

A STUDY ON MARKETING OF PRODUCTS BY TRIBAL PEOPLE IN JAWADHU HILLS - TIRUVANNAMALAI DISTRICT

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ABSTRACT

The source of livelihood for the tribal people is dependent on various factors that are associated with the natural resources. The place of their origin has significant impact on the life-style led by people. The tribal people are forced to work on the local employment opportunities due to various reasons. The tribal areas have limited access to the main land and it further dampens their hope of getting a regular employment. The majority of the people have to cope with the employment that is available at their living places mainly due to lack of connectivity. The tribal people are looking after various sources to empower themselves economically which has made them to source the resources from the forests and produce agricultural cash crops that are demanded in the local market. The sense of insecurity over the financial resources has made them to look out for diverse opportunities that may help them to have funds for running their day today life. The tribal people look for collection of resources from the markets with the permission of the government officials and sell them in the local market out of which they earn certain income. The majority of them look out for opportunities in producing the agricultural crops which will give them an income to survive over a period of time. This production activity is only the beginning and it has to be sent to the market in demanded way to meet the consumer utility. The marketing of the goods in the tribal area is considered to be vital for making the strategies work towards getting a income from the market. The quality, quantity, price along with various other factors determines the ability of the market to be demanded by the consumers. The tribal market has limited reach and all the production in these areas will be dumped in the local market which makes the task of producers or sourcing people tough in making sale of the product. The marketing strategies have to work prominently to make profitable returns from the tribal market. The following are the various reviews that deals with the area of marketing of tribal products which helps to identify the research gap.

Keywords: Marketing, Tribal Products

INTRODUCTION

REVIEW OF LITERATURE

Hemasrikumar, D., & Indumathy, I. (2020)¹. Tribal community lifestyle and culture and environmental risk shape the imperative of safeguarding forest and protecting its innumerable wealth for present and future generations. The explanation why the tribal people are guaranteed rights is not just for them, but also for preserving the climate, as research understands. The data were obtained using the hierarchical random sampling process using a standardised interview schedule of 100 respondents. The district of Nilgiris was chosen in the first level. Two Taluks are chosen from the district: Coonoor and kotagiri. The two settlements of Nedimandhu and Kelkotagiri are chosen from the Coonoor taluk.

Rajathilagam. S & Kavitha. K (2018)² has observed that the Indian Government is working to improve the livelihoods of the tribes which make up

8.14% of the country's population. Of the many problems affecting the tribal India, the marketing practises of the tribal people are one factor which still has to be provided adequate attention in the programme. This research reflects on recent marketing strategies for tribal goods and guarantees that their products have a full support price (MSP). Therefore, the study aimed at figuring out how stable the livelihood of Kodaikanal tribal craftsmen is via the Social Networking Crowd sourcing network, in which tribal craftsmen / farmers / organisations / organisations engage. Consumers may speak directly with them. The middlemen are not interested and the tribal craftsmen will increase the highest price for their items. Tribal marketing needs a new approach to marketing than conventional. It is more about helping than concentrating and encouraging others who have the same enthusiasm.

Taylor, E. C., Moore, M. E., Chullen, C. L., & Zemanek Jr, J. E. (2018)³ published a research paper to examine the nature of tribal activity in soccer fans' groups importance and the impact of the collective on the consumption practises of group participants Members perform an ethnographic study of American soccer customers. Field-capital collective identity by

¹ Hemasrikumar, D., & Indumathy, I. (2020). A study on tribal people in forest conservation under the resources management. *IJRAR-International Journal of Research and Analytical Reviews (IJRAR)*, 7(2), 19-25.

² Rajathilagam. S & Kavitha. K (2018). Changing Dimensions of Tribal Markets through Social Media Platform with Reference to Kodaikanal. *International Journal of Scientific Research in Computer Science Applications and Management Studies*. 7(5). 1-5.

³ Taylor, E. C., Moore, M. E., Chullen, C. L., & Zemanek Jr, J. E. (2018). Tribalism among US-based Premier League supporters groups: a tribal marketing perspective.

ethnographic, non-participant observation hypotheses and tribalism were examined. Three backers in the US English Premier League football groups were analysed by social networks on the Internet, in particular Reddit and debate. Results have shown that, as a way to define and actualize themselves, citizens are forming tribes. Like a socialising type, too. In addition, affiliation status has been inferred in order to influence particular consumption. The products and football fans have been proposed as parts of the business which have a rich potential if adroitly grown business sector.

Kithan, N., Goswami, S., & Biswas, S. (2016)⁴ explained that the field research on the effect of edible bamboo has been carried out in four villages in the Wokha district of Nagaland. The use of peoples' livelihoods was among seven species are found out of 18 bamboo species found in the research region were simple to feed. The studies demonstrate that bamboo shooting is used for modern harvesting and processing instruments, sustainable resource management and marketing have potential for opportunities for workers. There are about '10,000 monthly salaries in communities throughout the bamboo shooting season open (from June to Oct) is 8000/- a month, while the bamboo shooting season is available. The established marketing channels are manufacturer-consumer and producer-midconsumer (Channel-I) (Channel II). The studies approach development and marketing issues in a broad variety of forms including transport of capital to manufacturing units and markets, seasonal phonological flowering phenomena, importance addition, capability creation and strengthening of communities' abilities.

