned incentives of Rs.7 lakh (October 2018 to 20th Jun 2019 time period, for Kharif seasons), On the other, for Rabi and summer seasons saved 2.06 lakh units and earned incentives of Rs. 8.24 lakh (21st Jun to 20th August 2019 time period,) under the Punjab government Agri-reform scheme, *PaniBachao, Paisa Kamao*. The Delhi government (Hindustan Times, 2019) announced a waiver incentive for installation of water meters to raise the functional meter in Delhi. In the past, the same exercise has resulted in an increased number from 1.87 million connections to 2.37 million by 2018-19 since 2014-15. This initiative leads to the estimated revenue generation of Rs 600 crore. Wight, et al. (2021), discusses the intense water scarcity and its impact on people, economies, and environment and how it is posing a growing challenge for sustainable development. According to researchers, in order to meet these challenges, it will require incentives to encourage sustainable water use. In the study, a multi-scale assessment of water reallocation and investment in water conservation technologies is undertaken to understand their potential and limits for addressing different drivers of water scarcity. This study builds on several local and high-resolution models demonstrating the potential to increase the economic efficiency (and marginal productivity) of water use. The gap between potential and implementation is high, however. Efforts to bridge this gap in priority geographies can link modelling advances with the design of pathways that combine incentives with robust water accounting, caps on water extraction, and enforcement capacity at multiple scales.

Matto, et al. (2017) study on urban water efficiency and conservation study showed that urban water management models are outdated and unregulated and have a negative impact on quality and quantity of present water resources. “cities are overwhelmed with water-related challenges”, water conservation is very essential at the local level and there is overexploitation of water resources and neglected also. Water is not only significant for social and economic purposes but is inevitable for sustainable biodiversity in urban areas. In the study by Tortajada (2020), has discussed water resources, and how they are essential for every development activity, not only in terms of available quantity but also in terms of quality. Wastewater, whose value had not been appreciated until recently, is increasingly recognised as a potential ‘new’ source of clean water for potable and non-potable uses, resulting in social, environmental, and economic benefits. This paper discusses the potential of recycled wastewater to become a significant source of safe water for drinking purposes and improved sanitation in support of the Sustainable Development Goals.

Silali, et al. (2014), study, discuss Trans Nzioa County, in Kenya, and face challenges in reaching water and sanitation Millennium Development Goals (MDGs) and objectives of primary prevention. Cross-sectional design, using a mixed data collection procedure was conducted. For the present study 297 respondents participated. The results of the study showed secondary attained households are critical for efficient implementation of safe and clean water supply compared to primary attained households. The researchers felt the need for more grants and well-wishers for Public Private Provision programmes in water resource management; policy to increase male involvement in community participation in integrated Water, Sanitation and Hygiene WASH programmes in Trans Nzioa County is timely required. Government of India Ministry of Water Resources (National Water Policy, 2012), incentives and subsidies are provided for the industries. Education and awareness programs are framed to conserve and efficient use of water by the stakeholders.

Shaikh, et al. (2019) in the study, discuss the quantity and quality characteristics of Greywater (GW) in developed and developing countries. As per them a number of systems varying from low-cost devices to complex treatment systems have been used/studied for the treatment of GW. Also, different combinations of chemical, physical, and biological processes such as coagulation, sedimentation, filtration, biodegradation, and disinfection have been used for GW treatment. In order to reduce cost, treatment of GW by natural systems is gaining importance in both developed and developing countries. Several factors such as type of GW, scale of treatment, land availability, reuse applications, post treatment requirements, capital and maintenance costs, and reliability and replicability should be considered while selecting an appropriate GW treatment technology. The study also analyses the health risk associated with the use of treated GW.

Moluno, et al. (2018) in their study have discussed the effect of willingness to pay for water supply and sustainability water facilities in Niger Delta Communities carried out in extension and revalidation of an earlier study done by European Union – Assisted Niger Delta Support Programme (EU-NDSP). Nine self-selected small towns in two pilot intervention local government areas in Bayelsa state, Nigeria were used for the study. Samples of 660 respondents were initially sampled using Bill Godden (2004) formula for determination of sample size, out of which 610 were eventually used for the study. The research design adopted for the study is the survey design. It was found that respondents are willing to pay, which affects the sustainability of water

facilities and there is willingness on the part of the communities to pay for water services under the EU-NDSP and other donor water supply schemes.

**Statement of Problem**

For sustainable use of water there is a need for economic incentive and also to draw the attention of water users in urban households. For efficient use of water, economic incentive plays an important role. The thrust area of research is to find out the available economic incentives for sustainable use of water by urban households. The focus of the problem is to see how the individual household efficiently uses the water. The problem is to study the efficient use of water supplied to the household and its conservation. Sustainable use of water refers to the usage of water in the best possible ways to fulfil the needs of the household with lower water consumption and use of wastewater for alternative use. Economic incentives include any benefit in the monetary terms like subsidy on use of water efficient technology, water rebate, waiver, tax concession, free installation of water meters, free water service charges, slab rate etc. Urban households include the residents of city areas and the limits of the municipal corporations.

**Objective of the Study**

To study the available economic incentive for sustainable use of water by urban households.

**Rationale of the Study**

Rural households Fetch water from a far place and water is not easily available to them which compels them to use water efficiently and sustainably. Due to the increasing demand for water in the urban areas, water is getting scarce but the attitude of the urban households towards efficient use of water is rare. Urban users are getting easy supply from municipal corporations and there is no hardship to get it. But the municipal corporation is facing challenges to meet the increasing demand. Thus, to increase the efficient use of water by urban households is very important not in the future but also at present.

**Significance of the Study**

It is expected that the outcome of this study will benefit the society, economy, and government. This study will help the citizens to identify the benefits of sustainable use of water and its implications for the future generations. It will help them to enlighten and create alertness/ awareness on the future damages in the absence of water and likely benefits of sustainable use of water. The present study will encourage students and researchers to undertake research on similar lines.

**Scope of the Study**

The essence of the present research study is primarily to study the impact of overuse of water and how the government can encourage and motivate people by providing economic incentives to go for sustainable water usage. The study basically focuses on proposing to the government to come out with such a policy framework which calls for sustainable economic development through sustainable use of water.

**LIMITATIONS OF THE STUDY**

1. The present study is focusing only on sustainable aspects of water. The study is based on review of literature only.
2. Study focuses only on economic incentives for sustainable use of water by the urban households.
3. Study excludes the state government and local bodies receiving incentives from the centre, international and other bodies for sustainable use of water.
4. Study only covers the economic incentives offered in the country India.

**Strength of the Study**

This study is a gender-neutral study.

**RESEARCH METHODOLOGY**

The present study is based on review of other related studies carried out in the same field/ area. The conclusion of the study is drawn on the basis of literature review done in the present study. Also referred to various schemes pertaining to water incentive.

**Summation**

On the basis of literature reviewed in the present study the following findings are listed below.

1. Rural farmers are provided economic incentive for sustainable use of water in irrigation. There are positive results of economic incentives on sustainable use of water; the result is drawn from the irrigation incentive for farmers.



2. Economic incentive provided for the urban water user in Delhi, waiver incentive for installation of water meters. It raises the functional meter in Delhi.
3. Urban water management is unregulated and using outdated technology, which affects the quality and quantity of water resources.
4. Willingness to pay for the water services affects the sustainability of the water facility and can contribute towards sustainable use of the water.
5. There are more financial resources and Public Private Participation in water resources is needed.
6. Potential of recycled wastewater plays an important role in the source of safe water for drinking.
7. Grey Water (GW) reduces the cost and treatment of GW by natural systems is gaining importance.
8. Economic efficiency in water use is important and needs incentive which in turn will contribute towards sustainable use of water.
9. The National Water Policy 2012, economic incentives are available for agriculture and industry for the sustainable use of water.

### **CONCLUSIONS AND SUGGESTIONS**

Hon'ble Prime Minister Shri Narendra Modi led campaign "Catch the Rain" with the theme "catch the rain, where it falls, when it falls" alert the nation on water crises. Based on the findings, the paper concludes the following.

- Growing scarcity of water is now becoming a universal problem and urban households are not an exception to it.
- India has not achieved 100 percent water meter installation in urban households. Government can issue water meters at discounted prices.
- Economic Incentives are available for agriculture and industry. The same strategy can be applied for the sustainable use of water in urban areas.
- Urban households are 35 percent of the total population (World Bank 2021) and important stakeholders in water sustainability.
- National Water Policy 2012 has no clear direction on economic incentive by the state government to the urban households.
- Economic incentive is directly related to the efficient use of water.
- Economic incentives are the key factor and inevitable in sustainable water use.
- Economic incentives to urban households are missing in India to encourage the efficient use of water.

The study suggests that the policymakers can take the initiative to introduce and frame policies which gives economic incentives to the citizens for the sustainable use of water in urban India. Economic incentive is a successful tool for the attention of water users and helps in sustaining water for present as well as for future.

### **REFERENCES**

- Achanta Jyoti (2017), "Water Poverty in India: Issues and Strategies", SAGAR International Journal of Management and Research", ISSN 2458-2815, Vol. 1, Issue 4, April-June 2017
- Bhattarai Keshav Prasad (2013), "Cooperative Water Diplomacy: A Fine Way to Prop up Asian Country Analysis", Eurasia Review- News and Analysis
- Government of India Ministry of Water Resources (NATIONAL WATER POLICY, 2012) Retrieved September 2, 2021 [http://jalshakti-dowr.gov.in/sites/default/files/NWP2012Eng6495132651\\_1.pdf](http://jalshakti-dowr.gov.in/sites/default/files/NWP2012Eng6495132651_1.pdf)
- Hindustan Times. (2019, August 27). What the Delhi water bill waiver scheme means to consumers. Hindustan Times. Retrieved September 10, 2021 <https://www.hindustantimes.com/cities/what-the-waiver-scheme-means-to-consumers/story-cl4DWUgYxM2XVbQIC8sNUN.html>

- Irshad N. Shaikh, M. Mansoor Ahammed and M.P. Sukanya Krishnan (2019), “Gray Water Treatment and Reuse”, in ‘Sustainable Water and Wastewater Processing’, ed by Charis M. Galanakis and Evita Agrafioti, ISBN- 978-0-12-81617-8, Elsevier
- Kingsley Davis (1965), “The Urbanization of the Human Population”, W. H. Freeman Publisher
- Matto, M., Shivali Jainer, S. J., Kumar, M., & Sharda, C.(2017) Urban-Water-Efficiency-and-Conservation.pdf. Retrieved September 16, 2021, from <https://cdn.cseindia.org/userfiles/Urban-Water-Efficiency-and-Conservation.pdf>
- Maurice BarasaSilali and Nijambe Eunice (2014), “Community Participation in Integrated Water, Sanitation & Hygiene (WASH) Programs in Supply of Safe Water in Trans Nzioa, Kenya”, in ‘Journal of Biology, Agriculture and Healthcare’, ISSN 2224-3208 (P) ISSN 2225-093X (online), Vol.4, No.6
- McGrahanan. G. (2006), “An Overview of Urban Environmental Burdens at Three Scales: Intra-Urban, Urban-Regional and Global”, in C. Tacoli Edited, ‘The Earthscan Reader in Rural-Urban Linkages’, Earthscan, IIED, London
- MolunoShedrackUwadinisu, Ogwezzy Melody Diobodo, Oseafiana Joseph Ofor and Esedebe Joseph Ejime (2018), “Willingness to Pay for Water Supply and Sustainability of Water Facilities in Niger Delta Communities”, in ‘Advances in Multidisciplinary & Scientific Research’, Vol. 4, No. 2, June 2018
- Padhee, D. A. K. (n.d.). Repurposing public policies for sustainable water management in Indian agriculture - India. ReliefWeb. Retrieved September 16, 2021, from <https://reliefweb.int/report/india/repurposing-public-policies-sustainable-water-management-indian-agriculture>
- Pankaj Kumar (2021), “Water Governance”, in ‘YOJANA: A Development Monthly’, April 2021, ISSN 0071-8400
- Planning Commission (2007), “Eleventh Five Year Plan: 2007-12”, Planning Commission of India, Government of India
- Rakeshreneu (2021), “Har Ghar Jal”, in ‘YOJANA: A Development Monthly’, April 2021, ISSN 0071-8400
- Shekhawat, G. S. (2021, March 18). India Statement: Water-Related Goals and Targets of the 2030 Agenda. UNITED NATION. Retrieved September 17, 2021 [https://estatemnts.unmeetings.org/estatemnts/10.0010/20210318/deBTywqTcGUG/ygEvGte0dDjR\\_en.pdf](https://estatemnts.unmeetings.org/estatemnts/10.0010/20210318/deBTywqTcGUG/ygEvGte0dDjR_en.pdf)
- Suresh Prabhu (2021), “Water Security”, in ‘YOJANA: A Development Monthly’, April 2021, ISSN 0071-8400
- The Indian Express. (2020, September 13) Punjab: 75% fall in registrations under Capt govt’s ambitious ‘PaniBachao, Paisa Kamao’ scheme | India News, The Indian Express. Retrieved September 16, 2021, from <https://indianexpress.com/article/india/75-fall-in-registrations-under-capt-govts-ambitious-pani-bachao-paisa-kamao-scheme-6594098/>
- Tortajada, Cecilia (2020), “Contributions of Recycled Wastewater to Clean Water and Sanitation Sustainable Development Goals”, in ‘NPJ Clean Water’ 3, 22 (2020). Retrieved September 20, 2021. <https://doi.org/10.1038/s41545-020-0069-3>
- UN Water (2015), “International Decade for Action - WATER FOR LIFE-2005-2015”, Retrieved September 8, 2021, [https://www.un.org/waterforlifedecade/water\\_and\\_sust](https://www.un.org/waterforlifedecade/water_and_sust)
- UNICEF (2013), “Water in India: Situation and Prospects”, UNICEF, FAO, SasiWATERs

- 
- UN-Water. (2021, February 22). High-Level meeting on the implementation of the water-related goals [UN WEBSITE]. UN-Water. Retrieved September 14, 2021<https://www.unwater.org/high-level-meeting-on-the-implementation-of-the-water-related-goals/>
  - Vishnu Krishna ( 2021), “Urbanisation in India: Trends, Opportunities and Smart Cities”, in ‘Alliance Experts’, 30th May 2021, Retrieved September 24, 2021. <https://www.allianceexperts.com/en/knowledge/countries/asia/opportunities-in-urbanisation-in-india/>
  - Water Science, Retrieved September 16, 2021,[https://www.usgs.gov/special-topic/water-science-school/science/where-earths-water?qt-science\\_center\\_objects=0#qt-science\\_center\\_objects](https://www.usgs.gov/special-topic/water-science-school/science/where-earths-water?qt-science_center_objects=0#qt-science_center_objects)
  - World Bank. Water Resources Management [Text/HTML]. World Bank. Retrieved September 15, 2021, from <https://www.worldbank.org/en/topic/waterresourcesmanagement>

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**ZIRCONIUM –BASED METAL-ORGANIC FRAMEWORKS FOR SUPER CAPACITOR APPLICATIONS**

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**ABSTRACT**

*Metal-organic frameworks are considered as promising materials for a vast array of applications. Because of their unique features, they have gained increasing attention in both energy storage and conversion applications like batteries, super capacitors, solar, and fuel cells. Of the many combinations of MOF that are available, a zirconium based MOF called UiO-66 was chosen for this study. The synthesis procedure was optimized and the product has been characterized using X-ray diffraction, FT-IR spectrometry, SEM, and TGA. One of the growing applications of MOF is in the electrochemical energy storage devices. In this context, the ability of UiO-66 to serve as electrochemical material in a supercapacitor was tested. It showed a maximum specific capacitance value of 20.7 mF g<sup>-1</sup> at 50 mV s<sup>-1</sup> scan rate and also good recycling stability (charge/discharge cycles).*

**Keywords:** MOF, UiO-66, Electrochemical material, Supercapacitor

**1. INTRODUCTION:**

Metal-organic frameworks (MOFs) are also known as porous coordination polymers (PCPs). They are a new class of porous crystalline materials consisting of metal clusters and organic linkers. MOFs have attracted considerable attention for its applications in many areas, mainly due to their tuneable structure, porosity, and functionality [1]. Research in the area of MOFs has been subjected to intense efforts on both laboratory and industrial scale. One of the most interesting aspects is that, apart from various combinations of the metal centre and organic linker, the bridging ligand can be modified to introduce a desired functionality into the framework [2].

In this line, different types of MOFs have been typically synthesized using conventional hydrothermal and solvothermal methods. But various other eco-friendly methods using super critical water, biocompatible building blocks, and involving direct conversion of the metal oxide have also been developed [3]. Recently, the microwave-assisted hydrothermal method was successfully applied for the synthesis of MOFs leading to a considerable reduction in reaction time with high yield and high phase purity due to homogeneous heating and fast kinetics [4] and [5]. Experiments done by various research groups like [6],[7] and [8] have shown a light upon the topology, morphology, and chemistry behind these crystalline materials. Various applications of MOFs including super capacitors has been recently reported [9], [10], [11],[12], [13],[14]. Apart from this, a huge amount of research has been done on the treatment of wastewater [15]; [16]; [5]; [17].

Recently, MOFs as an electrode materials for batteries and supercapacitors have been extensively explored [18]; [19];[20]; [21]. Supercapacitors are an important class of energy storage devices which store charges and electrons statically via electrostatic double-layer capacitance (EDLC) and via electrochemical capacitance. Most of the EDLCs use carbon based materials like activated carbon, carbon gel, and carbon nanotubes [22]. The Faradaic or pseudo capacitors are generally made of metal oxides/hydroxides such as nickel oxide [23] and conducting polymers like polyaniline and polypyrrole[24].It has been shown that MOFs can be altered to give optimal capacitance and lifecycle without compromising the other [25].

Among them, Zr-MOF which exhibits rich structural types, outstanding stability, intriguing properties, and functions, is foreseen as one of the most promising MOF materials. It is especially attractive because of its numerous practical applications. An extensive review of the various synthesis strategies and applications of zirconium based MOFs has been reported [26]. Its application as an electrode material for supercapacitors has been reported by very few, hence this work was intended to synthesize Zr-MOF UiO-66 and explore its use as an electrode material for supercapacitor application due to its excellent thermal, aqueous and acid stability.

**2. METHODS AND MATERIALS**

Reagent-grade chemicals used for the synthesis of MOF (Zirconium chloride octahydrate (ZrOCl<sub>2</sub>·8H<sub>2</sub>O), Terephthalic acid,N, NDimethylformamide(DMF), and hydrochloric acid (HCl))were purchased from Sigma-Aldrich. UiO-66 was synthesized using the conventional solvothermal method and the chemicals obtained were used without any further purification. It was based on the scalable procedure reported by [27] with slight

modifications. Zirconium Oxychloride (0.388 mmol pre-dissolved in a 6 ml solution of 5:1 volume ratio of DMF:HCl) and Terephthalic acid ( $\text{H}_2\text{BDC}$  pre-dissolved in 5ml of DMF) were mixed (1:1.91 molar ratio of  $\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}:\text{C}_8\text{H}_6\text{O}_4$ ). The mixture was placed in a Teflon lined autoclave and was heated at  $100^\circ\text{C}$  for 24 hours. The formed crystals were then placed in ethanol solution for 3 days while replacing the ethanol every 8 hours for solvent exchange. Finally, the product was dried at  $100^\circ\text{C}$  for 12 hours. Various analysis like thermal analyzer (TGA)(NETZSCH STA 449 F3), FTIR (JASCO FT/IR-6600type-A, Japan), XRD (PANalytical X'Pert PRO MRD), SEM analysis (TESCAN Vega 3, Czech Republic) were done.