Kumari, G., Ratnesh, M., & Egoruz, E. S. (2020)⁵ examined that the goal of the study was to analyse the contribution of corporations to the socio-economic growth of local communities in Jharkhand, which centred on women craftsmen. The analysis underlined the significance of CSR in promoting and nurturing the local craft community. It also addresses how the CSR ventures are used to build expertise for Jharkhand's tribal artisans. In view of the promotion of tribal handicrafts, this analysis also contrasts critically the CSR measures introduced by Jindal Steel and Power and Tata Steel Ltd. The thesis followed the inductive method so the report concentrates on the full explanation and examination. Finally, this analysis examines the effect of these initiatives on the local community's socio-economic growth. It is necessary to remember that other

CSR programmes will often use this method of encouraging art to transform the existence of the unprivileged classes of society.

Sharma, D., Tiwari, B. K., Chaturvedi, S. S., & Diengdoh, E. (2015)⁶ revealed that Non-wood forestry goods are an important aspect of the subsistence and sustainability of tribal peoples near to woodland in Arunachal Pradesh with more than 80% of geographical value. This research has been completed Changlang, East Kameng, Near Subansiri, Tawang, Tirap, Upper Siang, in eight districts of Arunachal Pradesh viz. West Kameng and West Siang, covering 34 families and 34 towns. In all, 135 plants and 36 animals are based records is produced of based non-forest wood products. There are 54 species for leaves were collected among NTFPs dependent on plants, of which 30 were collected. For fruit stem and 22. Maintained/hunted in food were the animal related NTFPs (93 percent). The West has reported the largest plant-based NTFP collection the West Kameng and Tawang accompanied Siang. Likewise, the largest collection of NTFPs dependent on animals has been reported Tirap and Lower Subansiri accompanied West Siang. More than 50% of people's annual revenue was contributed by NTFP Tirap, Lower and Siang districts of East Kameng.

Ajaz-ul-Islam, M., Sulaiman Quli, S. M., Rai, R., & Sofi, P. A. (2013)⁷ revealed that the tracks forest services' subsistence contributions to the tribal Bundu block societies of Jharkhand district of Ranchi. The research is focused on the personal interviews performed in the survey villages utilising multiphased random sampling technologies by the chosen participants via interview schedules, customised impressions and participatory rural evaluation methods (seminar framework interviews and focus groups). The analysis showed that the average forest dependent direct paying work was 19.82 man days/household/ year for sample population and that the mean income received from these activities was '2199.70 / household/ year for the district. As no wood or non-wood products (NTFP) based enterprises were created, the livelihood generation from forest based secondary jobs in the study region was zero. For the households surveyed in the district, the average revenue and unpaid jobs generated by the NTFPs are calculated to be '4791.16/Household/annum and 88.22

⁴ Kithan, N., Goswami, S., & Biswas, S. (2016). Traditional Edible Bamboo Products and their Impact on Livelihood of Tribal Village Community of Wokha District, Nagaland. *Indian Forester*, 142(6), 595-600.

⁵ Kumari, G., Ratnesh, M., & Egoruz, E. S. (2020). Role of CSR in supporting tribal handicrafts of Jharkhand. *Journal of Critical Reviews*, 7(4), 57-61.

⁶ Sharma, D., Tiwari, B. K., Chaturvedi, S. S., & Diengdoh, E. (2015). Status, utilization and economic valuation of non-timber forest products of arunachal pradesh, India. *Journal of forest and environmental science*, 31(1), 24-37.

⁷ Ajaz-ul-Islam, M., Sulaiman Quli, S. M., Rai, R., & Sofi, P. A. (2013). Livelihood contributions of forest resources to the tribal communities of Jharkhand. *Indian journal of fundamental and applied life sciences*, 3(2), 131-44.

man days/annum. The number of households engaged in gathering different NTFPs ranged from 1.83% to 100% and marketing of NTFPs in survey villages was 1.83% to 80.49%.

Pradhan, S. K. (2019)⁸ has examined that many Indians and international clients have often been drawn by the elegance and Appeal of tribal handicrafts items. The tribal craft is the obvious emblem of tribal society, it can be told. Also known for its tribal people, tribal handicrafts which represent the aboriginal culture of this region is the Undivided K-B-K of Odisha. The tribes of these areas have specialist skills that move from one generation to the next in the form of handicraft. The tribal craftsmen in this sector are very sensitive and less inclined to alter their typical culture. The tribal craftsmen must fight for their sustainable development through the social and economic transition. The tribal artisans who are the real spreaders and predictors of tribal society, have compelled them to abandon their career in order to survive in urban areas. Many governments have not made advisable attempts to achieve the high-quality handicrafts market.

Research Gap

The various national and foreign studies that were part of the literature survey in the area of tribal marketing were reviewed for identifying the research gap. The studies have focused on the various production activities and sources of livelihood for the tribal people. This area of research is vastly explored and has given various production activities that are available for the tribal people in their area of origin. The sources of livelihood for the tribal people are also another area that has been studied majorly by the researchers. The production process induces the producers to make good prices for the produce which promotes them to involve in the marketing activities. The marketing activities focus on making the products reach the market and other marketing aspects are largely not adopted by the tribal people. The area of marketing and promotion in the case of tribal people are unexplored which forms the base for the study. The study also attempts to examine the various problems faced by the tribal people in marketing of the goods in tribal area. The above research gap will serve as the base for study.

Statement of the Problem

The problems in the tribal marketing play a vital role in providing source of livelihood for the tribal people. The tribal people undergo lot of pain towards earning their day today bread due to the lack of access and employment opportunities. The problems faced by

them in the form of lack of recognition for the produced goods, lack of support by the government for produced goods, lack of training in marketing of goods etc all these play a vital role in making the end products reach the consumers. The lack of expertise in marketing area makes the people to suffer from the losses for lower sales. The goods of non-durable nature also make the situations tough for the tribal people to store the products without cold storage. The products either produced or sourced from the forest resources majorly have short time period which hampers the sale of the product. The marketing and various problems faced by the tribal people force them to leave the area in search of employment which forces the tribal economy to fade. The studies of this nature addressing the marketing and other operational problems are vital for making the tribal people to stick to their original livelihood sources.

Research Questions

- a. What are the various factors that are promoting the marketing of tribal products in the study area?
- b. What are the diverse problems that are in association with the marketing of tribal products in Jawadhu Hills?

Importance of the Study

The tribal economy produces the rare products that are useful for both day today activities and medicinal properties. The products produced in the tribal areas are natural and having high potential for exports. The export of the goods will help to generate foreign exchange reserves for the economy. The working of the tribal economy is vital for the production of forest resources and other cash crops that can be produced only those areas. The role of the tribal economy is understood by the government which has made them to stratigise various programmes and policies that ensures the livelihood of people living in the tribal area. The produce of the forest resources are significantly larger and only part of it sourced by the tribal people which helps the people to earn the current income. The various aspects of production and marketing activities have to be investigated to address the problems of migration from the tribal areas to urban areas which will directly impact the tribal economy. The production and contribution from the tribal areas are vital for export generation and it can be ensured only when the tribal people are working on the production as well as marketing of tribal produce. The various problems that may hinder the working of the tribal people has to be identified and addressed with these type studies to make the tribal economy blooming.

Objectives of the Study

- a. To examine the various factors that may promote the marketing of tribal products in different markets of study area

⁸ Pradhan, S. K. Marketing Orientation of Tribal Handicrafts with Special Reference to KBK Districts* Debasis Pani. *International Journal of Exclusive Global Research*. 1(5). 1-5.

- b. To identify the diverse challenges faced by the tribal in marketing and selling of products in Jawadhu Hills.

Research Methodology

The research methodology explains that the study is empirical in nature which is conducted based on the opinions and observations from the tribal people. The various methods used in the study are based on the empirical research design. The primary data is the major source of data used for the study. The primary data was collected using the structured interview schedule. The interview schedule consists of three parts in the form of

- Demographic information
- Various Factors promoting marketing of tribal products

- c. Problems faced by the tribal people in marketing of products

The interview schedule was administered among the tribal people who are involved in the marketing of tribal products. The non-random sampling technique of convenient sampling was used for the study due to the paucity of time even though the population was finite. The sample size of 175 was fixed based on the Z-sample size calculator using the error term of 5 percent.

Analysis and Interpretations

The data were collected using the interview schedule and the results obtained were presented below

Table -1: Demographic Representation

Demographics	Category	Frequency	Percent
Gender	Male	147	84.00
	Female	28	16.00
	Total	175	100.00
Age	Below 25 Years	23	13.10
	26 Years – 35 years	67	38.30
	36 Years – 45 Years	45	25.70
	Above 46 Years	40	22.90
	Total	175	100.00
Educational Qualification	School Level	46	26.30
	Higher Secondary Level	37	21.10
	UG	58	33.10
	PG	25	14.30
	Others	9	5.10
	Total	175	100.00
Monthly Income	Below Rs. 10,000	79	45.10
	Rs. 10,001 – Rs. 15,000	43	24.60
	Rs. 15,001- Rs. 20,000	23	13.10
	Above Rs. 20,001	30	17.10
	Total	175	100.00
Marital Status	Married	92	52.60
	Unmarried	83	47.40
	Total	175	100.00
Number of Family Members	Below 3 Members	29	16.60
	4-5 Members	122	69.70
	6-9 Members	11	6.30
	Above 10 Members	13	7.40
	Total	175	100.00
Family Structure	Nuclear Family	72	41.10

	Joint Family	103	58.90
	Total	175	100.00
Vehicle for Transporting of Goods	Own	39	22.30
	Rent	67	38.30
	Public Transport	19	10.90
	Others	50	28.60
	Total	175	100.00
Distance to Market	Below 3 Kms	63	36.00
	4Kms – 6 Kms	40	22.90
	7 Kms- 9 Kms	18	10.30
	10 Kms- 12 Kms	45	25.70
	Above 13 Kms	9	5.10
	Total	175	100.00
Entrance Fees	Yes	151	86.30
	No	24	13.70
	Total	235	100.00