### 3. RESULTS AND DISCUSSION

#### 3.1 ftir

The FTIR spectra of synthesized MOF are shown in Figure1. The intensive broad peak at  $3413\text{ cm}^{-1}$  indicates the presence of protons attached to N or O, for example hydroxylic ( $-\text{OH}$ ), phenolic ( $\text{Ar}-\text{OH}$ ) amide ( $-\text{CONH}_2$ ) and carboxylic ( $-\text{COOH}$ ) groups. Broad nature of the peak presence at  $3700\text{ cm}^{-1}$  to about  $2600\text{ cm}^{-1}$ , indicates the presence of extensive intermolecular hydrogen bonding between the protons attached to the hetero atoms. The peaks at  $1580\text{ cm}^{-1}$  indicates the presence of double bonded groups like  $\text{C}=\text{N}$  or alpha, beta-unsaturated  $\text{C}=\text{O}$  groups or  $\text{C}=\text{C}$  groups. The wide peak at  $3413\text{ cm}^{-1}$  coupled with the peak at  $1580\text{ cm}^{-1}$  indicates the presence of carboxylic acid functional group in the molecule and that the carboxylic acid group has conjugated double bonds at alpha and beta positions. The peaks at  $3700\text{--}2600\text{ cm}^{-1}$  coupled with the peaks at  $1580\text{ cm}^{-1}$  are also indicative of primary and secondary amides, which have conjugated double bonds. The peaks around  $1400\text{ cm}^{-1}$  are indicative of primary and secondary C-H bending vibrations. The peaks at  $747\text{ cm}^{-1}$  and  $666\text{ cm}^{-1}$  are indicative of C-C bending frequencies

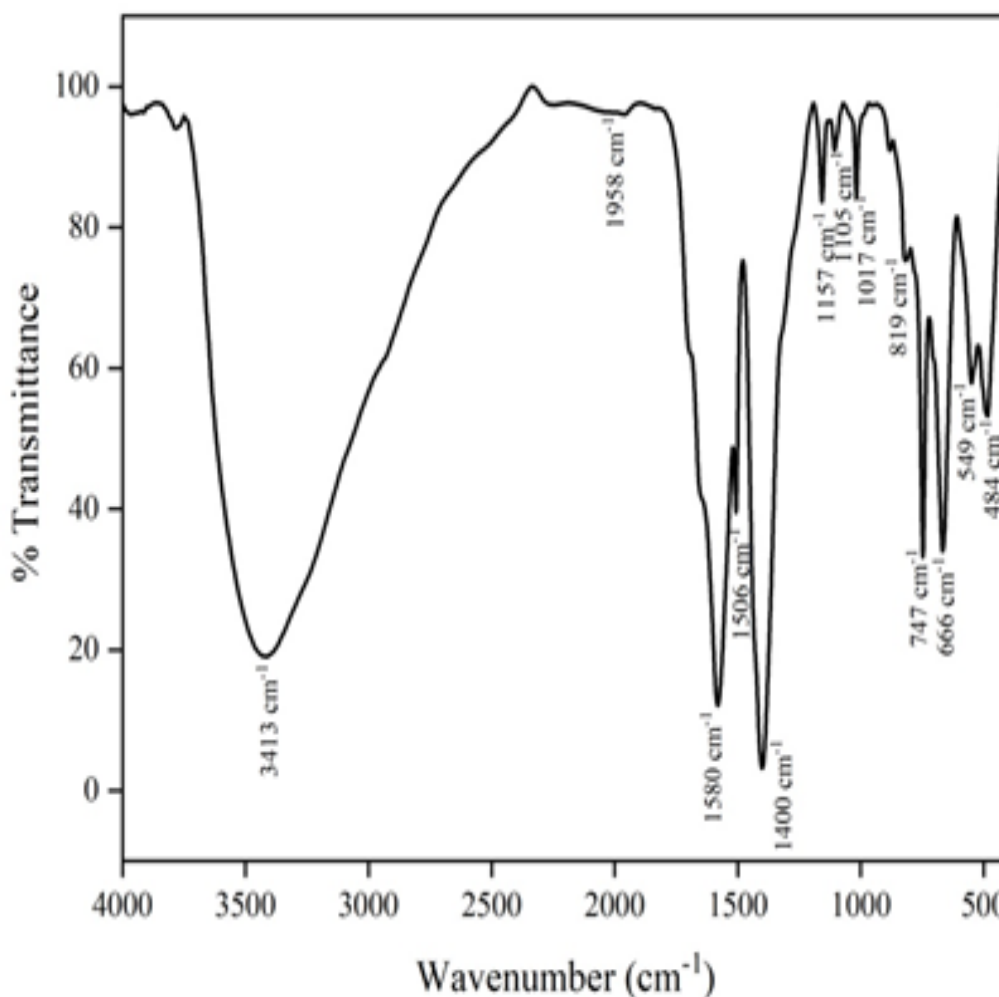


Figure. 1: FTIR analysis of theUiO-66

#### 3.2 sem analysis:

Surface morphology of the synthesized UiO-66 was investigated using SEM analysis (Fig.2). It displays that the crystals obtained were small in size at around 100 nm. It can also be seen that crystals are nearly uniform and homogenous throughout.

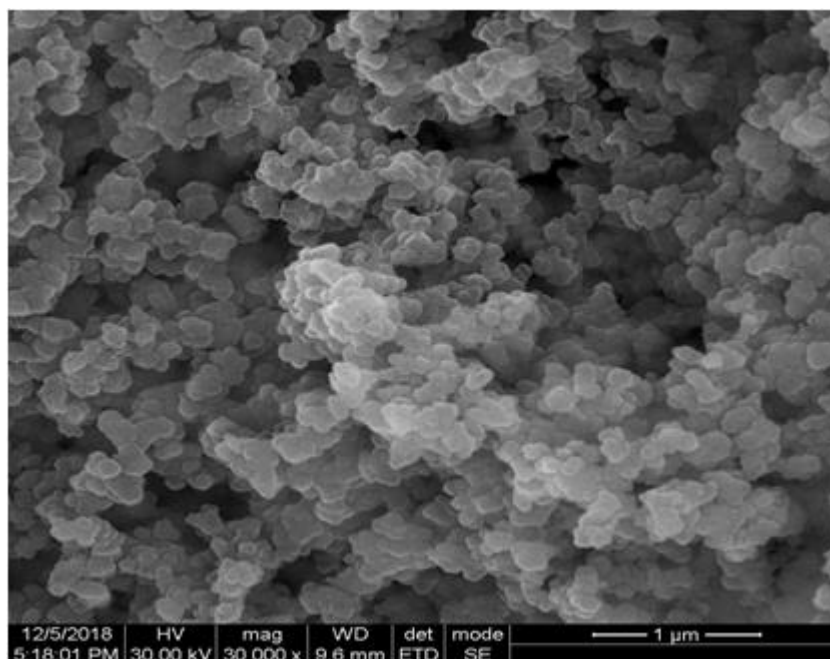


Figure 2.: SEM image of UiO-66

### 3.3 pxrd data analysis:

The synthesized Zr-MOF sample was subject to Powder X-Ray Diffraction studies and the structure was solved from the diffraction pattern (Fig.3). The typical diffraction peaks which are characteristic of UiO-66 were observed. The peaks at  $2\theta = 7.4^\circ$ ,  $8.5^\circ$ , and  $25.7^\circ$  appeared in the XRD pattern. A broad weak peak at  $2\theta = 7.4^\circ$  may be assigned to the cluster defects existing in correlated nanoregions. Peaks at  $2\theta = 25.7^\circ$  ascribed to the terephthalic acid ligand [28] and [29]. No glaring anomalies were found in the pattern which indicates an absence of unbound ligands and also a lack of any major defects.

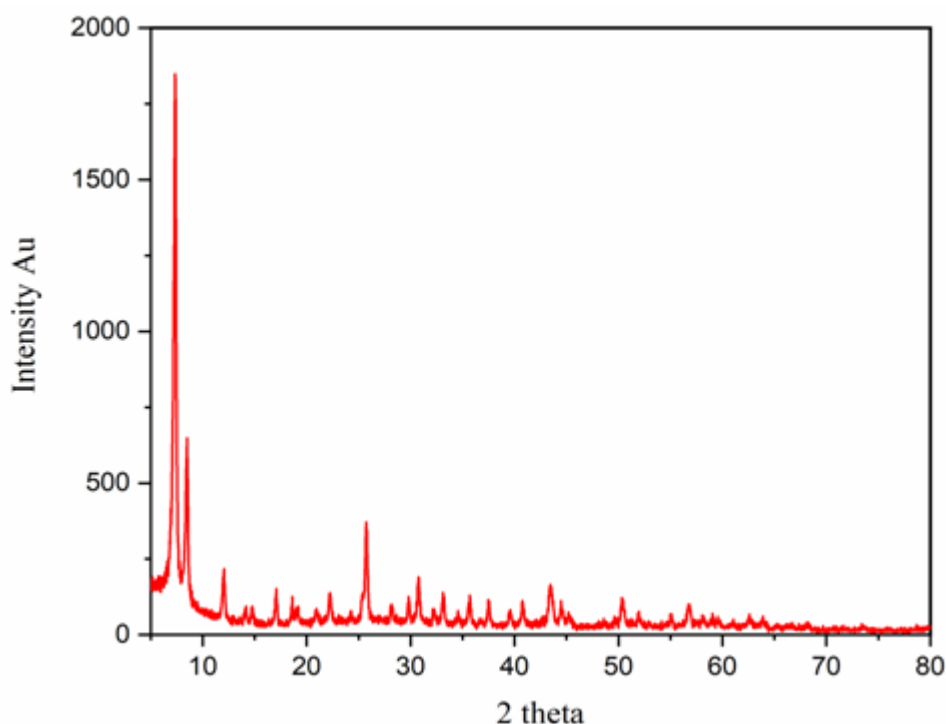


Figure. 3: Powder X-Ray Diffraction of Zr- MOF sample.

### 3.4 Tga

Thermo gravimetric Analysis (TGA) was performed on a sample of the synthesized MOF to determine its thermal stability (Fig.4). The graph shows two inflections typically seen for UiO-66. The initial inflection indicates the release of solvent molecules from the framework which is centered at around  $77^\circ\text{C}$ . The second

significant loss in mass occurring at 550°C denotes the complete decomposition of the structure with the removal of ligand molecules leaving behind  $\text{ZrO}_2$ . With a total loss of 63.93% of the initial mass, a residual mass of 36.07% is left behind from which the amount of Zirconium present can be deduced.

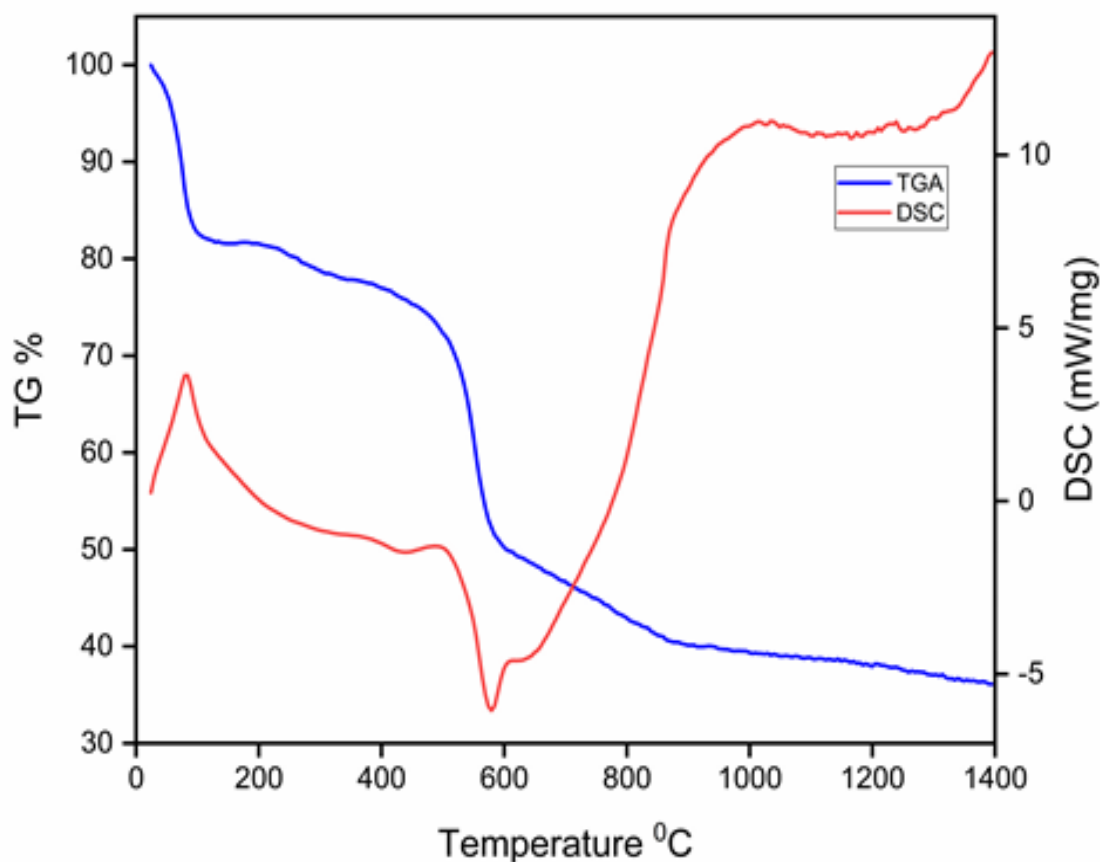


Figure. 4: Thermo gravimetric analysis of the synthesized UiO-66

### 3.5 electrochemical studies

The electrochemical performances of MOF were evaluated by the cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS) and galvanostatic charge/discharge (GCD).

All electrochemical studies were carried out on conventional three-electrode system coupled electrochemical workstation (CHI660D) with standard Calomel Electrode (SCE) as reference electrode, glassy carbon (GC) disk as working electrode (0.037 cm<sup>2</sup>), and platinum wire as the counter electrode. Working electrode was prepared by the drop coating of the MOF slurry. The quantified amount of the MOF dispersed in 5wt% of Nafion contained 100 µL of ethanol. The 2.5 µL of slurry was drop casted on the GCE (mass loading of 0.086 g/cm<sup>2</sup>) and this electrode was used for further electrochemical studies.

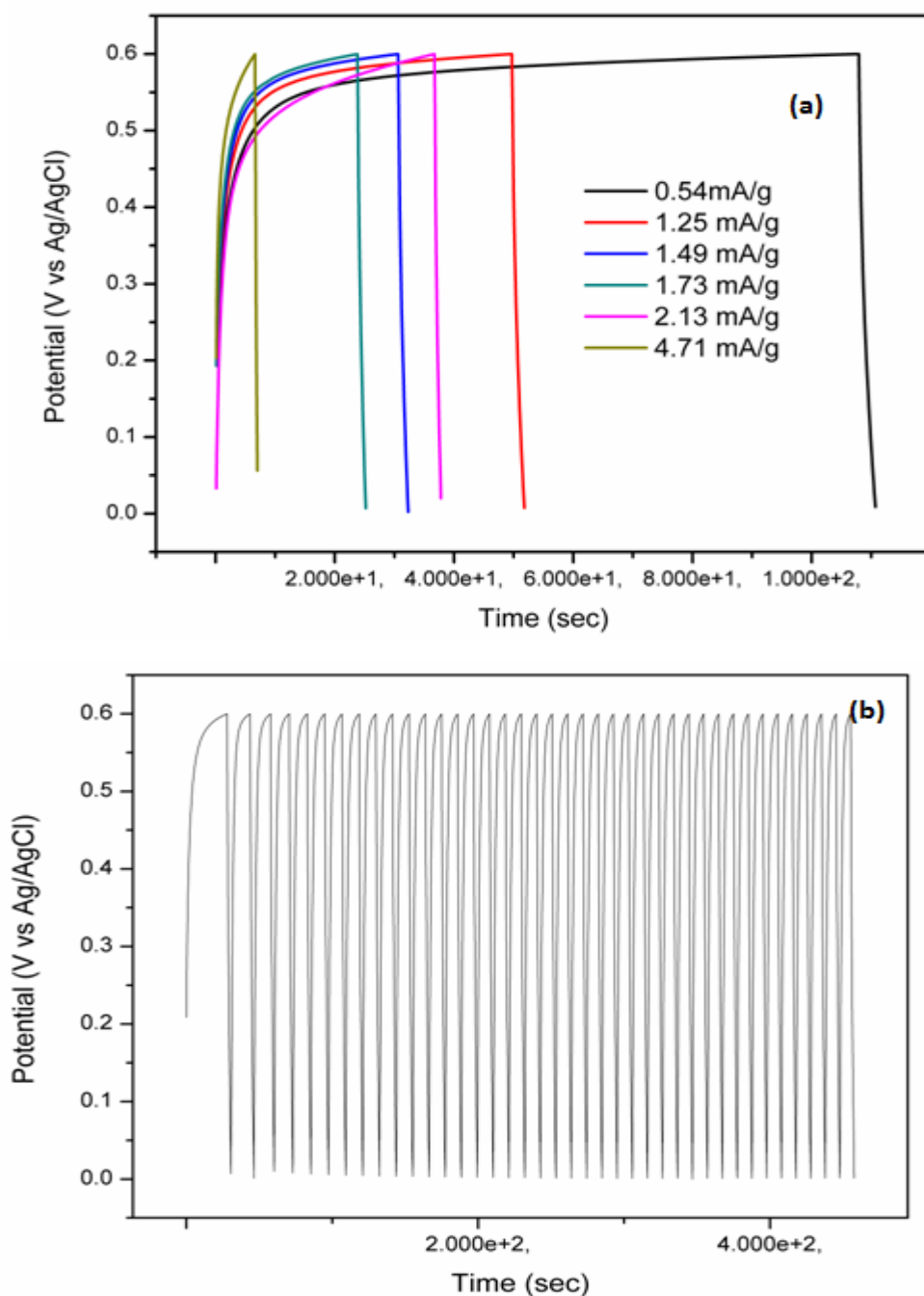
### 3.6 Galvanostatic charge/discharge studies:

The charge and discharge curves at different current rates 4.71, 2.13, 1.73, 1.49, 1.25 and 0.54 mA/g is shown in Fig.5a&b. It can be observed that the symmetrical characteristics of the curve indicate good pseudo capacitance properties due to fast charge/discharge process. The specific capacitance ( $C_{sp}$ ) is calculated using the equation given below [14].

$$C_{sp} = \frac{2 * I * \Delta t}{m * \Delta V}, (F/g)$$

Where, m is the mass of MOF on the electrode (g) and I,  $\Delta t$ ,  $\Delta V$  are the constant discharge current (A), discharge time (seconds) and potential change during the discharge process (V) respectively.

Galvanostatic charging/ discharging (Fig.5a&b) of MOF demonstrate the potential window of 0 to 0.6 V at various current densities. All the discharge curves were sharply decreased which menace the electrical double layer capacitance behaviours. The MOF show the specific capacitance value of 151, 177, 155, 199, 245, 311 mF/g, at 4.71, 2.13, 1.73, 1.49, 1.25 and 0.54 mA/g, respectively. The maximum specific capacitive values corresponding current density cycled for 40 cycles show the same capacitive values. [30]; [31].



**Figure.5 a & b: Galvanostatic charge and discharge (GCD) profiles**

From GCD curves the specific energy (SE, Wh Kg<sup>-1</sup>) and specific power (SP, KWKg<sup>-1</sup>) were calculated using the following equations.

$$SE = \frac{0.5 C_{sp} v^2}{3.6}$$

$$SP = 3600X \frac{SE}{t}$$

Where,  $C_{sp}$  is the specific capacitance,  $v$  (V) the working potential, and 't' the discharge time

### 3.7 Cyclic voltammetry:

From the cyclic voltammetry, the value of specific capacitance ( $C_{sp}$ ) was calculated. The CV curve of MOF (Fig 6) shows typical rectangular voltammogram at maximum current density of 41  $\mu$ A/g denotes the electrical double layer capacitance behaviour. The maximum specific capacitance value of 20.66 mF/g at 50 mV/s was calculated from the equation 1.



$$C_{sp} = I * t * V * m \quad (1)$$

Where, I- current, t- time, v-voltage, m-mass of the active electrode. [32]

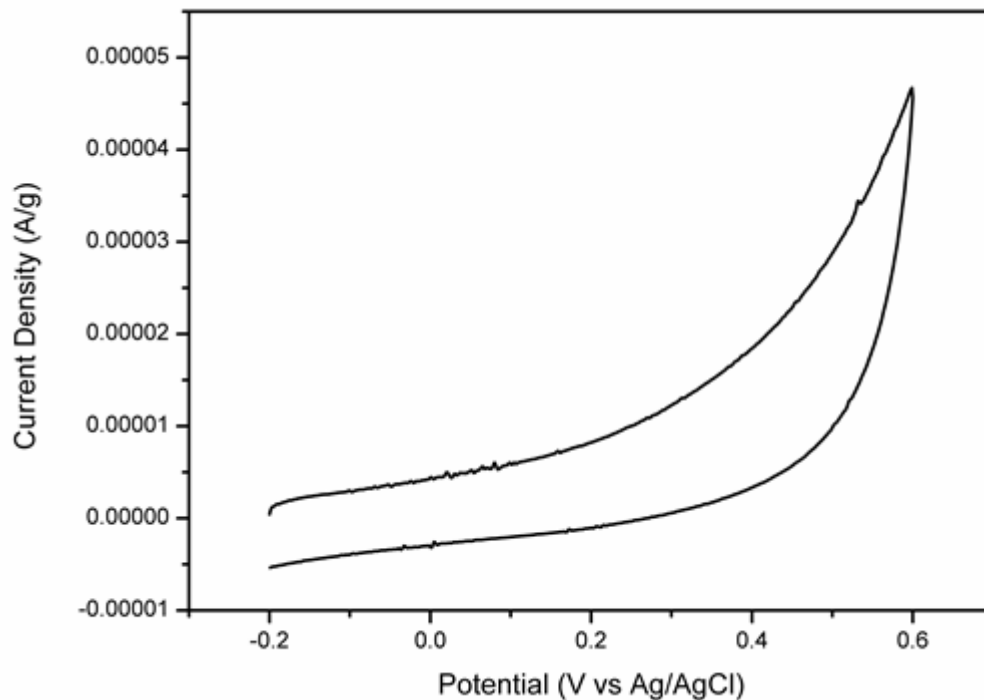


Fig.6. Cyclic voltammograms with different scan rates

### 3.8 Electrochemical impedance spectroscopy (EIS):

EIS measurements were performed over the frequency range of 1MHz to 1 Hz at open circuit potential, and corresponding Nyquist plots were presented in Figure7.