(Source: Primary Data)

The demographic representation reveals that majority of the tribal people involved in the marketing activities are male with 84 percent of responses in that category and 16 percent of responses in the female category. The age group of the respondents reveals that the people involved in the marketing activities are middle aged which is supported by 38.30 percent of responses in the age group of 26-35 years. The educational qualification of the respondents reveals that 33.10 percent of responses are recorded in the category of UG which reveals that mostly they are well educated. The monthly income of the tribal people is still lower with 45.10 percent of responses recorded in the category of Below Rs. 10,000. The marital status of the respondents reveals that 52.60 percent of the tribal people married are

involved in marketing activities. The family size of the respondents reveals that they are living in 4-5 members group with 69.70 percent in that category. The family structure also supports the view of family size with joint family having majority of responses. The vehicle for transporting of goods to the tribal market is rented with 38.30 percent of responses in that category which adds to the prices of the product. The distance to market for the tribal people is below 3 kms for majority of the respondents which is nearly 1/3rd of the total population. The entrance fees or membership fees are charged for the tribal people for marketing of goods which is prevalent among 86.30 percent of respondents involved in the study.

Table – 2: Problems faced by Tribal People in Marketing

S. No.	Problems faced by Tribal People in Marketing	Opinions									
		SA	(%)	A	(%)	N	(%)	DA	(%)	SDA	(%)
1	Perishability	15	8.60	67	38.30	63	36.00	9	5.10	21	12.00
2	Lack of Cold Storage	13	7.40	81	46.30	72	41.10	3	1.70	6	3.40
3	Lack of Access to Forest Resources	38	21.70	99	56.60	16	9.10	15	8.60	7	4.00
4	Local Officials Regulations	23	13.10	108	61.70	26	14.90	12	6.90	6	3.40
5	Monsoon Problems	27	15.40	93	53.10	43	24.60	5	2.90	7	4.00
6	Crop Damage due to Animal Attack	27	15.40	106	60.60	35	20.00	4	2.35	3	1.65
7	Non-Availability of Government Training	32	18.30	98	56.00	45	25.80	---	---	---	---

(Source: Primary Data)

The problems involved in the study are vital in assessing the hindrance in the marketing of the tribal products. The problems of Perishability (38.50 percent), Lack of Cold Storage (46.30 percent), Lack of Access to Forest Resources (56.60 percent), Local Officials Regulations (61.70 percent), Monsoon Problems (53.10

percent), Crop Damage due to Animal Attack (60.60 percent) and Non-Availability of Government Training (56 percent) are having majority of the responses in the agree category. The assessment of the problems reveals the nearly half of the tribal people involved in marketing

activities are affected by the operational problems mentioned in the study.

Association between Educational Qualification and Vehicle for Transporting of Goods

The educational qualification of the respondents has significant impact on the vehicle that is used for

transporting the goods. The economical usage of the forces for transportation of the products is influenced by the educational qualification. The relationship is assessed with the help of cross tabulation

Table – 3: Cross – Tabulation - Educational Qualification and Vehicle for Transporting of Goods

			Vechile for Transporting of Goods				Total
			Own	Rent	Public Transport	Others	
Educational qualification	SSLC	N	17	15	0	14	46
		C(P)	37.0%	32.6%	0.0%	30.4%	100.0%
		R(P)	43.6%	22.4%	0.0%	28.0%	26.3%
	HSC	N	8	17	2	10	37
		C(P)	21.6%	45.9%	5.4%	27.0%	100.0%
		R(P)	20.5%	25.4%	10.5%	20.0%	21.1%
	under graduation	N	11	25	8	14	58
		C(P)	19.0%	43.1%	13.8%	24.1%	100.0%
		R(P)	28.2%	37.3%	42.1%	28.0%	33.1%
	post graduation	N	0	10	6	9	25
		C(P)	0.0%	40.0%	24.0%	36.0%	100.0%
		R(P)	0.0%	14.9%	31.6%	18.0%	14.3%
	others	N	3	0	3	3	9
		C(P)	33.3%	0.0%	33.3%	33.3%	100.0%
		R(P)	7.7%	0.0%	15.8%	6.0%	5.1%
Total		N	39	67	19	50	175
		C(P)	22.3%	38.3%	10.9%	28.6%	100.0%
		R(P)	100.0%	100.0%	100.0%	100.0%	100.0%

(Source: Primary Data)

The cross-tabulation reveals that the majority of members are using rented vehicles across all categories of the educational qualification and it is not having impact as revealed by the cross tabulation. The chi-square test is used to assess the relationship among the variables of educational qualification and transportation vehicles. The following hypothesis is used for the testing the association

H₀: There is no significant association between educational qualification of tribal people and vehicle used for transportation to tribal market.

H₁: There is significant association between educational qualification of tribal people and vehicle used for transportation to tribal market.