The Nyquist plot of MOF shows a small semicircle at 62  $\Omega$  in the high-frequency region which confirming the lower charge transfer resistance which means of high conductive nature of MOF (Fig.7). At the low-frequency region, a slight vertical line denotes the capacitive behaviour of MOF. The presence of a resistance against charge transfer and the diameter of this semicircle were used for estimation of the charge transfer resistance (RCT), which  $R_{ct}$  and  $R_s$  values were estimated to be 0.5 $\Omega$  and 0.13 $\Omega$ , respectively.

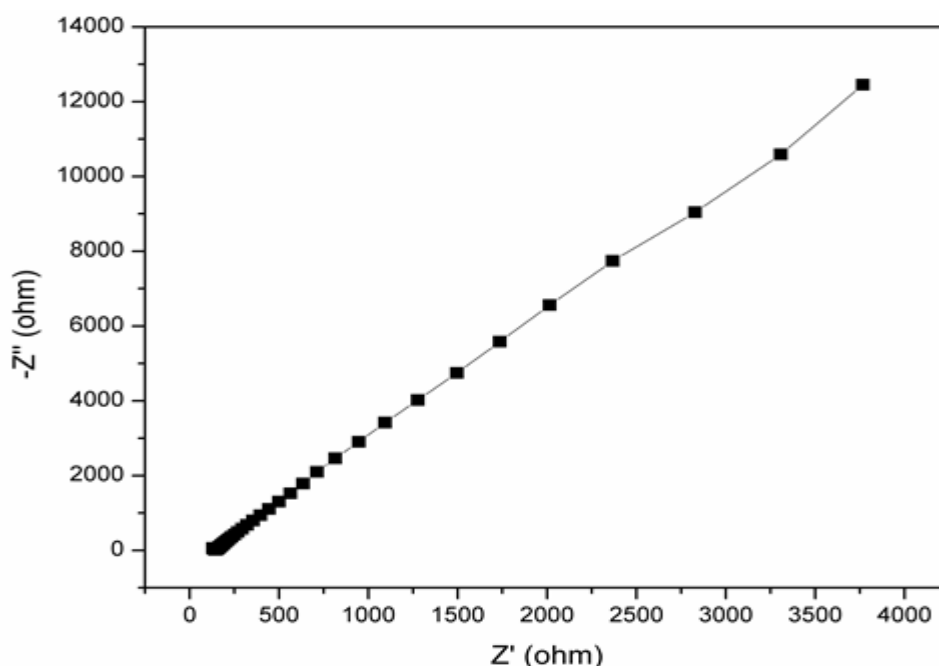


Fig.7 Nyquist plots

#### 4. CONCLUSIONS

In conclusion, UiO-66, a Zr-based MOF was successfully synthesized and characterized. Its ability to be used as a potential electrochemical material was also explored. Electrochemical properties were measured by the cyclic voltammeter (CV), electrochemical impedance spectroscopy (EIS), and galvanostatic charge/discharge (GCD). The maximum specific capacitance value of 20.66 mF/g at 50 mV/s was obtained. The charge transfer resistance (RCT), which  $R_{ct}$  and  $R_s$  values were estimated to be  $0.5\Omega$  and  $0.13\Omega$ , respectively. The electrochemical performance indicated that the UiO-66 electrode have potential application in electrode material for supercapacitors.

#### ACKNOWLEDGEMENTS

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#### 5. REFERENCES

- [1] Y. Sun, H.C. Zhou, Recent progress in the synthesis of metal–organic frameworks, *Sci. Tech Adv. Mater.* 16 (2015) 054202. <https://doi.org/10.1088/1468-6996/16/5/054202>
- [2] Z. Yin, S. Wan, J. Yang, M. Kurmoo, M.H. Zeng, Recent advances in post-synthetic modification of metal–organic frameworks: New types and tandem reactions, *Coordination Chemistry Reviews.* 378 (2019) 500-512.
- [3] T. Frišćić, P.A. Julien, C. Mottillo, Environmentally-Friendly Designs and Syntheses of Metal-Organic Frameworks (MOFs), *Green Technologies for the Environment 2014* (pp. 161-183). American Chemical Society. 10.1021/bk-2014-1186.ch009
- [4] J. Klinowski, F.A. Paz, P. Silva, J. Rocha, Microwave-assisted synthesis of metal–organic frameworks. *Dalton Trans.* 40 (2011) 321-330.
- [5] D. Chen, P.F. Feng, F.H. Wei, Preparation of Fe (III)-MOFs by microwave-assisted ball for efficiently removing organic dyes in aqueous solutions under natural light, *Chemical Eng. Process.* 135 (2019) 63-67.
- [6] N. Stock, S. Biswas, Synthesis of metal-organic frameworks (MOFs): routes to various MOF topologies, morphologies, and composites, *Chem. Reviews.* 112 (2012) 933-969.
- [7] M. Eddaoudi, J. Kim, N. Rosi, D. Vodak, J. Wachter, M. O'Keeffe, O.M. Yaghi, Systematic design of pore size and functionality in isorecticular MOFs and their application in methane storage, *Science.* 295 (2002) 469-472.
- [8] X. Zhang, M.R. Saber, A.P. Prosvirin, J.H. Reibenspies, L. Sun, M. Ballesteros-Rivas, H. Zhao, K.R. Dunbar, Magnetic ordering in TCNQ-based metal-organic frameworks with host-guest interactions, *Inorg. Chem. Front.* 2 (2015) 904-911.
- [9] L.L. Zhang, X.S. Zhao, Carbon-based materials as supercapacitor electrodes, *Chem. Soc. Rev.* 38 (2009) 2520-2531.
- [10] J. Sun, Q. Li, G. Chen, J. Duan, G. Liu, W. Jin, MOF-801 incorporated PEBA mixed-matrix composite membranes for CO<sub>2</sub> capture, *Sep. Purif. Technol.* 217 (2019) 229-239.
- [11] J. Lee, O.K. Farha, J. Roberts, K.A. Scheidt, S.T. Nguyen, J.T. Hupp, Metal–organic framework materials as catalysts, *Chem. Soc. Rev.* 38 (2009) 1450-1459.
- [12] L.E. Kreno, K. Leong, O.K. Farha, M. Allendorf, R.P. Van Duyne, J.T. Hupp, Metal–organic framework materials as chemical sensors, *Chem. Rev.* 112 (2012) 1105-1125.
- [13] A.C. McKinlay, R.E. Morris, P. Horcajada, G. Férey, R. Gref, R. Couvreur, P. Serre, C. BioMOFs: metal–organic frameworks for biological and medical applications. *Angew. Chem. Int. Ed.* 49 (2010) 6260-6266.
- [14] C. Feng, C.P. Lv, Z.Q. Li, H. Zhao, H.H. Huang, A porous 2D Ni-MOF material with a high supercapacitive performance, *J. Solid State Chem.* 265 (2018) 244-247.
- [15] Y. Su, Z. Li, H. Zhou, S. Kang, Y. Zhang, C. Yu, G. Wang, Ni/carbon aerogels derived from water induced self-assembly of Ni-MOF for adsorption and catalytic conversion of oily wastewater, *Chem. Eng. J.* 402 (2020) 126205.

- [16] J. Abdi,H.Abedini, MOF-based polymeric nanocomposite beads as an efficient adsorbent for wastewater treatment in batch and continuous systems: Modelling and experiment, *Chem. Eng. J.* 400(2020) 125862.
- [17] P. Kumar, V.Bansal, K.H. Kim, E.E. Kwon, Metal-organic frameworks (MOFs) as futuristic options for wastewater treatment, *J.Ind.Eng.Chem.*62 (2018) 130-145.
- [18] K.B. Wang,Q.Xun, Q. Zhang, Recent progress in metal-organic frameworks as active materials for supercapacitors,*EnergyChem.* 2(2020) 100025.
- [19] Y. Wang, B. Li, B. Zhang, S.Tian, X. Yang, H. Ye, Z. Xia, G.Zheng, Application of MOFs-derived mixed metal oxides in energy storage, *J. Electroanal.Chem.* 878(2020) 114576.
- [20] F.B. Ajdari, E. Kowsari,M.N.Shahrak,A.Ehsani,Z.Kiaei,H.Torkzaban, M.Ershadi,S.K.Eshkalak, V. Haddadi-Asl,A.Chinnappan, S. Ramakrishna, A review on the field patents and recent developments over the application of metal organic frameworks (MOFs) in supercapacitors,*Coord. Chem. Rev.* 422 (2020) 213441.
- [21] H.S. Kim, M.S. Kang,W.C.Yoo, Boost-up electrochemical performance of MOFs via confined synthesis within nanoporous carbon matrices for supercapacitor and oxygen reduction reaction applications. *J. Mater. Chem. A.* 7 (2019) 5561-5574.
- [22] Li Li Zhang, X. S. Zhao, Carbon-based materials as supercapacitor electrodes, *Chem. Soc. Rev.* 38 (2009) 2520-2531.
- [23] Z. Yin, S. Wan, J. Yang, M. Kurmoo, M.H. Zeng, Recent advances in post-synthetic modification of metal–organic frameworks: New types and tandem reactions,*Coord. Chem. Rev.* 378 (2019) 500-512.
- [24] T. Liu, L. Finn, M. Yu, H. Wang,T.Zhai, X. Lu, Y. Tong, Y. Li,Polyaniline and polypyrrolepseudocapacitor electrodes with excellent cycling stability, *Nano lett.* 14 (2014) 2522-2527.
- [25] R. Díaz, M.G.Orcajo, J.A.Botas, G. Calleja, J. Palma, Co8-MOF-5 as electrode for supercapacitors, *Materials letters.* 68(2012) 126-128.
- [26] Y. Bai, Y. Dou,L.H.Xie, W. Rutledge, J.R. Li, H.C. Zhou,Zr-based metal–organic frameworks: design, synthesis, structure, and applications. *Chem. Soc. Rev.* 45 (2016) 2327-2367.
- [27] M.J. Katz, Z.J. Brown, Y.J. Colón, P.W.Siu,K.A.Scheidt,R.Q.Snurr, J.T.Hupp, O.K.Farha, A facile synthesis of UiO-66, UiO-67 and their derivatives,*ChemComm.* 49 (2013) 9449-9451.
- [28] J.H. Cavka, S. Jakobsen,U.Olsbye,N.Guillou, C.Lamberti,S.Bordiga,K.P.Lillerud, A new zirconium inorganic building brick forming metal organic frameworks with exceptional stability, *J. Am. Chem. Soc.* 130 (2008) 13850-13851.
- [29] N.Lu, F. Zhou, H.Jia, H. Wang, B. Fan, R. Li, Dry-gel conversion synthesis of Zr-based metal–organic frameworks, *Ind. Eng. Chem. Res.*56 (2017) 14155-14163.
- [30] T. Mehtab, G. Yasin, M. Arif, M.Shakeel, R.M.Korai, M. Nadeem, N. Muhammad, X. Lu, Metal-organic frameworks for energy storage devices: batteries and supercapacitors, *J. Energy Storage.* 21 (2019) 632-646.
- [31] D.G. Wang, Z. Liang, S.Gao, C.Qu, R.Zou, Metal-organic framework-based materials for hybrid supercapacitor application,*Coord.Chem. Rev.* 404 (2020) 213093.
- [32] A.E.Baumann, D.A. Burns, B. Liu, V.S.Thoi, Metal-organic framework functionalization and design strategies for advanced electrochemical energy storage devices,*Commun. Chem.* 2 (2019) 1-4.

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**BUDGETED AND ACTUAL REVENUE AND EXPENDITURE OF THANE MUNICIPAL CORPORATION: A COMPARATIVE STUDY**

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*The Municipal Corporation are having budgeted estimation regarding revenue, grants which they expectable to receive as well as expenditures planning of upcoming financial year. But in reality there is a difference in estimated and actual revenue and expenditures which affect the development planning of administration and citizen's expectations. The study is an attempt to undertake to analysis of budgeted revenue and expenditures with actual with respect to Thane Municipal Corporation in order to find whether any significant difference is exist between them. For this prepare trend analysis tables for comparative study by Income and Expenditure Account and Budget Books of 10 years from 2007-08 to 2016-17. It statistically examine whether the budgeted revenue reach to reality and to examine the budgeted expenditure utilise up to maximum extend for development of the Thane City.*

*Key Words-* Thane Municipal Corporation (TMC), Budget, Revenue, Expenditures

**INTRODUCTION**

Finance is the core element like blood circulation in institution whether its commercial or non-commercial institutions are concerned. Municipal Corporations are the financial core of the state.

Municipal Corporation play pivotal role in local economic development as they have a sizeable proportion of overall public financial resources but they are subject to the scrutiny in terms of physical and financial performance. The Municipal Corporation are also having a pattern to prepare the budgeted estimation regarding revenue, grants which they expectable to receive as well as revenue and capital expenditures planning are in upcoming financial year. But in reality there is a difference in estimated and actual revenue and expenditures which affect the development planning of administration and citizen's expectations.

The study is an attempt to undertake to analysis of budgeted revenue and expenditures with actual with respect to Thane Municipal Corporation in order to find whether any significant difference is exist between them. The study is focused to find whether the expected revenue reach to reality and administration is able to utilise budgeted expenditure up to maximum extend for development of Thane City or not. Findings with suggestion are also be provides to reduce the difference between budgeted and actual figures of revenue and expenditures.

**PROFILE OF THANE MUNICIPAL CORPORATION:**

Thane Municipal Corporation (TMC) can be visualized at different levels as it comprises of the most cosmopolitan population with most advanced technologies and infrastructure which is closer to Mumbai holds cosmopolitan population next to Mumbai. Due to limited space accessible for future population and economic expansion, Greater Mumbai began to relocate its inhabitants to nearby locations especially in Thane City. Thane Municipal Corporation came into existence on 1<sup>st</sup> Oct, 1982 with its geographical expanse 128.23 sq. km. with 18,41,000 populations as per census of 2011.

**OBJECTIVES OF STUDY:**

1. To analyse the revenue and expenditures of the Thane municipal corporation.
2. To find whether the budgeted revenue reach to reality.
3. To examine the budgeted expenditure utilise up to maximum extend for development of the Thane City.

**HYPOTHESIS:**

H1: There is no significant difference between the Budgeted and Actual Revenue and Expenditures of the TMC.

H2: There is significant difference between the Budgeted and Actual Revenue and Expenditures of the TMC.

**RESEARCH METHODOLOGY:**

- The Balance Sheet and Income and Expenditure Account of 10 years from 2007-08 to 2016-17 had collected.
- Prepared trend analysis tables for comparative study.
- The Budget Book of 10 years from 2007-08 to 2016-17 are utilised for preparation of trend tables of budgeted figures and match with actual.

- Trend Analysis with linear and polynomial fit was used to analyse the secondary data acquired.
- Mean, standard deviation used to examine the data.
- Kolmogorov-Smirnov used for test of normality.
- T-test used to compare the significance of difference between Budgeted and Actual Revenue and Expenditures.
- The tables and graphs are laid out in such a way that they are easy to comprehend.

#### Data Analysis and Interpretation:

**Table No. 1: Test of Normality:**

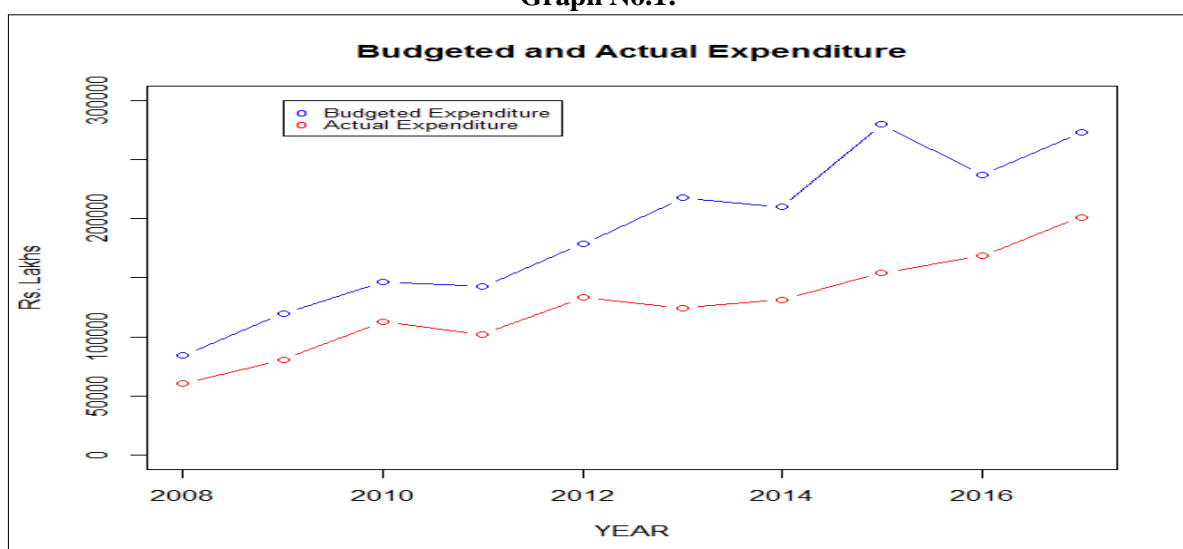
Difference	Kolmogorov-Smirnov <sup>a</sup>		
	Statistic	df	Sig.
Income and Expenditure	.244	10	.093
Budgeted and Actual Expense	.203	10	.200*
Budgeted and Actual Revenue	.172	10	.200*

**Interpretation:** As p-value for all the parameters is greater than that of 0.05 indicating that the data is at least approximately normally distributed. Therefore we used paired t-test to compare the significance of difference between Budgeted and Actual Revenue and Expenditures.

**Table No. 2: Budgeted and Actual Expenses:**

Year	Budgeted Expenses	Actual Expenses	Difference
2007-08	8428894500	6080935038	2347959462
2008-09	11989376650	8063590265	3925786385
2009-10	14651318040	11275141943	3376176097
2010-11	14291450812	10205847000	4085603812
2011-12	17853292000	13326560000	4526732000
2012-13	21770062000	12457869000	9312193000
2013-14	20996206000	13124076000	7872130000
2014-15	27957603000	15430269000	12527334000
2015-16	23698000000	16843072000	6854928000
2016-17	27298523000	20118944000	7179579000
<b>Mean</b>	18893472600	12692630425	6200842176
<b>S.D.</b>	6549075094	4134542599	3147488602

**Graph No.1:**



With the help of above data, study testing that there is significance of difference between the budgeted and actual Expenditure of the TMC exist or not. The Graph no.1 also indicates the difference between budgeted and actual Expenditure.