Table – 4: Chi-Square Test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	31.245 ^a	12	0.002**
Likelihood Ratio	42.078	12	0.000
Linear-by-Linear Association	5.066	1	0.024
N of Valid Cases	175		

(** - indicates significance @ 1 % level and * - indicates significance @ 5 % level)

The above table explains that the educational qualification is having an association with the vehicle used for transportation of tribal products which is

supported by the p-value of 0.002** that is statistically significant at one percent level.

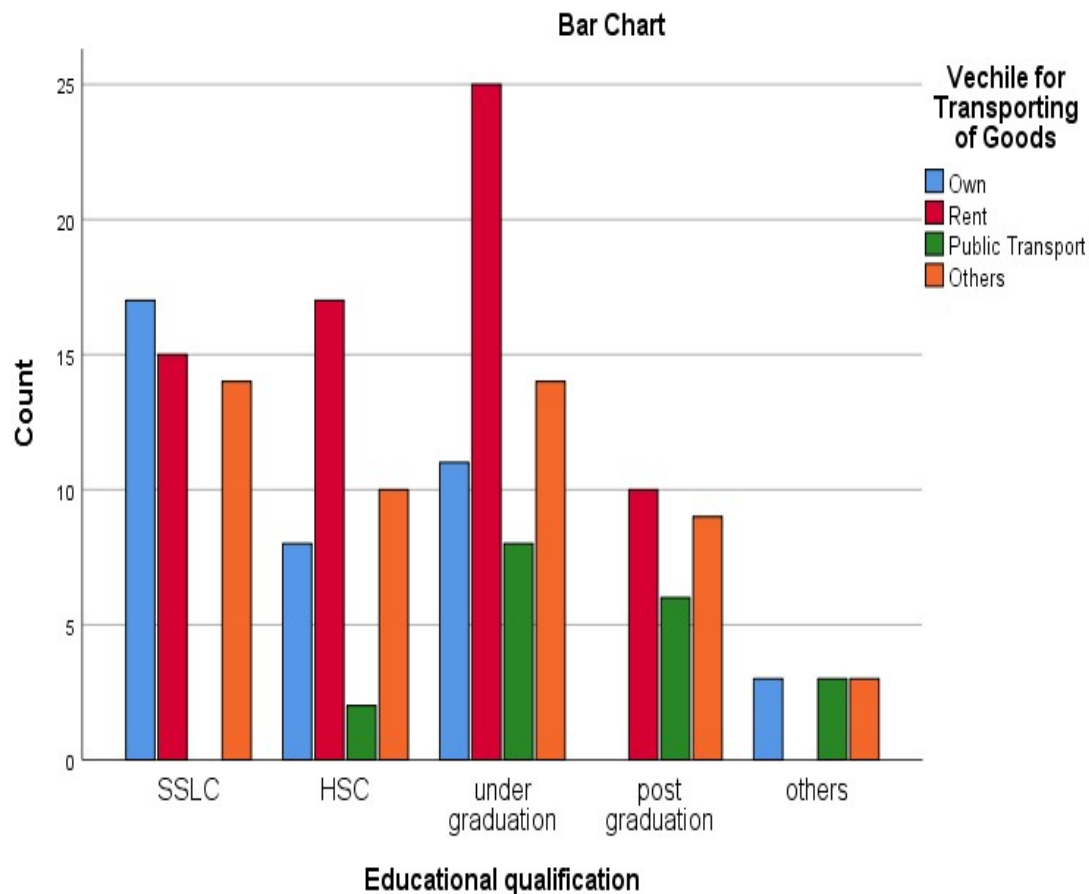


Fig.1 - Educational Qualification and Vehicle for Transporting of Goods

Factor Analysis – Promotion of Marketing in Tribal Areas

The various factors that can be used for effective marketing are assessed with help of twelve variables which were seems to influential in promoting the tribal products. The variables are heterogeneous and

it is converted in the homogeneous factors that help in effective marketing of tribal products which is done with the factor analysis. The following are the results of factor analysis

Table – 5: KMO and Barlett’s Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.712
Bartlett's Test of Sphericity	Approx. Chi-Square	1179.254
	df	66
	Sig.	<0.001**

(**-

indicates significance @ 1 % level and *- indicates significance @ 5 % level)

The above table explains the results of the KMO and Barlett’s test which reveals that the variables used in the factor analysis are normal and attained factors of the

test will help in promoting the marketing of tribal products by focusing on the core areas rather than all areas involved in the study.

Table – 6

Communalities		
	Initial	Extraction
Attractive Advertisements	1.000	0.764
Branding of the Product	1.000	0.718
Improving the logistics of the product	1.000	0.682
B2C Connectivity	1.000	0.705
Maintaining the Quality of Product	1.000	0.473
Creation of Trust	1.000	0.714
Improved accessibility to tourists	1.000	0.512
Low cost of transportation	1.000	0.811
Enhancing Government purchases	1.000	0.818
Providing training for Marketing of Products	1.000	0.673
Rules and Regulations to Avoid Dumping of Goods	1.000	0.669
Awareness creation among consumers	1.000	0.598
Extraction Method: Principal Component Analysis.		

The initial and extraction values helps to understand the formation of the factors and various

statistical relationships that are associated with communalities of the variables involved in the study.