**Table No.3: Descriptive Statistics:**

In Lakhs	Mean	N	SD
Budgeted Expenditure	188934.7270	10	65490.74952
Actual Expenditure	126926.3040	10	41345.42637

**Table No.3: t-test result:**

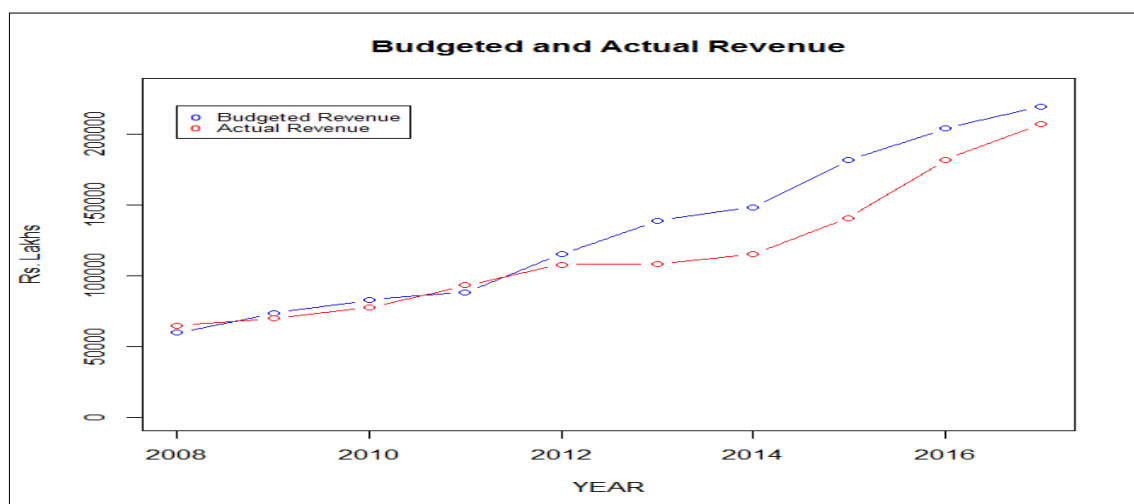
t-test	df	p-value
6.230	9	.000

**Interpretation**

As p-value for the t-test is less than that of 0.05 indicates that there **exists significance of difference between the average Budgeted and Actual expenditure over the study period**. It is observed that the average budgeted expenditure is significantly more than actual expenditure.

**Table No. 4: Budgeted and Actual Revenue:**

YEAR	Budgeted Municipal Revenue	Actual Municipal Revenue	Difference
2007-08	5975944000	6478218850	-502274850
2008-09	7348869000	6993628064	355240936
2009-10	8288178000	7774566000	513612000
2010-11	8840990000	9321077000	-480087000
2011-12	11511748000	10787297000	724451000
2012-13	13870157000	10838585000	3031572000
2013-14	14846059000	11543757000	3302302000
2014-15	18140000000	14075094000	4064906000
2015-16	20380000000	18160979000	2219021000
2016-17	21955000000	20718831000	1236169000
<b>Mean</b>	13115694500	11669203291	1446491209
<b>S.D.</b>	5657771930	4723462310	1617455963

**Graph No. 2:**

With the help of above data, study testing that there is significance of difference between the budgeted and actual revenue of the TMC exist or not. The Graph no.2 also indicates the difference between budgeted and actual Expenditure.

**Table No. 5: Descriptive Statistics:**

In Lakhs	Mean	N	SD
Budgeted Revenue	131156.9450	10	56577.71930
Actual Revenue	116692.0330	10	47234.62299

**Table No. 6: t-test result:**

t-test	df	p-value
2.828	9	.020

**Interpretation:**

As p-value for the t-test is less than that of 0.05 indicates that there exists **significance of difference between the average Budgeted and Actual Revenue over the study period**. It is observed that the average budgeted revenue is significantly more than actual revenue.

**HYPOTHESIS TESTING:****Table No. 7: Hypothesis testing:**

Parameters of Hypothesis	P- Value	Result	Hypothesis
Difference between the Budgeted and Actual Revenue of the TMC.	0.02	Significant	H2 Accepted
Difference between the Budgeted and Actual Expenditures of the TMC.	0.00	Significant	H2 Accepted

As p-value for the t-test is less than that of 0.05 for both parameters of hypothesis indicates that there exists **significance of difference between the average Budgeted and Actual Revenue and Expenditures over the study period**. Therefore null hypothesis is rejected and accept alternate hypothesis of **there is significant difference between the Budgeted and Actual Revenue and Expenditures of the TMC**.

**FINDINGS**

- The Budgeted and Actual Expenditures of the TMC is significantly different of the study period from 2007-08 to 2016-17.
- It is observed that the average budgeted expenditure is significantly more than actual expenditure.
- The average budgeted expenditure of Rs.188934.7270 lakhs is significantly more than actual expenditure of Rs.126926.3040 lakhs of the study period from 2007-08 to 2016-17.
- The Budgeted and Actual Revenue of the TMC is significantly different of the study period from 2007-08 to 2016-17.
- It is observed that the average budgeted revenue is significantly more than actual revenue.
- The average budgeted revenue of Rs. 131156.9450 lakhs is significantly more than actual expenditure of Rs. 116692.0330 lakhs of the study period from 2007-08 to 2016-17.

**SUGGESTIONS****Measures to increase Revenue Collection to match with Budgeted:**

- Municipal Revenues limit local spending since municipalities are required by law to balance their budgets and any municipal borrowing must be approved by the state government.
- The major cause is to fall in collection of property tax, water bills, fines, charges and premiums from the real estate etc.
- Thane Municipal Corporation announce before or due date payment benefits for municipal bills and taxes to avoid late payment by residents which increases risk of debts.
- Create awareness by advertising or hoardings to pay taxes or municipal charges on time by offering discount.
- TMC have to adopt adequate software solution for its revenue and debt management controls.
- By adequate software solution TMC able to get effectively profile of the defaulters for late or not paying a tax.

**Measures to match expenditures with Budgeted:**

- TMC have to develop a mechanism to which ensure the development plans execution as per schedule.
- Adopt technological involvement through software's to accelerate the process of fund disbursement for purchase and development expenditures.
- The maintenance expenditures are mostly lack behind to spend, so have to concentrate on maintenance work.

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- To adopt adequate and fast disputes resolve measures which affect the on time completion of projects.
  - To appoint a committee on every financial year to analyse the reason of discrepancies between budgeted and actual revenue and expenditures.

**CONCLUSION**

The comparative study about Budgeted and Actual Revenue and Expenditure of Thane Municipal Corporation is conducted by analysing Income and Expenditure account of 10 years from 2007-08 to 2016-17 which is statistically tested. The study conclude that the Budgeted and Actual Expenditures of the TMC is significantly different of the study period from 2007-08 to 2016-17. The average budgeted expenditure is significantly more than actual expenditure and need to adopt suggestions to ensure proper implementation of development plans on stipulated schedule. Similarly the Budgeted and Actual Revenue of the TMC is significantly different of the study period from 2007-08 to 2016-17. The average budgeted revenue is significantly more than actual revenue which indicates failure in collection of taxes, charges or other revenue.

**REFERENCES**

- Economic survey of Maharashtra 2014-15 and 2015-16 Directorate of Economics and Statistics, Planning Department, Government of Maharashtra, Mumbai.
- Annual Report of Thane Municipal Corporation from 2006 -2007 to 2016-17.
- Budget Books of Thane Municipal Corporation from 2006 -2007 to 2016-17.
- Thane Municipal Corporation (2007-2017): Budget of all related years.
- [https://en.wikipedia.org/wiki/Thane\\_Municipal\\_Corporation](https://en.wikipedia.org/wiki/Thane_Municipal_Corporation)
- [https://en.wikipedia.org/wiki/2011\\_Census\\_of\\_India](https://en.wikipedia.org/wiki/2011_Census_of_India)



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**PRESERVATION OF LIBRARY MATERIALS: A CRITICAL FACTOR IN ATTAINMENT OF SUSTAINABLE DEVELOPMENT IN AFRICA**

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**ABSTRACT**

*The paper discusses the importance and roles of preservation of information material as a key factor in achieving sustainable development. Natural aging, chemical composition, activities of biological agents, disasters, attitudinal behaviour were identified as the major courses of damage and deterioration and destruction of traditional information materials, while Digital materials were faced with media fragility and technological obsolescence. Deacidification, reformatting (digitization, microfilming and photocopying), Integrated pest management (IPM) development of disaster plan, and digital preservation were the preservation strategies discussed. Lack of documentation, inadequate funding, lack of policy framework, lack of trained personnel were the identified challenges facing preservation programmes in Nigeria. The paper recommended establishment of national preservation programme necessary policy framework, provision of adequate funding and preservation training for library personnel*

*Keywords: Libraries and sustainable development, sustainable development, preservation of library material, access to library material, African libraries*

**INTRODUCTION**

Human beings through their activities and interaction with their environment generate information and recorded them for use and developmental purposes. This may be in form of oral history or oral tradition, folklore, proverbs, festivals, artistic works, music, poetry and pottery, agriculture, medicine etc. These are documented on papyrus, vellum and parchment roll in the ancient time. In the modern time, scientific breakthroughs are documented on various media such as paper and digital media which make them widely available. However, the media of recording information from papyrus, vellum and parchment, paper and electronic media are susceptible to degradation, deterioration, damage and destruction by natural and man-made factors. Expressing his frustration, Alegbeleye (2008) asked a pertinent question “how far are we down the road towards cultural amnesia since throughout history the awesome task of transmitting society’s culture has been assigned to media as fragile as papyrus, clay tablets, parchment, paper and more recently digital media? Conway (1996) posited that the capacity to record and store gives rise to one of the central dilemmas of recorded history: Our capacity to record information has increased exponentially over time while the longevity of the media used to store the information has decreased equivalently. Traditional paper-based materials are prone to deterioration by natural aging, the inherent chemical component, environmental factors such as temperature and relative humidity, light, dust, mould and mildew, pest infestation, disasters, etc. Also, digital and electronic media are susceptible to damages through media fragility and technological obsolescence. Herdstom and Montgomery (1998) observed that digital media are especially vulnerable to loss and destruction because they are stored on fragile magnetic and optical carriers that deteriorate rapidly and that can fail suddenly from exposure to heat, humidity airborne contaminants, or faulty reading and writing devices. These challenges call for proactive measure in order to protect and preserve information materials from damage, destruction and deterioration for continuing access and use. Unfortunately, despite threats to information materials in their custody, little efforts are put in place by libraries to address preservation concern. Alemna (2005), expressed his concern about attitude of libraries to management of indigenous knowledge in Ghana, according to him, university libraries like their counterparts – special and public libraries, are doing very little in the form of collection, organising and disseminating indigenous knowledge. The need to preserve information materials for sustainable development stems from the fact that new knowledge was developed from old ones. Giving credence to this is the essence of literature review in research works. This paper is designed to establish how preservation of library resources could be harnessed for sustainable development

**Synergy of preservation of information materials and sustainable development**

“Access to the past enables us to understand and locate ourselves in the present and gives us the opportunity to inform the future and in preserving our shared past, we are preserving the collective memory for future generation. Preservation allows for the continuity of the past with the present and future” Mnjama.

Heritage institutions are saddled with the responsibility of acquiring/ collecting, organising storing and preserving information materials in different formats to meet the varying needs of society for information, research, scholarship and recreation for the wellbeing and development of society. It is believed that no

meaningful development could be achieved without access to and use of information. Therefore, it is important for governments, organisations and institutions to preserve and conserve their information resources to meet the present needs and lay foundation for future development. Preservation includes all the managerial and financial considerations including storage and accommodation provisions, staffing levels, policies, techniques and methods involved in preserving library and archive materials and the information contained in them. According to Conway (1996) the top priority of preservation is extending the usability of papers, films, magnetic tapes, and other media by stabilizing their structures and limiting the ability of the internal and external factors to cause deterioration. Drijfhout (2001) opined that without preservation, access becomes impossible and collections will decay and disintegrate. This will damage future scholarship and weaken our scientific and cultural heritage. Reaffirming IFLA's Lyon Declaration, Loida Garcia- Febo (2019) believed that "public access to information enables people to make informed decisions that can improve their lives. Communities that have access to timely and relevant information for all are better positioned to eradicate poverty and inequality, improve agriculture, provide quality education, and support people's health, culture, research, and innovation"

The International Institute for Environment and Development defined Sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development encompasses addressing climate change; food security, spread of diseases; underdevelopment and solving ecological and environmental problems. Discussing the role of libraries in sustainable development, a former IFLA President, Scheeder (2019) declared that 'there is no truly sustainable development without access to information, and no meaningful, inclusive access to information without libraries'. Justifying the assertion that development is a continuous process and the present development takes its root from the past, Feather (2004), posited that inheritance is the essence of heritage, but its custodians must concern themselves with what the future will inherit from the present as well as with what the present has inherited from the past. Also, Abrigo and Abrigo (2010), remarked that whatever was documented in the past is what present users are benefitting from today and that it is the role of today's users to safeguard the heritage for further generation to enjoy. Emphasising the importance of digital preservation Fitterman (2019 ) submitted that "one of the most important lessons of history is that societies without a well-maintained history do not progress. We need to think seriously now about preserving the advancements of the past century for future, much of which is contained on digital media. Lack of access to this knowledge, whether by destruction or obsolescence, has the same inevitable result.. a darker future for our children".

Adebayo (2012) expressed the need to appreciate indigenous knowledge as the cornerstone and bedrock of sustainable development. According to him, we must appreciate African traditional systems to be sustainable, and any proposal for modernization or change must proceed from a careful study of indigenous values and practices. Corroborating this position, Jain (2008), affirmed that although the western knowledge system still dominates the world today, even the scientists and professionals are acknowledging that the concept of sustainable development can never be fully appreciated without integrating IK in the development process. Adjie (2004) opined that recording essential aspects of the culture of a people will help increase knowledge about that culture worldwide, as documenting the culture of a people would help preserve that knowledge for posterity. Zulu and Kalusopa (2006) concluded that preservation of IK is critical to maintaining the identification of specific culture, for economic development, for preserving artistic and cultural works, and for achieving political goals of self identification and self reliance of indigenous communities, and for helping them to appreciate their history. On education, Fafunwa (1995) opined that, for possible educational reforms, reflection on previous events and policies will assist considerable in planning any future course of action. From the foregoing, it is established that sustainable development should be anchored on preservation of information materials to meet the current needs and future access.

### **Vulnerability of Information Resources to loss**

The media of recording information has evolved over time. According to Zulu and Kalusopa (2006) the written heritage of humankind, found in museums, monasteries, and private collections, consists of different cultural materials incised or written with ink or palm-leaf, bark, wooden tablets and traditional papers. Expressing his concern about vulnerability of information storage media to deterioration and loss of information content, Alegbeleye (2008), exclaimed that "how far are we down the road towards cultural amnesia since through history the awesome task of transmitting society's culture has been assigned to media as fragile as papyrus, clay tablets, parchment, paper and more recently digital media?". The vulnerability, susceptibility of media of information to various forms of deterioration and loss is well documented in literature. Factors responsible for their damage, deterioration and destruction are as discussed below:

**Lack of documentation:** Africa is predominantly oral society where little efforts are made on documentation of information generated through Indigenous Knowledge (IK) for access by future generation. Lamenting the lost of indigenous knowledge through oral tradition, Alemna (2005), said, “the grief arising from the devastating of a library by fire or similar causes in the western world is only comparable in intensity to the loss through death of old man in Africa. The latter like the former, is the veritable embodiment of an archive or proto-library – a library without shelf”.

**Chemical composition of the media:** In-built and chemical composition of some information materials are responsible for their deterioration and damage. Popoola (2003), observed that the main significant cause of deterioration and brittleness in paper-based information materials in Africa countries today is acidity. According to Kellerman (1999), books published in India and Africa is highly acidic, with few exception, all books from these two countries were printed on acidic paper. Akussah (1994) observed that the specific physical and chemical nature of the audio visual carriers in general and of sound carriers in particular is a factor in their increased vulnerability. A study conducted by Alegbeleye (1994) on deterioration of microfilm at the Kenneth Dike library, University of Ibadan revealed that chemical reaction influenced by heat moisture and or the presence of acidic vapour generated within the cellulose acetate support from where it diffuses creating a sharp acidic odour, and since they have all been afflicted by Vinegar syndrome they have to be removed from circulation.

**Attitudinal behaviour:** In many libraries, materials have been lost through careless treatment and mishandling. Rolich and Mohchenrich (1997), observed that the problem with library materials is that even those people who respected and value them as community property cause unthinking damage that lead to their gradual demise. According to them, most damage are not malicious but are as a result of thoughtless or careless behaviour including careless handling and stock of book on top of each other or flicked over roughly to expose their inside back cover for date stamping when being forced down hard onto photocopier.

**Environmental factors:** Information materials are stored under poor environmental condition especially under high temperature and relative humidity. Apart from accelerating deterioration of library materials, fluctuation and unstable weather condition aggravate and provide conducive environment for pest infestation.

**Destruction by biological agents:** Studies on preservation of archives and library materials (Pinniger and Winsor, 2004, Ngulube, 2005, Nyanga, Nengomasha and Beuke- Amiss, 2018) Bankole and Abioye, 2005, Bankole, 2010) revealed that libraries and archives especially in the tropical African climate have recorded unprecedented loss of their valuable materials through destructive activities of biological agents like cockroaches, rodents, termites, silverfish and micro-organisms like fungi, mould and mildew.

**Disasters:** Libraries and other heritage institutions have recorded irreparable losses of their materials to various types of disasters. Peggy (2014) listed the types of disaster that commonly occur in libraries to include fires, flooding, interior and exterior building leaks, hurricanes, tornadoes, volcanoes, vermines and pest infestations, storm damage, chemical spills and extended power failures theft and mutilation, arson, earthquake, tsunami, computer virus. Fitterman (2019) observed that throughout human history, civilization has suffered massive losses of knowledge to various types of disaster. For example, the library at Alexandria, constructed by Ptolemy in the 5<sup>th</sup> Century BCE, which had the greatest accumulation of knowledge in the ancient world was destroyed three times, each time taking with it untold intellectual riches of the ancient world. Akussah and Fosu in their report of disasters in Ghanaian libraries detail how an earthquake badly affected Accra's Aglonby Library in 1939.

**Challenges of digital Preservation:** Like their paper-based counterpart, digital media are not insulated from deterioration and damage which may deny access to information contain in them. Okafor and Olalekan (2018) observed that two germane issues constitute the need for developing and implementing digital preservation practices in any organisation, they are physical deterioration of the carrier media of digital contents and technological obsolescence of the hardware and software of the carrier and functional media of the digital contents. According to Alegbeleye (2018), experts have identified a number of threats to digital materials to include:

- a. Hardware and software obsolescence
- b. Media failure
- c. Operational error
- d. Malicious external attack

- e. Economic failure
- f. Lack of expertise
- g. Organisational failure
- h. Disasters and accidents

### Strategies for Preservation of library materials for sustainable development

Advocating the need to address preservation of information materials for attainment of desired goals, Sanett (2002) suggested that applying business concepts, in combination with archival precepts and collection management principles to the challenge of preserving electronic records will assist institutions such as archives and libraries in making decisions that will support their mission statement and act in the best interests of their users. In order for libraries and archives to meaningfully contribute to sustainable development, the following strategies are imperative:

Preservation of Indigenous Knowledge (IK): Jain (2008) posited that Indigenous knowledge (IK) are difficult to acquire, process and preserve because of the way and manner they were created. She proposed that IK can be preserved by:

- a. Recording IK into audios, videos and other modern ICT media formats
- b. Making the communities aware of the value of IK through storytelling, dances, plays etc
- c. Assisting communities in documenting their local practices
- d. Making IK available to the whole community
- e. Protecting intellectual property rights so that IK is not misused and provides benefits to its originators.

Use of permanent paper by publishers: Since paper acidity is the major cause of deterioration of paper-based collections, publishers of information materials should adopt international practice by publishing with permanent, groundwood-free alkaline paper with properties that guarantee the use and retention of records generated on it for a maximum of time. Teygeler (2004) described permanent paper as a paper that will last for several hundred years without significant deterioration under normal use and storage conditions. Publishing with permanent paper will address the issue of degradation and prolong the life of paper-based documents.

Deacidification: Akussah (2002) explained that deacidification treatment is reserved for books that are acidic and at risk of loss if no action is taken. The goal of deacidification, according to Wishand and Musser.(2003) is to absorb or reduce acidic levels in existing paper publications to permit a longer shelf life. The process halts further acid damage but does not repair or improve the extant condition of the item.

Reformatting: Since most of materials especially audio-visual materials are on platforms challenged by technological obsolescence, there is a need to move them to a better platforms. Reformatting is generally associated with safeguarding materials on a medium that is threatened by instability or technological obsolescence, it can also be used to shift use from original documents (Drijfhout, 2001, Ngulube 2002)). Reformatting or copying information from unstable original to media with proven and verifiable standards for longevity. Reformatting include, microfilming, photocopying and digitization. Astle & Muir (2002), defined digitisation as the conversion of any type of original, be it paper, photographic prints or slides, three dimensional objects or moving images into digital format. Researchers in preservation of library resources have discussed the benefits of digitization in libraries (Astle and Muire, 2002, Agyen- Gyasi, 2011, Ifijeh, 2014). Discussing the benefits of digitisation of the Ghana collections, Agyen- Gyasi (2011) posited that digitisation would bring added values including:

- a. Providing online access to the collection, and increased visibility, while facilitating enhanced searches with the creation of a new finding aids;
- b. Providing access to those materials can no longer be accessed in their original format, thus reducing demand for the original materials;
- c. Providing users with equitable access to unique national resources and government information;
- d. Enhancing use through improved quality images, for example improved legibility of faded or scanned documents;
- e. Encouraging new scholarly use through the provision of enhanced resources in the form of widespread dissemination of local or unique collections; and

- f. Taking-up very little space in the library in circumstances where lack of space for growth in collections is a common problem.

**Developing disaster management plan:** In order to forestall and prevent disasters in our heritage institutions, it is essential and mandatory to have a well implemented disaster preparedness plan. These encompass having a disaster plan, disaster policy, disaster team, equipment and facilities, and collaboration with organisations and institutions.

**Pest management and control:** In order to prevent destruction and damage of information materials in libraries and other heritage institutions, a consciously planned pest management should be put in place. However, IFLA recommended Integrated Pest Management which integrates a variety of methods to keep pest population below economic threshold while reducing overall loss and overuse of synthetic chemical but advocating judicious use of insecticides. It is described as ecologically based solution to pests problems that ensures reduction or elimination of pest in a community while protecting the environment from degradation

**Digital preservation:** Experts have device several methods and techniques for the preservation of digital information resources. Alegbeleye (2018), Koiki-Owoyele and Egbuni, 2018, Gbaje and Ibrahim, 2018)) summarized digital preservation techniques to include:

- a. Migration and conversion
- b. Refreshing
- c. Encapsulation
- d. Normalisation
- e. Durable/ preservation media
- f. Technology preservation
- g. Adhering to the Open Archiving Information Systems (OAIS)
- h. Creation of computer museum

#### **Challenges of preservation of library information materials in Africa**

Preservation of information materials in heritage institutions especially in Africa is faced with barrage of challenges. Report of Mnjama (2007, 2010), investigation on the management of audiovisual materials in the Botswana revealed that the problems emanate from weak legislative framework, lack of trained personnel, technological challenges, inadequate equipment and storage facilities and the perception by users that audiovisual materials are not as valuable as records in other formats. Okafor and Olalekan, 2018, Zulu and Kalusopa (2008) identified the problems of preservation of indigenous knowledge to include:

- a. Lack of a national policy framework on digital heritage preservation
- b. Relevant legislation on ICTs, especially on digital material preservation, is yet to be drawn and enacted;
- c. Lack of clearly defined national heritage institution(s) responsible for digital material preservation;
- d. Absence of coordinated national initiative and programmes on digitization
- e. Gaps in the necessary human resource requirements, in terms of knowledge skills and competences to drive digital material preservation in heritage institutions;
- f. Lack of standards in digital material preservation, in terms of hardware, software, storage media and metadata;
- g. Haphazard approach to digital material preservation in most heritage institutions; absence of local institutions that could serve as models for “best practices” ( or centre of excellence) in digital material preservation;
- h. The management of indigenous knowledge systems, in terms of their digitization, remain to be addressed; and
- i. Disaster planning and recovery in most heritage organisations remains to be addressed

**Financial Resources:** Poor funding has been identified as the key problem confronting preservation management in developing countries. Report of assessment of future of preservation across continents of the world by Varlamoff, (2004), revealed that in Africa, government and politicians in general do not consider

libraries or archives as a priority, and therefore allocate no money for preservation of the collections. Abioye quoting Toyo 2017 identified the challenges of managing electronic records to include inadequate funding; inadequate security measures; lack of ICT skills; inadequate basic infrastructure; and absence of standard procedures.

**Lack of trained personnel:** Abioye (2008), observed that education and training in preservation and conservation constituted a critical issue in heritage preservation, according to him, while in developed world, the issue has received the priority attention it deserved, going by the survey of institutions offering courses in the field, not much has been achieved in Africa.

### **RECOMMENDATIONS**

In order to attain sustainable development through a consciously preservation programme, the following recommendations are imperative:

- 1 National policy on preservation of cultural heritage which will stipulate guidelines for collection and preservation of all formats of published information materials should be developed. Taking a cue from University of Washington, such policy should outline the plan to support sustainable preservation of and access to scholarly record for the foreseeable future. The policy will be subject to change as new capabilities, standards, best practices and technologies evolve, and as such will be regularly reviewed, revised and updated as needed.
- 2 Adequate financial resources should be provided for heritage institutions to support preservation activities and programmes such as reformatting especially digitization and digital preservation projects.
- 3 Institution for the training of information professionals on preservation and conservation of library and information materials should be established. For instance, American Institute for Conservation of Historic and Artistic Works and Canadian Conservation Institute in the United states of America and Canada respectively, are responsible for the training of manpower in preservation in those countries.
- 4 Training programmes should be organized by Library and Information Science associations and institutions for information professionals to acquire necessary skills in preservation and conservation.

### **CONCLUSION**

Access to information for research and development is critical to achieving sustainable development. It is established that all formats information are susceptible to damage, deterioration and destruction which will prevent access to their intellectual contents. It is incumbent on stakeholders in heritage institutions to preserve information materials in their custody for sustainable development. This can be achieved through a national preservation policy framework that will make adequate provision for the implementation success of the programme.

### **REFERENCES**

- Abioye, A.A (2008) Education and training in preservation and conservation. Paper presented at provision for the 1<sup>st</sup> National Heritage Preservation Conference held in Abuja, 19 – 21February, 2008, p.6
- Abrigo C.M and Abrigo, V.M (2010) Audio-visual preservation: a perpetual dilemma among Philippine academic libraries. <http://www.jst210/0304/2.abrigo.pdf>
- Adebayo, A. G (2012), A keynote address at the 2012 edition of Ibadan Sustainable Development Submit ( ISDS) “Building resilience in sustainable development in changing world” organized by the Centre for Sustainable Development, University of Ibadan, p. xiii
- Adjei, E (2005), Preserving indigenous knowledge: a case of audio-visual archives of the International centre for African Music and Dance (ICAMD). Ghana Library Journal Vol. 2005 Special Issue pp 43 - 53
- Agyen-Gyasi, K (2011), The Ghana collection at the Kwame Nkrumah University of Science and Technology Library. Information Development 27(1) pp 66 -71
- Akussah, H. (1994), The managing of microforms in the Balme Library, University of Ghana. African Journal of Library, Archives, and Information Science Vol. (1) pp. 35-40
- Alegbeleye, G.O (2008), Past imperfect, present continous, future perfect: the challenges of preserving recorded information in Nigeria. An Inaugural lecture delivered at the University of Ibadan, 2008

- .....(2007), Media deterioration: the case of microfilm damage at the National Archives of Nigeria and university of Ibadan. Paper presented at Nigeria's intellectual heritage. Proceedings of the International Conference in preserving Nigeria scholarly and literary tradition and Arabic/Ajami manuscript heritage held at the Ahmadu Bello University, Zaria, Kaduna State March, 2007 pp. 175 – 187
- .....(2018), Overview of digital preservation strategies. Proceedings of the Digital Preservation Conference 2018 held at the FCT Archives and History Bureau Area 11 Abuja Nigeria, pp. 1 -6
- Alemna, A.A (2005), The role of libraries in harnessing indigenous knowledge in Ghana. Ghana Library Journal. Vol. 17, pp.28 - 32
- Astle, P.J and Muir (2002) A Digitization and preservation in public libraries and archives. Journal of Librarianship and Information Science Vol. 34(2) pp 67 – 79
- Bankole, Olubanke M. (2010) A review of biological deterioration of library materials and possible control strategies in the tropics. Library Review. Vol. 59 (6), pp.414 – 429
- Conway, P. (1996) Preservation in the digital world, Washington, D.C: Commission on preservation and access.
- Drijfhout, D (2001) The dilemma of modern media: preserving web publicationc'. Journal of Librarianship and Information Science in Africa Vol. 1 pp 17- 27
- Fafunwa, B. ( 1995) History of education in Nigeria, Ibadan, NPS Educational, p.42
- Feather J. (2004) Managing preservation for libraries and archives: current practice and future development", Aldershort, Ashgate pp. 83 – 112
- Fitterman, J 2019 Preserving our future, <https://www.georgetowntech.org/blogfulltext/2018/9/9/preserve-our-future-the-importance-of-digital-preservation#>. Retrieved March 13, 2020
- Gbaje, E. S and Ibrahim U (2018) Beyond visibility and access: OAIS framework and institutional repository a strategy for long-term digital preservation of scholarly contents. In the Proceedings of the Digital Preservation Conference 2018 held at the FCT Archives and History Bureau Area 11 Abuja Nigeria pp 136 - 149
- Ifijeh, G. (2014), Adoption of digital preservation methods for theses in Nigerian academic libraries: applications and implications. Journal of Academic Librarianship 40
- Jain, P (2008), Indigenous knowledge systems in Africa in L.O Aina, Mutula S.M and Tihamiyu M.A ed. Information and Knowledge management in digital age: concepts, technologies and African perspectives, Ibadan, Third World Information Services
- Kellerman, L. S (1999), Combating whole-book deterioration: the rebinding & mass deacidification program at the Penn State University libraries. Library Resources and Technical Services Vol.43(3) pp 170 – 177
- Koiki-Owoyele A.E, Alabi A.O and Egbunu A.J (2018), Safeguarding Africa's cultural heritage through digital preservation: who takes the lead? Proceedings of the Digital Preservation Conference 2018 held at the FCT Archives and History Bureau Area 11 Abuja Nigeria, pp 66 -79
- Mnjama, N M (2005) A review of ESARBICA resolutions 1969 . African Journal of Library, Archives, and Information Science Vol.15 (2)pp. 23-32
- ..... 2010 Preservation and management of audio-visual archives in Botswana. African Journal of Library, Archives, and Information Science Vol.20 (2)
- Ngulube, P. (2002) Preservation reformatting strategies in selected sub-saharan African Archival Institutions. African Journal of Library, Archives, and Information Science Vol. 12 (2) pp. 117-132
- Peggy J, 2014) Fundamentals of collection development and management 3<sup>rd</sup> ed., London: Facet Publishing,
- Popoola S.O (2003) LSE 317: Preservation & conservation of information resources, Ibadan, Centre for Distance Learning, University of Ibadan

- 
- Rolich, A and Mohchenrich, J (1997) Staff and users education programmes for local and statewide initiatives. In promoting awareness in libraries: a sourcebook for academic, public, school and special libraries. Dorewes J and Page I.A ed. Westport Greenwood Press.
  - Sanett, S (2002), Toward developing a framework of cost elements for preserving authentic electronic records into perpetuity College and Research Libraries Vol. 63(5)pp 388 – 404
  - Teygeler, R 2004 Preserving paper: recent advances. In Feather J. ed. "managing preservation for libraries and archives: current practice and future development", Aldershot, Ashgate pp. 83 – 112
  - Varlamoff, M (2004) The future. In Feather J. ed. "managing preservation for libraries and archives: current practice and future development", Aldershot, Ashgate pp. 159 – 174
  - Wishard L.S and Musser L.R 2003 Preservation strategies for geoscience literature: new technologies for an old literature. Library Resources and Technical Services Vol. 43 pp 129 – 139
  - Zulu, S.F. C and Kalusopa, T (2008) Framework for digital preservation in Africa in L.O Aina, Mutula S.M and Tiamiyu M.A ed. Information and Knowledge management in digital age: concepts, technologies and African perspectives, Ibadan, Third World Information Services.



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**PROBLEMS FACED BY THE MEMBERS OF SELF HELP GROUPS: A STUDY OF TIRUPUR DISTRICT**

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**ABSTRACT**

*Microfinance is one of the down to earth advancement techniques and approaches that has been found and carried out for practical turn of events and has been utilized as a way to encourage comprehensive development in the Indian economy. Self improvement Gathering are assuming a vital part during the time spent monetary incorporation and ladies strengthening. Fortifying of women has been seen as a central issue in choosing countries like India, women have been isolated by the overall population. In any case, presently SELF HELP GROUPS have given a discussion to communicate her perspectives, support in dynamic and cooperation with one another with the assistance of miniature credit. Inspite of these ladies individuals from SHGs are as yet confronting a portion of the serious issues. So the current concentrate principally center on assessing the serious issues looked by SHGs in chosen spaces of Tirupur District. The current review depends on essential information. The essential information were gathered through meet method. It covers 50 SHGs both registered and unregistered in the study area. Stratified random sampling method was used to select the respondents. Out of 50 SHGs four members from each SHGs were selected for the study.*

*Keywords- Micro-finance, Problems, strategies, Empowerment.*

**INTRODUCTION**

Microfinance is one of the useful improvement methodologies and approaches that has been found and carried out for supportable turn of events and has been utilized as a way to cultivate comprehensive development in the Indian economy. It has been found as a method for satisfying the little monetary necessities of the helpless part of the general public. It is viewed as an effort movement in giving sufficient and inconvenience free money to the penniless and filling the hole existed in the formal institutional organization of giving little money. Self improvement Gathering are assuming a vital part during the time spent monetary consideration and ladies strengthening. Self improvement Gatherings is a little gathering of poor people 15-20, who intentionally convene positive to address their neediness and other social issues. It is framed deliberately and fairly with no political intercession and association. It tends to be all ladies gathering or all men bunch or even blended gathering. In any case, over 95% of these SHGs have just ladies individuals. The center action is activation of little reserve funds from bunch individuals and gathering loaning from collected reserve funds just as bank advances. An incredible larger part of the poor are ladies due to financial components, inflexibility of sex job, lack of education, and so on Miniature credit has played an impetus job in getting sorted out these ladies into SHGs. Strengthening of ladies has been perceived as a focal issue in deciding nations like India, ladies have been separated by the general public. Be that as it may, presently SHGs have given a discussion to communicate her perspectives, cooperation in dynamic and collaboration with one another with the assistance of miniature credit. Inspite of these ladies individuals from SHGs are as yet confronting a portion of the serious issues.

**OBJECTIVES OF THE STUDY**

➤ The overall objectives of this study are to evaluate the problems faced by the members of SHGs.

**SCOPE OF THE STUDY**

The study is restricted to the Tirupur District in the state of Tamilnadu. The sample is selected as random from SHGs in the study area. Since study is for generally evaluation of the foremost problems faced by the members of SHGs, only aspect related to members were collected.

**RESEARCH METHODOLOGY**

For the function of this study the primary information were collected throughout well structured interview schedule containing questions relating to major problems faced by members of SHGs like personal problems, marketing problems, financial problems, and product oriented problems by discussion with the two members of each SHG. The field survey has been carried out only in Tirupur city. It covers 50 SHGs both registered and unregistered in the study area. Stratified random sampling method was used to select the respondents. Out of 50 SHGs four members from each SHGs were selected for the study.

In order to problems faced by the women members the following were identified and included in the questionnaire

- ✓ Personal Problems
- ✓ Financial Problems
- ✓ Marketing Problems
- ✓ Socio-Cultural problems
- ✓ Production Oriented Problems

#### LIMITATIONS OF THE STUDY

- This study is limited only to Tirupur District
- Many members are not ready to give actual information.

#### TABLE-1 DEMOGRAPHIC PROFILE

The demographic profile of women members of SHG was analyzed results are presented in Table 1.

TABLE-1

Demographic profile	Frequency	Percentage
<b>Age group</b>		
19 – 28	89	22.25
29 – 38	186	46.5
39 – 48	83	20.75
49- 58	42	10.5
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Educational Qualification</b>		
Illiterate	54	13.5
Primary	190	47.5
Secondary	118	29.5
Graduate	38	9.5
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Occupation</b>		
Farmer	92	23
House wife	38	9.5
Labour	200	50
Small Scale Business	70	17.5
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Marital Status</b>		
Married	351	87.75
Divorcee	20	5
Separated	12	3
Widow	17	4.25
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Family Size</b>		
Below 2	43	10.75
2 – 4	288	72
4 – 6	42	10.5
Above 6	27	6.75
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Family Income</b>		
10000 – 12000	243	60.75
12000 – 14000	97	24.25
14000 – 16000	25	6.25
16000 and Above	35	8.75
<b>Total</b>	<b>400</b>	<b>100</b>

Source (Primary Data)

The table I reveals that 46.5% of the respondents are belongs to the age group of 29-38 years, 37.8% of the respondents are secondary, 50% of the respondents are labour, 87.75% of the respondents are married and 60.75% of the respondents are earning family income belongs to Rs.10000 - 12000.

**TABLE -2: PROBLEMS FACED BY THE SHG MEMBERS**

PROBLEMS	FREQUENCY	PERCENTAGE
<b>Personal Problems (A)</b>		
Lack of formal Education	245	61.25
Excessive Tension	58	14.5
Lack of Family Support	42	10.5
Family Responsibilities	27	6.75
Health Problems	28	10.75
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Financial Problems (B)</b>		
Shortage of Capital	105	26.25
Lack of collateral Security	97	24.25
Heavy Interest Rate	25	6.25
Insufficient Loan	135	33.75
Fixed Capital Problems	43	10.75
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Marketing Problems (C)</b>		
No Market for the Product	79	19.75
Lack of Marketing Experience	156	39
Heavy Competition	83	20.75
Credit Collection & Bad Debts	42	10.5
Lack of Training Programme on marketing the Product	40	10
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Socio-Cultural Problems (D)</b>		
Lack of Social Mobility	64	16
Male Domination	150	37.5
Lack of Motivation from Family Members	104	26
Traditional and Social Norms	38	9.5
Lack of Co-operation among the Members	44	11
<b>Total</b>	<b>400</b>	<b>100</b>
<b>Production Related Problems (E)</b>		
Non-availability of raw-material	40	10
Lack of Specialized Skill	251	62.75
Interruption and power failure	22	5.5
Non-availability of Equipment	27	6.75
Lack of Technical Know-how	60	15
<b>Total</b>	<b>400</b>	<b>100</b>

Source (Primary Data)

**Table 2 (A)** reveals that 61.75% of the respondents personal problem is that they do not have formal education. Where as 14.5 percent and 10.5 percent of the respondents have excessive tension and lack of family support. Respondents having family responsibilities and health problems are 6.75 percent and 10.75 percent respectively. Majority of the respondents having the problem of not have formal education.

**Table 2 (B)** reveals that 26.25 percent of the respondents having the problem of Shortage of Capital for commencing their business. Where as 24.25 percent and 6.25 percent of the respondents having the problem of lack of collateral security and heavy interest rate respectively. Where as the respondents having the problem of insufficient loan and fixed capital problems are 33.75 percent and 10.75 percent respectively. Majority of the respondents having the problem of insufficient loan.

**Table 2(C)** depicts that 19.75 percent of the respondents are no market for their product.39 percent of the respondents opinion is that they do not have marketing experience. Where as 20.75 percent and 10.5 percent of the respondents are facing the problem of heavy competition and credit collection and bad debts. 10 percent of

the respondents lack any training programme on marketing their product. Majority of the respondents having the problem of do not have marketing experience.

**Table 2 (D)** depicts that 16 percent of the respondents facing the problem of social mobility. 37.5 percent of the respondents opinion is that they could not uplift because of domination of male. Where as 26 percent and 9.5 percent of the respondents states that they lack motivation from family members and traditional and social norms. 11 percent of the respondents lack co-operation among the members. Majority of the respondents having the problem of male domination.

**Table 2 (E)** reveals that 10 percent of the respondents are facing the problem of non-availability of raw-material. Where as 62.75 percent and 5.5 percent of the respondents opinion is that they do not have specialized skill for marketing their product and interruption and power failure problem for production. Non-availability of equipment and Lack of Technical Know-how are another problems faced by 16.75 percent and 15 percent respectively. Majority of the respondents having the problem of do not have specialized skill for marketing their product.

### FINDINGS

- 46.5% of the respondents are belongs to the age group of 29-38 years.
- 37.8% of the respondents are belongs to the education qualification of secondary level.
- 50% of the respondents are belongs to the occupation of labour.
- 87.75% of the respondents are belongs to the marital status of married.
- 60.75% of the respondents are earning family income belongs to Rs.10000 - 12000.
- 61.25% of the respondents having the problem of not have formal education.
- 33.75% of the respondents having the problem of insufficient loan.
- 20.75% of the respondents having the problem of do not have marketing experience.
- 37.5% of the respondents having the problem of male domination.
- 62.75% of the respondents having the problem of do not have specialized skill for marketing their product.

### SUGGESTIONS

All SHG ladies individuals ought to be given essential information about SHGs and its significance. Issues looked by SHG individuals ought to be routinely taken care of and given arrangements. Satisfactory protection inclusion ought to be given to the specialty units advanced by SHG against the monetary misfortunes to defend the interest of the business people. Preparing programs identifying with the board of funds, keeping up with records, creation and showcasing exercises and so forth ought to be given. There ought to be a nonstop progression of assets to SHGs. Follow up ought to be expanded and solidarity ought to be improved. Data on banking and advertising angles ought to be given. Loan amount should be increased.