Table – 7- 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	3.747	31.226	31.226	3.747	31.226	31.226	3.685	30.706	30.706
2	3.291	27.422	58.648	3.291	27.422	58.648	2.730	22.748	53.454
3	1.100	9.165	67.813	1.100	9.165	67.813	1.723	14.359	67.813
4	.945	7.875	75.688						
5	.842	7.019	82.707						
6	.576	4.797	87.505						
7	.391	3.261	90.766						
8	.348	2.903	93.669						
9	.271	2.257	95.926						
10	.204	1.697	97.623						
11	.158	1.320	98.943						
12	.127	1.057	100.000						

Extraction Method: Principal Component Analysis.

The variance table explains that the factor analysis have observed and categories 67 percent of opinions given by the tribal people which they expect to promote the marketing in the tribal areas. The variance among the each variable is explained in the above table

along with the variances among the variables. This helps to understand that the factor analysis has helped to sort out the core areas that will promote tribal marketing in the study area of Jawadhu Hills.

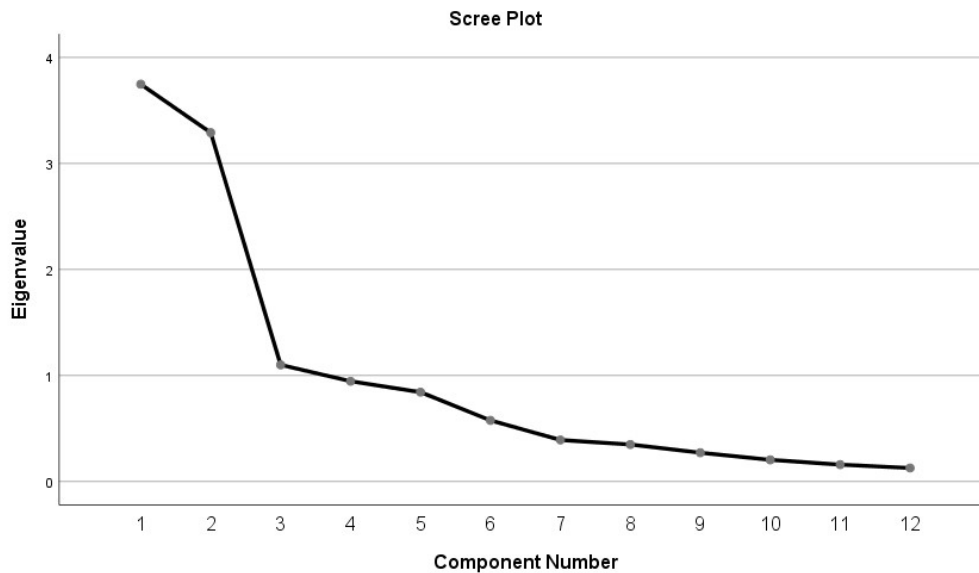


Fig.2 – Scree Plot for Factor Formation based on Eigen Values

Table - 8

Rotated Component Matrix ^a			
	Component		
	1	2	3
Enhancing Government purchases	0.903		
Low cost of transportation	0.898		
Providing training for Marketing of Products	0.815		
Rules and Regulations to Avoid Dumping of Goods	0.810		
Awareness creation among consumers	0.771		
Attractive Advertisements		0.869	
Branding of the Product		0.827	
Creation of Trust		0.816	
Improved accessibility to tourists		0.518	
Improving the logistics of the product			0.800
Maintaining the Quality of Product			0.684
B2C Connectivity			0.621
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			

The rotated component matrix explains the number of factors formed as the result of application of the factor analysis and diverse variables that are involved in formation of those factors promoting the tribal marketing

Factor – I- Government Support in Operational Areas of Marketing

This factor is formed based on the variables of Enhancing Government purchases (0.903),

Low cost of transportation (0.898), Providing training for Marketing of Products (0.815), Rules and Regulations to Avoid Dumping of Goods (0.810) and Awareness creation among consumers (0.771). The nature of the variables is coinciding on the fact of enhanced government support through various operational areas. Therefore the factor formed is named as Government Support in Operational Areas of Marketing

Factor – II- Enhanced Product Features

The second factor of Enhanced Product features is formed with the variables of attractive Advertisements (0.869), Branding of the Product (0.827), Creation of

Trust (0.816) and Improved accessibility to tourists (0.518)

Factor – III- Improving Marketing Infrastructure

The final factor that promotes the tribal marketing is formed with the help of improving the logistics of the product (0.800), Maintaining the Quality of Product (0.684) and B2C Connectivity (0.621)

The above factors are the key areas that the tribal people have outlined for improving the marketing of tribal products in the study area of Jawadhu hills which will also help them to earn their livelihood.

DISCUSSIONS

The research study has focused to ascertain of core factors that can promote the tribal marketing in the study area and identifying the various problems that are associated with the tribal marketing. The analysis and interpretations revealed that there are numerous problems that are faced by the tribal people in the study area in the form of lack of infrastructural facilities and inadequacy in the training programmes for the marketing of goods. The tribal people are suffering due to these problems which makes the perishable products turn into waste.