### CONCLUSION

All SHG ladies individuals ought to be given fundamental information about SHGs and it's significance. Issues looked by SHG individuals ought to be routinely taken care of and given arrangements. Sufficient protection inclusion ought to be given to the specialty units advanced by SHG against the monetary misfortunes to shield the interest of the business people. Preparing programs identifying with the board of funds, keeping up with records, creation and showcasing exercises and so on ought to be given. There ought to be a constant progression of assets to SHGs. Data on banking and showcasing viewpoints ought to be given. Advance sum ought to be expanded. The success of SHGs depends upon efficiency and effectiveness of groups.

### REFERENCE

- Shugufta Yasmeen & Gangaiah (2014). Women Empowerment Through Micro-Enterprises – A Study of Y.S.R District, A.P. *IOSR Journal Of Humanities And Social Science*, 19(2), 39-48.
- Srikanth & Kankipati Srinivasa Rao (2014). SHG's - Bank Linkage. *International Journal in Management and Social Science*, 2(12), 414-421.
- Vipinkumar V.P, Salim .Shyam S, Pushkaran K. N, Harshan N. K, Salini K. P & Sunil P. V (2014) The role of SHGs on coastal indebtedness in marine fisheries sector – a case study from Kerala, south India. *Indian J. Fish*, 61(1), 36-41.

- 
- Anju Kapoor, & Promila Kanwar, (2015). A brief account of women empowerment through self-help groups – A case study. *Himachal Journal of Agricultural Research*, 41(1), 93-96.
  - Eli kumari Das&Dharitri Baishya (2015). Role of Self-Help Groups in Empowering Rural Women: A case study on selected SHGs in Rani Block of Kamrup District of Assam. *IOSR Journal of Economics and Finance*, 6(2), 27-31.
  - Manjunatha Venkatappa & Theo Ebbers (2015). SHGs (SHGs) as a Tool of Socioeconomic Development of Rural People in the Mekong Region (A Case Study with special reference to the Kratie and Stung Treng provinces of Cambodia). *GMSARN International Journal*, 9, 107 – 112.
  - Meganathan, M. (2015). Development of schedule caste women through SHGs in Paramakudi Taluk. *International Journal of Research in Management, Economics & Commerce*, 5(1), 24-38.
  - Rahul Sarania, (2015). Impact of Self-Help Groups on Economic Empowerment of Women in Assam. *International Research Journal of Interdisciplinary & Multidisciplinary Studies*, 1(1), 148-159.
  - Ratna Ghosh, Paromita Chakravarti & Kumari Mansi (2015). Women's empowerment and education: Panchayats and women's Self-help Groups in India. *Policy Futures in Education*, 13(3), 294-314.
  - Rosary Ramona Fernando A., & Azhagaiah, R. (2015). Economic Empowerment of Women through SHGs. *Pacific Business Review International*, 8(5), 91-98.
  - Rupnawar & Sneha Upadhye (2015). Women empowerment through self-help group: A study of karjat taluka raigad district Maharashtra. *International Journal of Multidisciplinary Research and Development*, 2(10), 568-571.
  - Thirumagal. J. Pillai (2015). Self-Help Groups and Women Empowerment (an Empirical Study Done for Mulshi Taluka in Pune District of Maharashtra). *Indian Journal of Applied Research*, 5(3), 224-228.
  - Umakanta Tripathy, (2015). Socio-Economic Profile of SHGS on Women Empowerment: Case Study of three SHGS in Sambalpur District of Odisha, India. *International Research Journal of Social Sciences*, 4(5), 99-108.
  - Vipin Kumar, Monu Chauhan & Ritesh Kumar (2015). An Overview of Microfinance in India. *Abhinav National Monthly Refereed Journal of Research in Commerce & Management*, 4(10), 19-26.
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**ROLE OF FINANCIAL INSTITUTION IN SUCCESSFUL IMPLEMENTATION OF THE PROJECT  
FINANCIAL INCLUSION IN INDIA**

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Kargi Road, Kota, Bilaspur (C.G)**OBJECTIVE**

The transition from the state of `financial exclusion` to `financial inclusion` for such vast section of our society has become indispensable as India is still a home to one third of the world's poor. The country is also having largest unbanked population and only 35% adults have an account in financial institutions which shows that percentage of account penetration in India is below that of rest of the developing countries. To broaden the resource base of the financial system by developing a culture of savings among large segment of rural population and plays prominent role in the process of economic development. Further, by bringing low income groups within the perimeter of formal banking sector; financial inclusion protects their financial wealth and other resources in exigent circumstances. Financial inclusion also mitigates the exploitation of vulnerable sections by the usurious money lenders by facilitating easy access to formal credit. The most common reasons for not having a bank account in financial institutions are Lack of sufficient money to transact with Bank, One of the family members has bank account so other members are reluctant as reported by 41% of unbanked population. Other reasons as reported by 20 % of unbanked population are distance, cost, lack of necessary documentation etc.

A committee on financial inclusion headed by Dr. C.Rangarajan in its report has defined financial inclusion as "The process of ensuring access to financial services and timely and adequate credit where needed by vulnerable groups such as weaker sections and low income groups at an affordable cost."

**OBJECTIVES OF FINANCIAL INCLUSION**

- Financial inclusion intends to help people secure financial services and products at economical prices such as deposits, fund transfer services, loans, insurance, payment services, etc.
- It aims to establish proper financial institutions to cater to the needs of the poor people. These institutions should have clear-cut regulations and should maintain high standards that are existent in the financial industry.
- Financial inclusion aims to build and maintain financial sustainability so that the less fortunate people have a certainty of funds which they struggle to have.
- Financial inclusion also intends to have numerous institutions that offer affordable financial assistance so that there is sufficient competition so that clients have a lot of options to choose from. There are traditional banking options in the market. However, the number of institutions that offer inexpensive financial products and services is very minimal.
- Financial inclusion intends to increase awareness about the benefits of financial services among the economically underprivileged sections of the society.
- The process of financial inclusion works towards creating financial products that are suitable for the less fortunate people of the society.
- Financial inclusion intends to improve financial literacy and financial awareness in the nation.
- Financial inclusion aims to bring in digital financial solutions for the economically underprivileged people of the nation.
- It also intends to bring in mobile banking or financial services in order to reach the poorest people living in extremely remote areas of the country.
- It aims to provide tailor-made and custom-made financial solutions to poor people as per their individual financial conditions, household needs, preferences, and income levels.
- There are many governmental agencies and non-governmental organisations that are dedicated to bringing in financial inclusion. These agencies are focussed on improving the access to receiving government-approved documents. Many poor people are unable to open bank accounts or apply for a loan as they do not have any identity proof. There are so many people who live in rural areas or tribal villages who do not

have knowledge about documents such as PAN, Aadhaar, Driver's License, or Electoral ID. Hence, they cannot avail many of the services offered by governmental or private institutions. Due to lack of these documents, they are unable to avail any form of subsidies offered by the government that they are actually entitled to.

### **APPROACH TO FINANCIAL INCLUSION**

Also to note that Financial inclusion coupled with financial literacy program, equitable and inclusive growth of the nation can be achieved in a time bound manner. Various approaches initiated by the Govt. of India, RBI and Banks for financial inclusion plan are ;

1. Product based approach-
  - a) No-frills account
  - b) Opening savings account with overdraft facility
  - c) General purpose credit cards ( GCC )
  - d) Kisan Credit Cards ( KCCs )
  - e) Banking services to reach homes at unbanked areas through business correspondents (BC) and business facilitator (BF) model
  - f) RBI regulatory approach
  - g) Use of technology
2. Simplified branch authorization
3. Opening of branches in unbanked rural centres
4. Kiosk Banking
5. Biometric ATMs for rural India
6. Aadhaar Enabled Payments

It is important to note that one of the objectives of Digital India initiative is to bridge the gap of Digital divide through empowerment. Also, the digital India initiative taken by the Government of India lays emphasis on e-governance and seeks to transform india into a digitally empowered nations. In order to achieve this objective, all the banks are now increasingly using digital platform to deliver services, market their products and to reach out to customers. This initiative will result in knowledge based transformation of the Indian society. Various channels of Digital Banking are;

- a) Internet banking
- b) Mobile Banking
- c) POS terminals
- d) ATM
- e) E-wallet
- f) Call centre
- g) Social networking website/ payment sites
- h) Other websites

### **Financial Inclusion Schemes in India**

The Government of India has been introducing several exclusive schemes for the purpose of financial inclusion. These schemes intend to provide social security to the less fortunate sections of the society. After a lot of planning and research by several financial experts and policymakers, the government launched schemes keeping financial inclusion in mind. These schemes have been launched over different years. Let us take a list of the financial inclusion schemes in the country:

- Pradhan Mantri Jan Dhan Yojana (PMJDY)
- Atal Pension Yojana (APY)

- Pradhan Mantri Vaya Vandana Yojana (PMVVY)
- Stand Up India Scheme
- Pradhan Mantri Mudra Yojana (PMMY)
- Pradhan Mantri Suraksha Bima Yojana (PMSBY)
- Sukanya Samriddhi Yojana
- Jeevan Suraksha Bandhan Yojana
- Credit Enhancement Guarantee Scheme (CEGS) for Scheduled Castes (SCs)
- Venture Capital Fund for Scheduled Castes under the Social Sector Initiatives
- Varishtha Pension Bima Yojana (VPBY)

**Financial Inclusion Programmes Organised by the Reserve Bank of India (RBI)**

The Reserve Bank of India works on exclusive programmes and plans in order to have financial inclusion in the nation effectively. It applies a bank-led strategy in order to attain financial inclusion smoothly. The central bank of India also has firm regulations in place that need to be followed by every bank. The RBI also is offering qualified assistance to every bank in the nation in order to attain its financial inclusion objectives.

Let us take a look at some of the programmes introduced by the RBI in order to achieve its goals:

- The RBI instructed every bank to have Basic Saving Bank Deposits (BDS) accounts for the economically weaker sections of the society. These are no-frill accounts where account holders do not have to maintain any minimum balance or minimum deposit. These account holders can withdraw cash at any ATM or at the bank branch. They should also be given the opportunity to make use of electronic payment channels for receiving and transferring money to others.
- The RBI also asked banks to have simple Know Your Client (KYC) regulations for the less fortunate people of the society. There are many people in rural areas who are unable to open bank accounts due to strict KYC norms. Hence, the RBI wants banks to have simplified KYC requirements particularly if a low-income individual is interested in opening a bank account with an amount not above Rs.50,000. It also wants minimal KYC norms if the overall credit in the accounts does not go above Rs.1 lakh for 1 year. Recently, banks have been asked to accept Aadhaar Card as identity proof as well as address proof since most people belonging to low-income groups have made Aadhaar card in their names.
- Keeping in mind about the lack of bank branches in rural areas, the RBI has asked all banking institutions to open more and more branches in villages across the nation in order to provide good banking services to the villagers. There are many remote villages where there are no banks and also no good transportation services. It is very difficult for residents of these areas to commute to a far-off bank branch for availing banking services. Hence, with the compulsory rule of the RBI, banks are distributing the ratio of banks in villages and cities to have a balance.

**Operations of Financial Inclusion :**

Under financial inclusion, the main aspect is access to financial sources. This can be broadly divided into credit, wealth creation, and contingency planning.

- According to the concept of financial inclusion, under the credit aspect, a low-income individual needs proper access to emergency loans, consumer loans, housing loans, and business livelihood loans at affordable rates.
- Under the wealth creation aspect, a poor individual should be able to make excellent savings and have access to reliable investment options that generate good returns. Every low-income household should also have basic financial literacy and understand the concept of risk in finance clearly.
- Under the contingency planning segment of the financial inclusion system, a poor person should have access to funds that can be utilised exclusively in the future. It is not enough if these people have only means to improve their income and enhance their lifestyle. They should also have the right resources to be prepared for the future, especially when they get old. Many of the poor people may not be aware of retirement plans. They should be provided with affordable retirement plans that will give them good returns in the later stages of their lives.



They should also be given insurable contingencies to keep themselves safe and secure. Many less fortunate people do not even think of taking a life insurance policy or a vehicle insurance policy due to the high costs involved. Insurers should offer insurance options at subsidised premiums to the economically weaker sections. These insurance policies will give them coverage and prevent them from paying exorbitant compensation costs when something unforeseen or unfortunate happens to them or their family.

They should also be given buffer savings in order to be prepared and ready for unforeseen or emergency expenses. This way, they would not have to go to their relatives or friends or moneylenders for monetary support. They can be financially ready always.

The Reserve Bank of India is promoting the establishment of Financial Literacy Centres (FLCs). It has made many modifications and revisions regarding the functioning of Financial Literacy Centres (FLCs). The rural branches of various scheduled commercial banks and financial literacy centres are now required to improve financial awareness on a larger scale and enhance their financial literacy activities by organising catchy and simple financial literacy camps. These camps can be held outdoors under a tree or in some other open space by having financial awareness camps on a monthly basis or more frequently. Financial literacy camps work towards imparting financial literacy and offering convenient financial access to low-income people of the society.

With the objective of distributing the branches of scheduled commercial banks (SCBs), the RBI has instructed banks to establish their branches in Tier 2 to Tier 6 centres that have less than 1 lakh people. These branches can be opened with a general permission from the RBI. In Sikkim and North-Eastern states, scheduled commercial banks can set up branches without even getting any approval from the RBI. They are free to open any branch in these states. The RBI is also working to liberalise the functioning of commercial banks apart from regional rural banks (RRBs) so they can open branches in Tier 1 centres with a general permission.

The central bank of the nation also asked banks to discuss and create Financial Inclusion Plans (FIPs). These plans will include details about staff employed, branches opened, facilities offered in each of these branches, steps being taken to convert the unbanked sections of the society to individuals with basic access to banking services, etc. The plan will also include information about no-frills accounts opened with each public or private bank. The RBI has been checking each bank's FIP with full dedication and providing them with constructive feedback.

The RBI has also asked banks to set up intermediate brick and mortar structures between the base branch of a bank and the other branch locations. This should be done for the purpose of organising and administering cash, redressing customers' grievances, collecting and maintaining mandatory documents systematically, monitoring of branch activities, etc. This particular intermediate branch can be an inexpensive building with simple infrastructure, passbook printers, banking terminal, cash retention machines or safes for storing large amounts of cash.

The RBI also has invested huge amounts in technology for banking services so that innovative techniques can be incorporated to making banking processes simple, quick, and cost-effective. The scheduled commercial banks have been asked to utilise information and communications technology (ICT) to offer affordable digital banking services. Banks have also started to offer door-step delivery of bank accounts, loans, and other financial services with the help of technology. Moreover, with the introduction of technology in banking, it is okay if customers are illiterates. They can make use of technological devices and operate through biometrics. This also makes sure that customers have safe and secure transactions without any scope for scams or frauds. This will also make the unbanked sections of the society rely on the banking system.

The Reserve Bank of India enabled scheduled commercial banks to get business correspondents (BCs) as well as business facilitators (BF). These BCs and BF will play the role of intermediaries for the purpose of offering banking services to customers across the nation. The business correspondent strategy promotes delivery of banking products at the doorstep of the customers. They also offer cash transactions and hence, this makes it easier for people who live in rural areas where there are not too many banking branches and not proper modes of transport for them to commute to nearby towns or cities.

These business correspondents can be individuals as well as organizations or entities that serve as intermediaries between banks and customers. There are many people and entities that are ready to take up the role of a business correspondent. Both non-profit organizations and for-profit companies are allowed to serve as business correspondents. This is a great milestone in the field of banking.

In the rural setting, business correspondents typically take assistance from the Village Panchayat (the local governing body of a particular village) and develop a strong system consisting of Common Service Centre's (CSCs). A Common Service Centre is an electronic hub that functions in rural areas. This centre will have a computer and it will be connected to the internet. This system will offer electronic business services as well as e-governance to people living in rural areas. It also serves as an opportunity to rural people for being innovative and smart. People can come up with unique ideas and technological solutions for the purpose of creating and improving business operations, marketing activities, and increasing sales on a regular basis.

### **Financial Inclusion with the Help of Financial Technology (Fintech)**

Financial technology (fintech) refers to the utilisation of advanced technology in the financial industry or the financial sector. With the introduction of financial technology or fintech, financial inclusion is improving extensively across the whole world. India also has many fintech companies that are constantly working towards simplifying the process of providing financial services to prospective clients. Fintech companies have also been successful in offering financial services and products at minimal costs. This is very helpful to customers as their expenses are low and they can distribute their savings to their other needs also.

Financial technology companies are enabling people in rural areas to apply for loans or open bank accounts by using mobile phones. Several people in Indian rural places have mobile phones and some of them have access to mobile internet and hence, they can make use of fintech services to get reliable financial services.

A few of the latest fintech options that are used by individuals include crowdfunding, digital payment systems, peer-to-peer (P2P), electronic wallets, etc. Many people in both rural and urban areas are utilising these advanced options of banking. However, there are still many untouched people who have not had any experience with a banking or any other financial institution. For such people, it is tough to use any mobile-based financial service.

When many of these poor people engage in financial transactions via cheques or cash, they tend to get cheated by financial scammers. Also, when they visit bank branches or branches of NBFCs to open a deposit or to apply for a loan, they may end up paying high fees at the branch. These fees or charges can be processing fees, transaction fees, money order fees, etc. In order to save poor people from such high expenses for availing financial services, banks, NBFCs, and fin tech companies are collaborating together to come up with simpler and quicker banking processes which will eliminate unnecessary fees and charges. The evolvement of such processes will help in including the underbanked or unbanked people of the society.

### **Financial Inclusion through Digital Payment Systems**

They can also make payments for products and services in their residential regions with the help of electronic payment wallet systems. The Government of India has launched several electronic wallet systems through smartphone apps such as Bharat Interface for Money (BHIM), Aadhaar Pay, and lots more!

Electronic wallets or e-wallets refer to wallets that can be used with the help of electronic means such as mobile phones. These wallets replace physical wallets. A user can make cashless payments through online as well as offline means. He or she will need to download the e-wallet app on their mobile phone and utilise it to make transactions. These e-wallets can be utilised for mobile recharges, utility bill payments, grocery stores, e-commerce portals, etc.

Many digital financial tools offer attractive offers and discounts when people make use of these tools. These are very helpful and new to the economically underprivileged sections of the society. They can enjoy offers, receive cashback options, and rewards. These incentives will help a user save a lot of money.

### **Impact of Demonetisation on Financial Inclusion**

With the objective of making India completely cashless in a few years, the government has introduced inexpensive e-wallet options so that the less fortunate people of the nation are not excluded from going cashless. These e-wallets have regional languages apart from English. The user can select the language that he or she knows and make use of the app conveniently. Some of these e-wallets not only allow a user to make payments, but also enable them to make fund transfers from one bank account to another.

With the implementation of the demonetisation process in India in the year 2016, the need for digital financial services has risen. The ban on usage of the notes of Rs.500 and Rs.1,000 led to the increasing demand for alternative modes of payment for goods and services. Hence, the number of digital wallets increased extensively in the country. The goal of the Indian government is to make the nation cashless and hence, the high number of digital wallets is excellently helping the government in attaining its goal. Moreover, there was a rise in the transaction limit for electronic wallets to Rs.20,000. This is great news for both users and e-wallet companies.

Many people belonging to low-income groups also started to utilise electronic wallet options as they did not have any other choice. It is true that a lot of them struggled initially due to the demonetisation process. Several middle-class and low-class people were left stranded when the demonetisation process came into effect suddenly. However, the introduction of multiple digital banking and financial services served as a great boon to all economic classes of the society.

Several low-income people, unemployed people (including people who were illiterates) living in both rural and urban areas started to learn about how to open a bank account, how to apply for credit, how to use technology for banking services, how to avail financial services without standing in long lines, and how to carry out transactions without carrying cash in hand.

### **Financial Inclusion in India through Digitisation of Monetary Transactions**

The government of India intends to carry out crores of digital financial transactions for the present and upcoming years with the help of Unified Payment Interface (UPI), Unstructured Supplementary Service Data (USSD) banking methods, Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT), Aadhaar Pay, debit cards, BHIM, and credit cards.

Moreover, the government wants to make it compulsory for fertiliser depots, block offices, petrol pumps, road transport offices, hospitals, colleges, universities, etc. to make arrangements for accepting payments for services and products through digital payment systems. It makes a lot of sense especially when customers are required to make high-value payments at these institutions or offices. The government intends to achieve this by issuing a mandate to the above-mentioned institutions.

Apart from this, the government also wants to make it mandatory that every government receipt is offered exclusively through any digital mode. Presently, many government operations are carried out digitally and customers receive receipts for payments in the digital form. However, this has not been completely effective in every part of the nation. To attract more and more users for digital modes of payment, the government is trying its best to remove or reduce service charges that are levied by companies on the electronic transactions.

These digital financial apps will help in eliminating corruption apart from achieving financial inclusion. These apps aim to attain financial inclusion by offering interesting and attractive bonuses for both users and merchants. Customers who make use of these cashless payment tools will be able to enjoy referral bonus schemes and meanwhile, merchants will get cashback rewards and points when they allow customers to transact through these cashless systems.

Apart from introducing digital financial systems to the poor people, a few banks have released mobile banking vans or trucks to reach the interior parts or untouched parts of the country. In these parts, people do not have access to transport, communication, or financial services.

Along with the government-owned payment apps, there are many private mobile electronic wallet (e-wallet) systems created by private companies and banks. Most of these apps allow bank fund transfers. All these e-wallets enable users to make payments digitally in a convenient manner. Individuals will not get stranded anywhere even if they are out of cash in hand. If they have money in their electronic wallet, they are safe and can carry out financial transactions successfully without having to rely on others for money. Most of these apps are available on Android and iOS smartphones. There are also some apps that are available on phones that operate through Windows.

One of the leading e-wallets in India is Paytm. It is available on Android, Blackberry, iOS, Ovi, Windows, etc. Some of the other prominent e-wallet apps include Freecharge, MobiKwik, Citrus Wallet, Oxigen Wallet, ItzCash, Axis Bank Lime, Jio Money, ICICI Pockets, HDFC PayZapp, SBI Buddy, mRupee, Vodafone M-Pesa, PayMate, PayUmoney, Juspay, Ezetap, Citi MasterPass, MomoeXpress, Ola Money, Mswipe, etc.

### **CONCLUSION**

Social exclusion of low income families such as SCs, STs, and OBCs results in illiteracy, inhibition, pattern of occupation and poor physical access. It also limits awareness, ability to overcome prejudice about their bank-worthiness and enhances the transaction costs incurred by these families for using the financial services available. The small value of accounts and transactions expected by the banking system from financially excluded families results in high cost of operations and limits the incentive to serve them. The lack of understanding of products and services appropriate to the needs of low income families results in static approaches like the no frills account where it has become apparent that mere availability is not the issue. But those business strategies suitable for small value accounts and doorstep service delivery results in the slow

adoption of mechanisms for reaching financially excluded villages to include in the main stream of development.

The analysis also suggests a role for improving SHGs and BCs regulations. More often than not, capacity building, awareness attainment, and infrastructure development draw significant attention, owing to their visible impact on banking outreach. However, banking regulations can also hinder banking outreach.

The urgent attention are timely access to affordable financial services including credit, savings, insurance, pension and money transfer, responsible behaviour of the service providers, electronic modes of money handling, livelihood and enterprise creation, and a sound regulatory mechanism that oversees all the above. These all requires a complementary and supportive interplay of multiple institutions, channels, models, and experiments.

### **POLICY SUGGESTIONS**

- To promote Policy on to improve credit flow to rural areas
- To explore further improve efficiency of SHGs and BCs activities
- To examine the banks to conform to the priority sector lending target
- To explore on public policy may have to be geared up for increase rural connectivity
- To examine the Indian banking reforms must focus on suitable financial products & services with affordable, accessible and available
- To make policy on financial literacy, capacity building and awareness financial products and services
- To Promote policy on innovative economic strategies for greater use of technology to propagate financial inclusion

### **REFERENCES**

- Ananth, S., and T. Sabri. (2013). "Challenges to Financial Inclusion in India: The Case of Andhra Pradesh." *Economic and Political Weekly*, Vol. 48, No. 7, pp. 77-83.
- Bisaliah, S., S. Saifullah., S.M. Dev., and D. Sarkar. (2014). "Asset and Liability Portfolio of Farmers: Micro Evidences from India." Academic Foundation.
- Chakrabarty, K.C. (2011). Keynote address on Financial Inclusion. Mumbai, September 6.
- CRISIL. (2013). "Inclusix Financial Inclusion Index." Volume I, June.
- CRISIL. (2015). "Inclusix Financial Inclusion Index." Volume III, June.
- Deb, S., and M. Rajeev. (2007). "Banking on Baniyas for Credit." *Economic and Political Weekly*, Vol. 42, No. 4, January.
- Government of India. (2008). Committee on Financial Inclusion. (Chairman: Dr. C. Rangarajan).
- Government of India. (2014). Pradhan Mantri Jan-DhanYojana- A National Mission on Financial Inclusion, August 22.
- Kamath, R., A. Mukherji., and S. Ramanathan. (2008). "Ramanagaram Financial Diaries: Loan Repayments and Cash Patterns of the Urban Slums." *IIMB Working Paper*, No. 268, March 11.
- Khan, H.R. (2011). "Financial Inclusion and Financial Stability: Are they two sides of the same coin?." *Speech*, BANCON organized by Indian Bankers Association and Indian Overseas Bank, Chennai, November 4.
- Kumar, N. (2011). "Financial Inclusion and its Determinants: Evidence from State Level Empirical Analysis in India." 13th Annual Conference on Money and Finance in the Indian Economy, Indira Gandhi Institute of Development Research, Mumbai, February.
- NABARD. (2003-04 to 2015-16). Annual Report. Mumbai.
- Planning Commission. (2009). Report on Financial Sector Reforms. (Chairman: Dr. Raghuram G. Rajan). Government of India, New Delhi. IIMB-WP N0. 549 44 Reddy, S.T.S. (2007). "Diary of a Moneylender." *Economic and Political Weekly*, Vol. 42, No. 29, July 21.

- 
- Reserve Bank of India and Centre for Socio-economic and Environmental Studies. (2013). "How the Poor Manage their Finances: A Study of the Portfolio Choices of Poor Households in Ernakulum District, Kerala." *Research Project Study/Report Series*, RBI, Mumbai, May 17.
  - Reserve Bank of India. (2005). Report of the Internal Group to Examine the Issues Relating to Rural Credit and Microfinance. (Chairman: H.R. Khan). August 4.
  - Reserve Bank of India. (2011). Report of the Sub-Committee of the Central Board of Directors of RBI to Study Issues and Concerns in the MFI Sector. (Chairman: Y.H. Malegam). Mumbai, January 19.
  - Reserve Bank of India. (2014a). Report of the Committee on Comprehensive Financial Services for Small Businesses and Low Income Households. Mumbai, January 7.
  - Reserve Bank of India. (2014b). Report of the Technical Committee on Mobile Banking. (Chairman: B Sambamurthy). Mumbai, February 7.
  - Reserve Bank of India. (2015). Financial Stability Report. Mumbai, June.
  - Shiva,V. (2010). "Violence of the Green Revolution." Nataraj Publishers, Dehradun.
  - Singh, C., A. Mittal., A. Goenka., C.R.P. Goud., K. Ram., R.V. Suresh., R. Chandrakar., R. Garg., and Kumar, U. (2014). "Financial Inclusion in India: Select Issues." *IIMB Working Paper*, No. 474, November.
  - Yeshwanth, D. (2015). "Financial Inclusion of Microfinance Clients: A Village Level Study." Routledge India and Taylor & Francis Group.

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**AN ANALYTICAL STUDY ON EFFECTIVENESS OF TALENT MANAGEMENT PRACTICES  
FOLLOWED BY PRIVATE SECTOR BANKS IN BHILAI DISTRICT**

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**Poornima Thakur<sup>1</sup> and Dr. (Mrs.) Archana Agrawal<sup>2</sup>**<sup>1</sup>Ph.D Scholar, Dr. C.V. Raman University Kota, Bilaspur 495001 (C.G.)<sup>2</sup>Associate Professor (Commerce & Management), Dr. C.V. Raman University Kota Bilaspur 495001 (C.G.)**ABSTRACT**

*Today's changing landscape of business requires its HR to act more strategically to build employee engagement which is a great tool for talent management. Talent Management focuses on how individuals enter; move up across or out of the organization. This study investigated three Private Bank (Sector)' perspectives on Talent Management Strategy in term of their definition and understanding; and proposed key factors that influence effective talent management in Korba private Bank. To determine this, two hundred structured questionnaires were disseminated private bank 200 employees were interviewed. The study discovered that talent management is still a new challenge other bank compare to other banks, competitions issue in which the succession planning was recognized and utilized as the foundation of talent management in three private banks (Axis bank, ICICI bank, and Ecquitas small finance bank). This study is based on talent management strategies in 3 private banks the majority of in-deeply interview respondents suggested that they wished to manage individual talent as such encouraging, motivating and unleashing employees'. These problems significantly discouraged other bank employees from proposing any creative ideas about managing talent to their top executives. Thus, the participants in this study have agreed to provide some promising scientific information and an immediate HR agenda.*

**Keyword:** Employee Engagement, Talent Management Strategy, Succession Planning.

**INTRODUCTION**

Talent Management may be defined as a continuous follow the process of Talent management strategies to ensure the increase of employee performance, job enhancement, dynamic generation, employee motivation, talent acquisition, employee satisfaction, employee welfare, career planning, effectiveness of employee performance and efficient of employee performance, talent in systematic and planned way. it practice an employee and employer for future corporate role by bringing in performance and behavioral changes in the organization. Prepare the effects of talent management strategies on increase of organizational productivity.

**Effectiveness of talent management strategies**

Since McKinsey's proclamation of the War for Talent in 1998, the specific management of talents has been widely seen as a solution for the HR challenges that arise in today's labour market. Although a review of the literature shows that talent management is a growing field, the effectiveness of talent management and its added value have still not been accurately stated. Moreover, research dealing with talent management strategies and organizational performance is somewhat lacking; the question has not yet been answered as to whether deciding upon the right strategy would achieve the desired impact on organizational performance. As a result, there is evidently a great need for empirical research to investigate the dynamics and impact of talent management strategies. It also has to be acknowledged that the research that exists is mostly confined to the USA, raising the question as to the extent to which talent management influences organizational performance in other labour market structures or cultures. The main objective of this study, therefore, is to address these research gaps by identifying the effectiveness and impact of talent management strategies on organizational performance. A second objective is to describe the extent to which organizational performance is associated with talent management strategies. In addition to the fact that there exist various definitions of the terms talent and talent management, the challenge is also to quantify and qualify the impact of talent management practices. As a result, most companies continue with subjective estimates when assessing the effectiveness of their HR practices. Consequently, this paper details how the heads of HR, executives and supervisors perceive the effectiveness of talent management and what changes they have observed in their companies since the implementation of talent management strategies. The remainder of the paper is organized as follows: the next section reviews the literature on organizational performance; we then move to the theoretical background of talent management and our related propositions before we present the methodology and results; and we end with the discussion and conclusions. Ensure the Effectiveness and efficient of talent management strategies, make the planning human resource management, management provide good behavior of the employees, HR economics as well as the history of economic level thought.

## REVIEW OF LITERATURE

**Smart (1999)** in today's hyper-competitive environment, Attrition is a big crisis in the organization these days. Which is a hyper-competitive environment and in another organization, employee acquisition can be considered as a perceived salt and no interference to human resources. Reduce negative impact to organizational approaches and human resource.

**Collings&Mellahi (2009)** Talent management for organization is a concept that strengthens every practice and in this study the emphasis is on acquisition of talent.

**Tarque and Schuler (2010)** In order to meet the demand for continuous talent in the organization, the emphasis is on enclosing, developing and acquiring the talent. Due to which high performance talent has caused more business in the market. And the highest growth occurred in talent management picket recent study shows that talent management is very important in the market. Yet, there are a limited number of investigations conducted on TM, particularly in Bangladesh.

**K. R. Manjunath and K. Jalaja(2013)** Authors have stated that, the organization not only acquires the Most Talented Employee, but also hires the right talent from the market and in competition as much as it needs and Employees to ensure the benefit of the Changes in the strategy for their operation and it is important to stay in the market and company for long time.

**Tafti et al. and Naim&Lenka (2017)** the organization emphasizes on attracting the most talented employees and developing staff capabilities. Therefore, facing sustainable opportunities and challenges should be important for the organization. Figlino and second, then "add". In the Saudization policy, other workers need to be replaced in place of foreign workers. So that Saudi banks can succeed. These bank successes continue after Saudization applies and success is the proof of talent management. Saudization is applicable in the private.

## RESEARCH METHODOLOGY

Methodology is the theory of the creation of methodical process and methods. It associates the theoretical and substantive domains in research and plays critical role in determining the validity. For the purpose of the study all the employees residing in the Bhilai city of Chhattisgarh constituted the population. Target population includes employees who were involved in talent management study.

## OBJECTIVES OF STUDY

To identify the challenges of talent management, both for private sector banks as well as employees.

## HYPOTHESIS

**H1:** welfare activity has a significant impact on employee satisfaction.

## DATA ANALYSIS

The study sought to establish the perceived relationship between welfare activity and employee satisfaction. In the Analysis of variance setting, the observed variance in a particular variable is partitioned into components attributable to different sources of variation. ANOVA provides a statistical test of whether or not the means of several groups are equal, and therefore generalizes the t-test to more than two groups.

## ANOVAa

	Model	Sum of Square	Df	Mean Square	F	Sig.
1	Regression	1.912	1	1.912	33.316	.000b
	Residual	11.362	198	.057		
	Total	13.273	199			

a. Dependent Variable: Employee Satisfaction

b. Predictors: (Constant), Welfare Activity

The study found that the overall regression model is significant Here, the null hypothesis is "Welfare Activities has no significant impact on employee satisfaction" but here alternate hypothesis is accepted which is, "Welfare activity has a significant impact on employee satisfaction" is **accepted** because the sig. value obtained in above table is 0.00 which is less than alpha value of 0.05 ( $p < 0.05$ ).

## CONCLUSION

Talent management strategies are not only associated with elevated organizational results but are also a substantial factor in molding employee's attitudes. Training and development opportunities create the higher level of motivation for the enhanced discretionary behavior of employees with career development opportunities

that eventually lead to employee satisfaction. The job with the advanced scope and potential allied growth leads to improve employee performance. So employees who are experiencing the higher level of job satisfaction from their organizations are more likely to be productive and less likely to leave the job.

The study finds several key factors of TM that includes talent acquisition, talent retention, talent management and fringe benefit. The limitation of this study is that this study is empirically tasted. More scope of the study focuses on Private sector banks. The study recommends that HR managers should actively TM practices of the case bank to effectively manage their workforce. This study is the first study to uphold TM in Private sector bank.

## REFERENCES

- Effectiveness of talent management strategies, european j. International management, Vol. 5, no. 5, 2011.
- International journal of humanities and social science, vol. 5, no. 8; august 2015,issn 2220-8488 (print), 2221-0989 (online).
- Resource from the talented powered organization (cheese, 2008). Talent management: Meaning, features, process and models, article shared by vishakha b
- Author geoffroy de lestrange, date published october 17, 2019categories, talent, Talent management.
- (review literature of talent management,international journal of management studies Issn(print) 2249-0302 issn (online)2231-2528 <http://www.researchersworld.com/ijms>)
- Talent management implications in the lebanese banking industry, human resource Management research 2017, 7(2): 83-89 doi: 10.5923/j.hrmr.20170702.02)
- The effect of talent management on peshawar-based public And private banks' performance, european journal of business and social Sciences, vol. 5, no. 11, february 2017. P.p. 01 - 07 url: <Http://www.ejbss.com/recent.aspx-/> issn: 2235 -767x)
- Talent management: an escalating strategic focus in bangladeshi banking industry, Doi: 10.6007/ijarbss/v8-i1/3801, to link this article: <http://dx.doi.org/10.6007/ijarbss/v8-i1/3801>)
- “commercial bank selection in turkey,” international journal of bank marketing, Vol.9, no.4, pp. 30–39.combs howard and bourne s. Graham (1995). (employee Performance)



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**PERCEPTION OF PATIENT SAFETY CULTURE: HOSPITAL MANAGERS VIEW POINT**

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**ABSTRACT**

*Patient safety is a very complex subject and is being a part of the hospital organization and has moral value and beliefs which add value to the structure and support of safety culture and behavioural model in a health organization. The present study focuses on the hospital manager's perception and view point about safety culture in hospitals. A cross sectional survey was conducted among 32 health care institutions and data collected from hospital managers using a structured questionnaire based on the safety culture, which was analyzed with parametric and non-parametric statistical techniques. The findings provided that all managers provide a strong positive attitude formation towards the patient safety culture to be in healthcare institutions. The study didn't find any difference between the hierarchies of the hospitals managers working in different healthcare institutions. Further the study has a practical implication in designing a road map adoption of safety system in hospitals.*

*Keywords: Patient Safety, Health Care Institutions, Safety Culture, Organization Culture*

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**SUSTAINABLE DEVELOPMENT OF POLYMERIC NANOMATERIALS**

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*The rising expense of depletion and the dangerous consequences of petroleum resources on the environment in the creation of polymeric resins encourage us to strive toward the sustainable development of nanomaterials. Nanomaterials receive a lot of interest due to their size, shape, and surface, and they have better physical and mechanical characteristics. Several greener approaches produce polymeric nanoparticles to lower the cost-effectiveness, biodegradability, and plentiful availability in nanomaterials with low toxicity. Cashew nut shell liquid (CNSL) –phenolic lipid are supposed to be the ideal precursor for the synthesis of polymeric nanomaterials. The present work reports the fabrication of CNSL based nanomaterials via green route. Several standard techniques used to characterize the materials. The synthesized nanomaterials can be utilized for the protective applications. The application of such green-synthesized nanomaterial in environmental remediation leads to achieve environmentally beneficial results.*

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**ITERATIVE TECHNIQUE USING THE GRADIENT METHOD APPLIED TO ECONOMIC  
DISPATCH PROBLEM OF REAL POWER GENERATION**

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**ABSTRACT**

*The generating capacity of power plants is generally greater than the load demand and the total losses under normal operating conditions. In addition, power stations are not the same distance from load centers and have different fuel costs as well. Hence the need to develop improved methods for the economic dispatch of the electrical energy generated from their locations. In this paper an iterative technique using the gradient method applied to economic dispatch of real power generation. The performance and effectiveness of the proposed algorithm are verified via numerical studies on the 26-bus test system network. The results of simulation are obtained using matlab Simulink.*

*Keywords: Economic Dispatch problem, iterative technique, gradient method, costs of generation, demand power, power losses.*

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**CADMIUM AND LEAD TOXICOLOGICAL RISK ASSESSMENT IN AQUEOUS EXTRACTION OF TINOSPORA CORDIFOLIA USING INDUCTIVELY COUPLED PLASMA – OPTICAL EMISSION SPECTROSCOPY WITH ITS BIOCIDAL ACTIVITY**

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**ABSTRACT**

*Heavy metals residual accumulation in aqueous extraction of Tinospora cordifolia (Giloy leaf) lacking refereed literature in pharmaceutical applications such as vasorelaxant, anti-microbial, anti-diabetic, and anti-inflammatory due to presence of diterpenoid, alkaloids, glycosides and other aliphatic compounds. Estimation of cadmium and lead toxicological risk assessment from leaf aqueous extraction was main aim of study. Herbal extraction is having slow acting so single dose is not effective like allopathic medicine, perhaps long term exposure is required. Therefore, residual accumulation of heavy metals in body occur. Cadmium and lead level were measured with the help of inductively coupled plasma – optical emission spectroscopy (ICP-OES). Satisfactory results were obtained that confirms safety of Tinospora cordifolia leaves aqueous extraction as effective home remedial as well as pharmaceutical product. Biocidal activity of aqueous extract was tested on Aeromonas hydrophila. Satisfactory results were obtained from extract as a point of biocide. In best of our knowledge, cadmium and lead content as Heavy Metal Impurities (HMIs) in aqueous extraction of Tinospora cordifolia leaves with its Biocidal action is first reported in this study.*

*Keywords: Tinospora cordifolia, Herbal extraction, ICP-OES, HMIs etc.*

Praveen Sharma, Dean of FEBT and Former Chairman, Coordinator UGC SAP, Department of Environmental Science & Engineering, Guru Jambheshwar University of Science and Technology, Hisar, Haryana