These problems are forcing the tribal people to look out for other employment opportunities. The various factors that can promote the tribal marketing are

Factor – I- Government Support in Operational Areas of Marketing

Factor – II- Enhanced Product Features &

Factor – III- Improving Marketing Infrastructure

The opinions of the tribal people revealed that focusing on these areas can give support to the tribal marketing of goods in Jawadhu Hills. The addressing of the problems by promoting infrastructural facilities and enhancing the above core areas can promote the marketing of goods in the tribal areas.

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REAL AND REACTIVE POWER CONTROL USING MATRIX CONVERTER FOR INDUCTION GENERATOR BASED WIND ENERGY CONVERSION SYSTEM

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ABSTRACT

In this, the induction generator generates variable voltage with varying frequency and is effectively controlled by the design of Matrix Converter which injects real and reactive power. The Matrix Converter is controlled by efficient mppt based algorithm and is assessed with R-L load. The simulation work is done in MATLAB/Simulink software for Matrix Converter and Induction Generator are provided in this paper.

Key words: Squirrel Cage Induction Generator, Matrix Converter, MPPT control, Real and Reactive power Injection, Wind Energy Conversion system

I. INTRODUCTION

The Matrix device provides AC offer as input of constant frequency and voltage into varying output parameters such as voltage and frequency. The output filter parts needed square measure of reduced size since the method of conversion not involves any DC variables. Matrix Converters square measure devices that conducts in both forward and reverse direction and therefore regeneration is feasible and the energy is provided back to the source from the load facet wherever the source current is curving and also the displacement issue viewed by the source will be regulated by correct shift while not looking on the sort of load. The foremost fascinating options in frequency conversion devices square measure the following:

- a. Smaller converter size.
- b. Voltage generation with different magnitude and frequency.
- c. Lower harmonics at generation and load side.
- d. Maintaining the unity power factor irrespective of load.

The higher than mentioned constraints square measure glad by the Matrix Converters and so it met space of interest. that the megacycle is capable of upper power density and because it is freed from capacitors it's additional reliable. Hence, the applying of megacycle for the conclusion of terribly compact of AC drives [1]. Various control techniques are developed for the better transient behaviour including sensorless control techniques [2]. As the number of switching devices are high, the matrix converter switching losses are slightly higher than the conventional converters. The reduction in device current by 33% leads to reduction in thermal stress across the switching devices [3]. An algorithm is developed for power factor improvement and reduction in THD (Total Harmonic Distortion) using indirect transfer function approach [4]. In this, simultaneous source current and load voltage vector modulation approach is employed. A feed back based control strategy is proposed which provides maximum output

voltage for the PWM based AC-AC converters [5]. A simplified Venturini's modulation algorithm is introduced which provides displacement factor as unity at the source irrespective of the load displacement factor and designed in operation with closed loop. It is tested with various operating constraints in which it provides maximum of 86.6% of input voltage and power factor correction [6, 7]. An improved management structure is planned that employs AN fundamental principle coordinate system implementation comprising at the Repetitive management strategy combined with a standard trailing controller so as to attenuate or eliminates the unwanted harmonic distortion within the output voltage wave form of the Matrix device and to catch up on the steady-state error [8].

In this, the converters are built for managing the AC loads at various frequencies. The Direct Matrix Converter (DMC) is designed for required load voltage by turning ON and OFF of the switching devices as per the switching sequence. The required reactive power is provided by matrix converter which is controlled with the help of PI controller based reactive power control loop and voltage control loop.

II. SYSTEM DESCRIPTION

The proposed system consists of induction generator based wind energy conversion system which is shown in Fig 1. The induction generator coupled with wind turbine generates the power according to the wind speed. The unprocessed voltage is provided to the matrix converter which controls the real and reactive power injection to the load with the help of PI controller based control

loops.

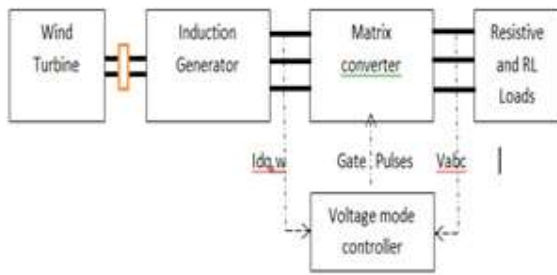


Fig 1 Proposed Wind Energy Conversion System

The matrix converter provides the conversion of AC-AC. The essential aspect of the proposed matrix converter as it converts the frequency and amplitude of supply into required frequency and voltage. The Matrix Converter consists of nine switching devices with bidirectional conduction property organized in a (3*3) Matrix form which is provided in Fig 2.