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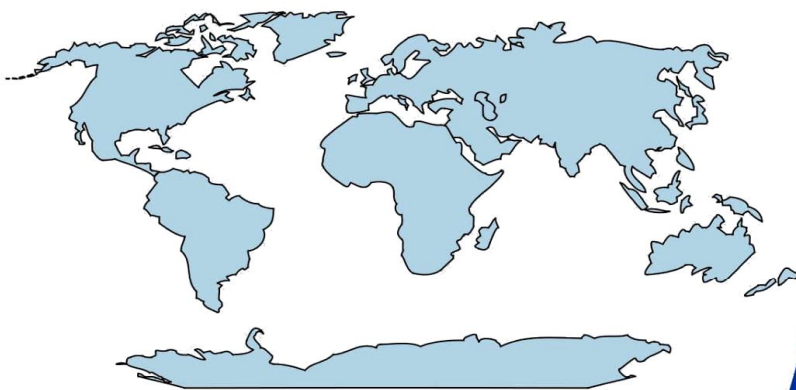
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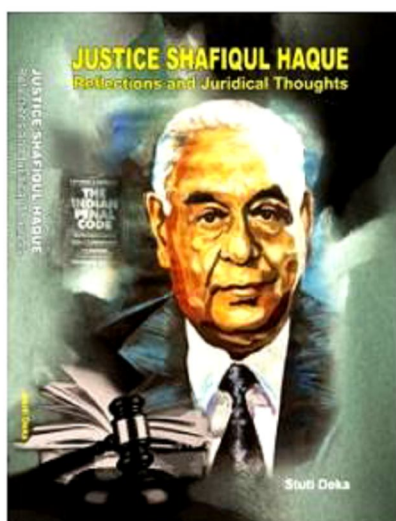


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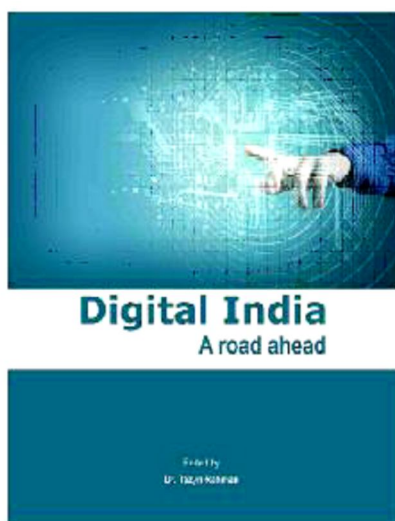
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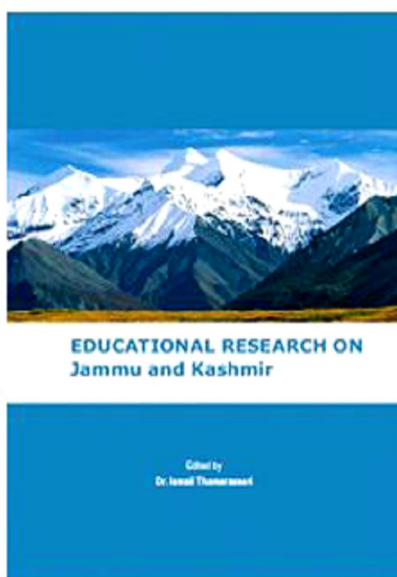
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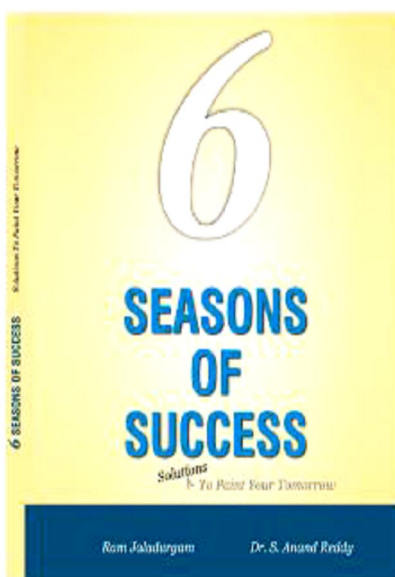
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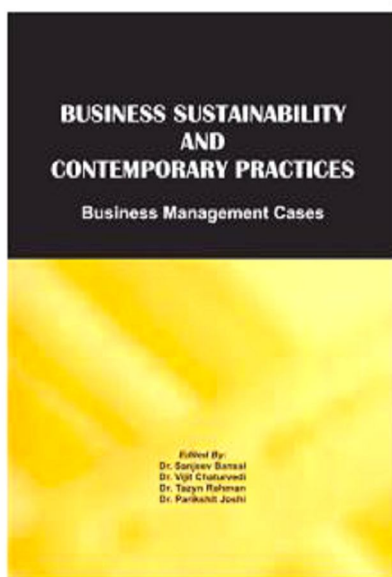
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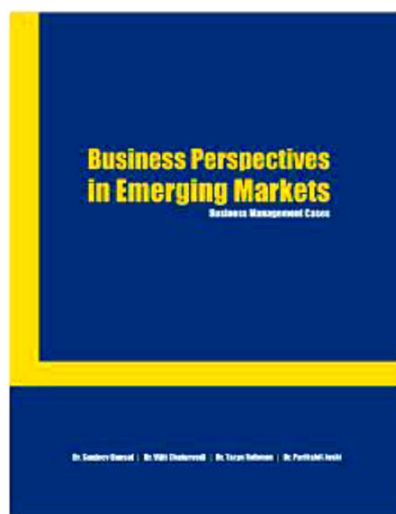
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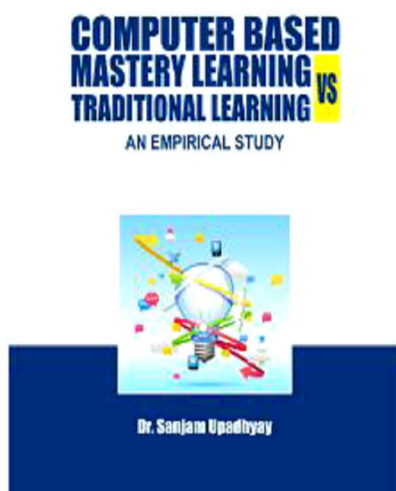
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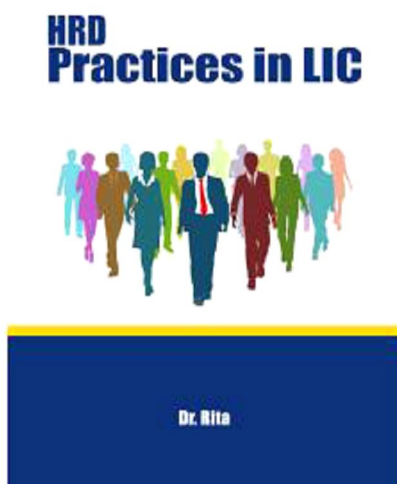
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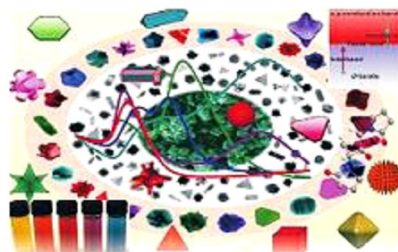


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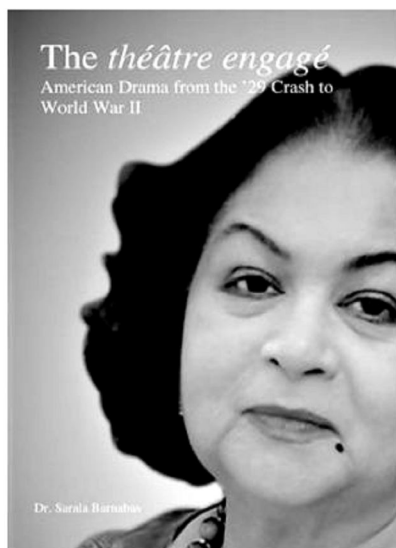
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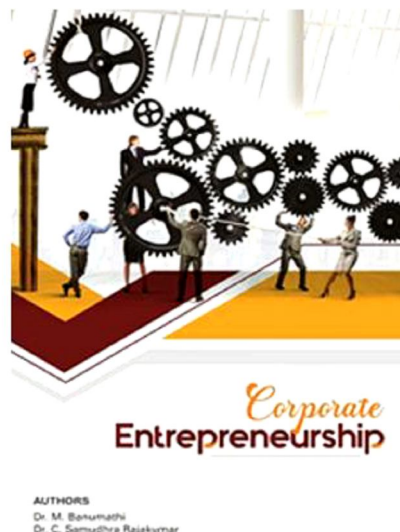
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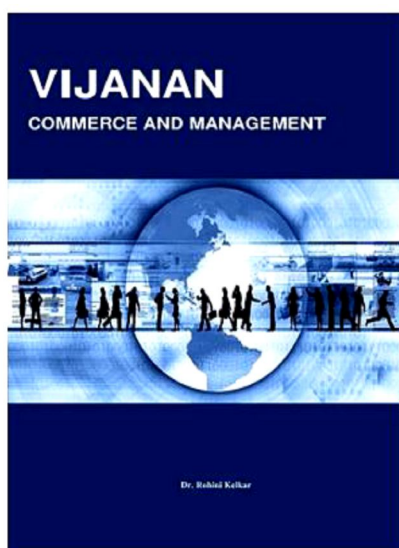
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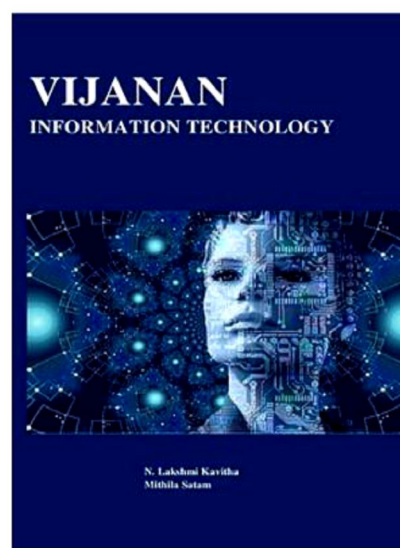
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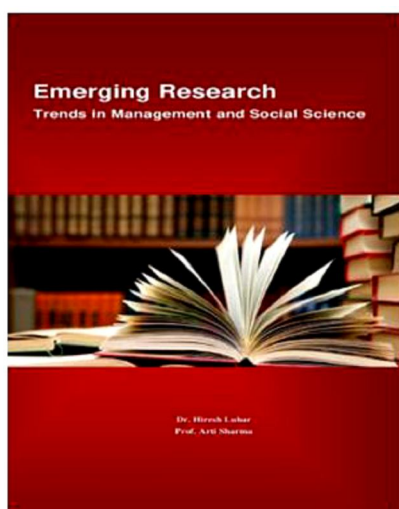
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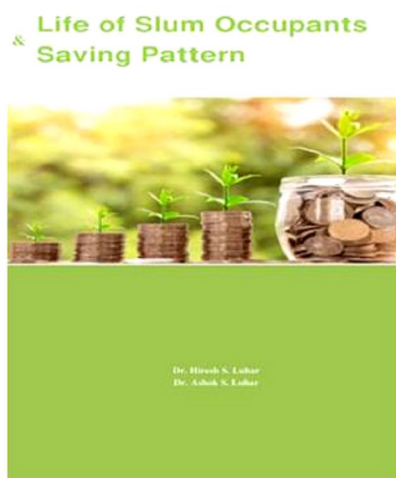
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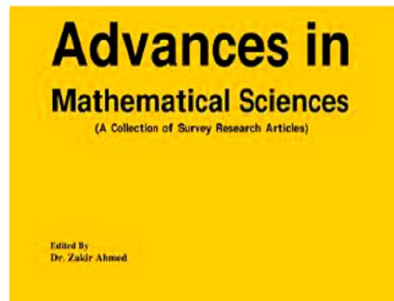
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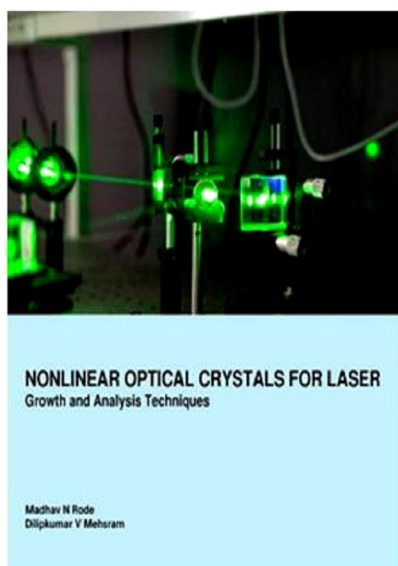


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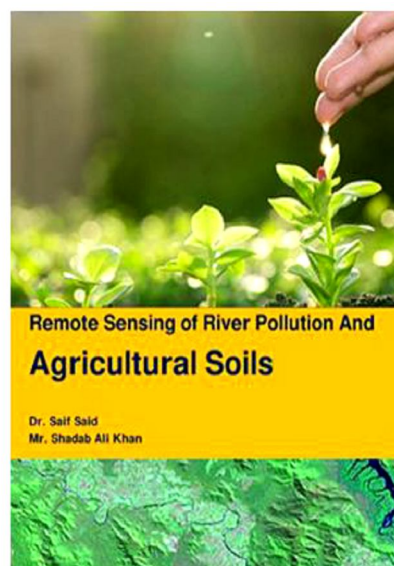
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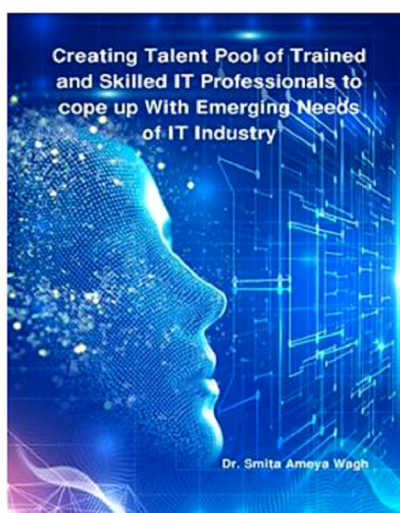
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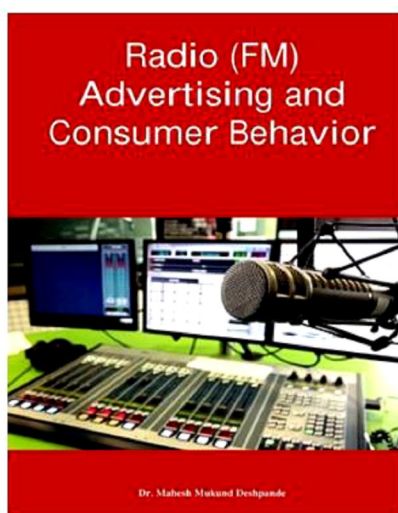
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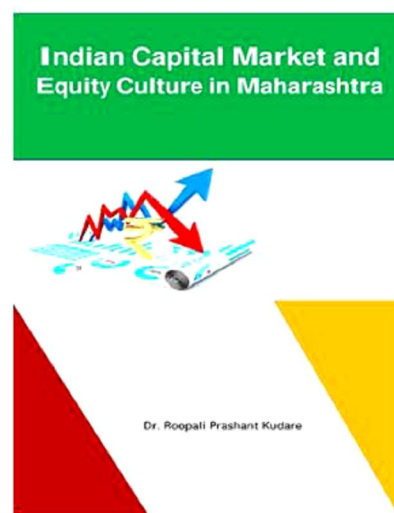
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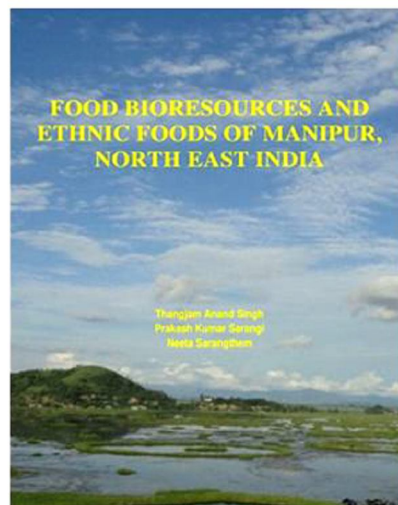




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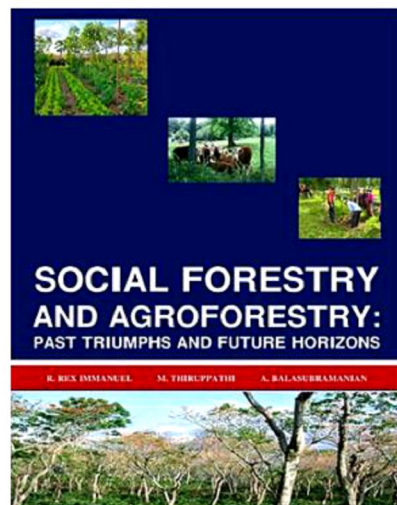
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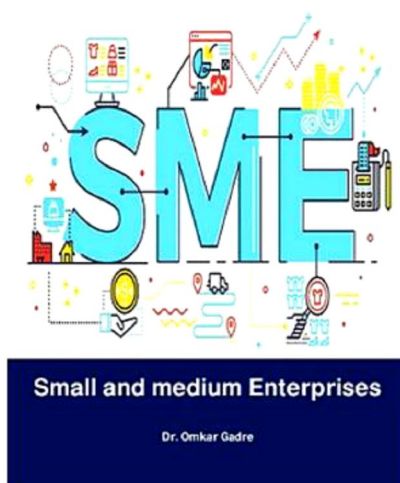
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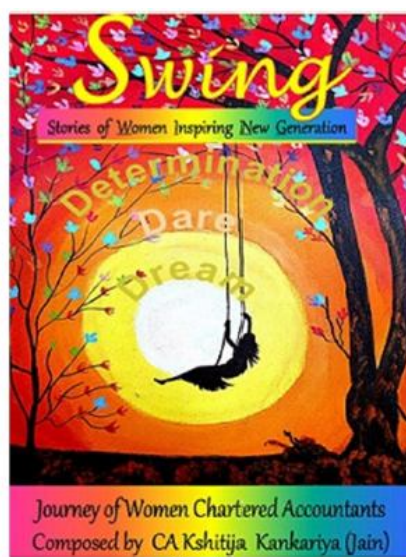
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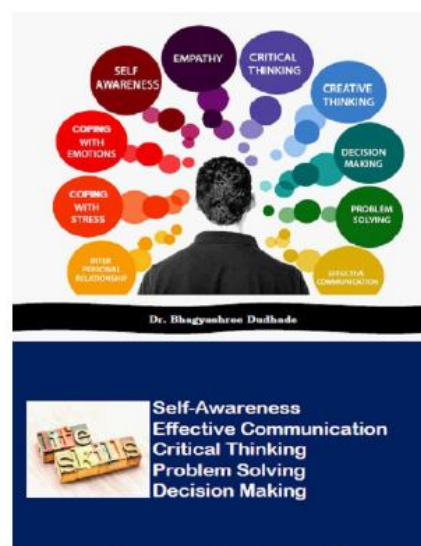


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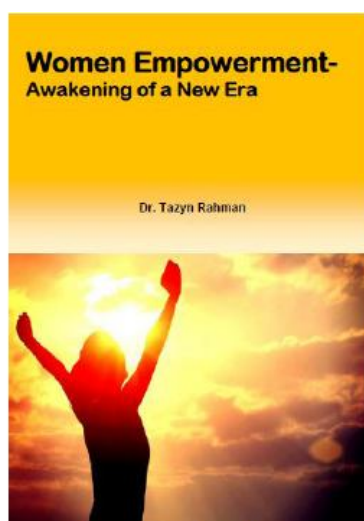


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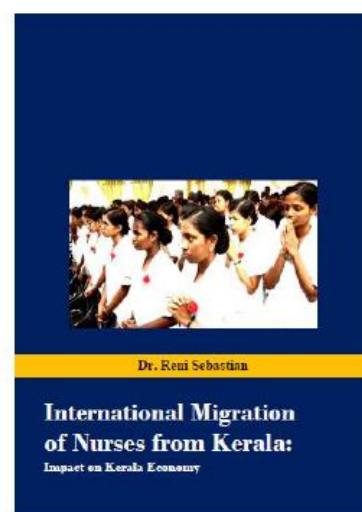


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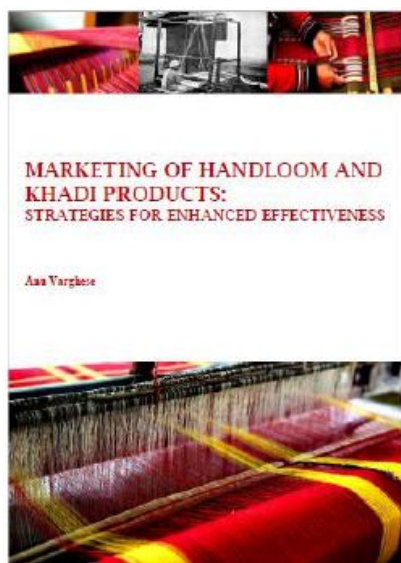
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