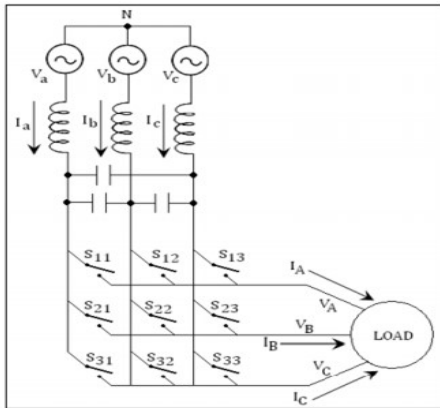


Fig 2 Three Phase Matrix Converter

The bifacial switch devices area unit employed by composition 2 switches in opposed parallel association to create one twin direction switch. The operating time of the switches area unit inhibited to get the required load voltage reckoning on the source provide voltage and required load voltage. The alteration of AC to AC may be done adequately victimisation Matrix device. the matter related to the 2 stage conversion victimisation rectifier and electrical converter is well eradicated. The Matrix device doesn't need any energy device. owing to the disposition of the DC link the dimensions of the device may be minimized and therefore both the forward and reverse flow of power is feasible using a Matrix device. The harmonics present in the load voltage and source current may be minimized by choosing the operating time duration of the switching devices at higher rate that moves the harmonics to the higher range of frequency. The R and RL loads are used in this system.

A. Matrix Converter as Cyclo-inverter

The Matrix device may be functioned as Cyclo-inverter for providing the load voltage of reference frequency. For cyclo-converter and cyclo-inverter the source may essentially be from grid or sources such as wind, etc. the chance of combinative operation of Matrix device may

increase the facility to weight quantitative relation. The simulation circuit three} section matrix device is provided in Fig 3.

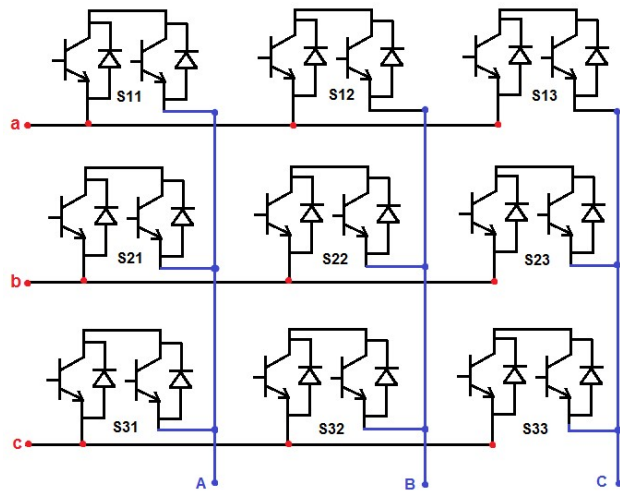


Fig 3 Matrix Converter as Cyclo Inverter

The operation as Cyclo-inverter is provided by the conductivity of switching devices for part A is S11a, S12a and S13a once output for part A is positive. once part A output is negative, S11A, S12B and S13C is working. Similar operation can takes place for different 2 phases. The output frequency $f_o = f_{source} \times N_r$, Where, $f_o =$ Output frequency, $f_{source} =$ frequency of source voltage and $N_r =$ real number. The load voltage waveforms of phase A for frequency, $f_o=100\text{Hz}$ is provided in Fig 4.

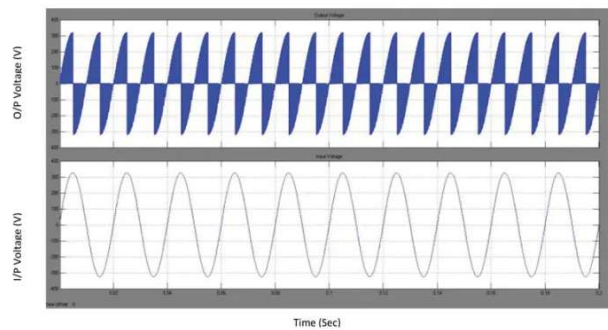


Fig 4 Cyclo Inverter phase A output and input voltage waveforms

B. Optimal Control of WECS

The vector control of the matrix converter is provided in Fig 5:

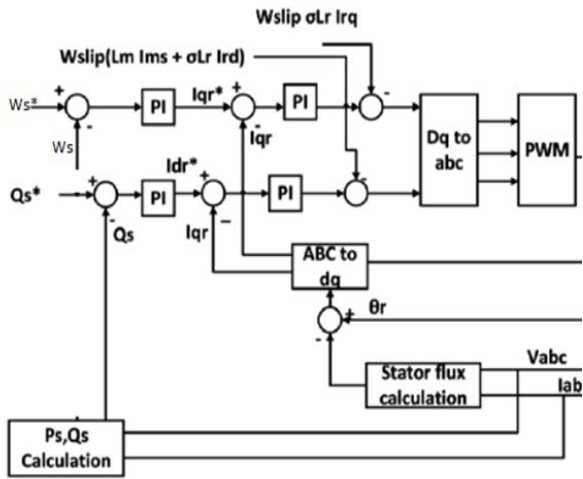


Fig 5 Real and Reactive power control for Matrix converter

In this, the speed reference is compared with measured speed and the error speed is provided to PI control which generates quadrature current reference I_q^* which is compared to I_q . The reactive power reference Q^* is compared to measured reactive power and error is provided to PI control which generates I_d^* which is compared to I_d . The error currents are provided to inner current controllers and V_d and V_q is generated. It is subjected to inverse Park transformation from which three phase modulation signals are generated which is provided to pwm pulse generation.

The optimal control of matrix converter based wind energy conversion system is provided in Fig 6:

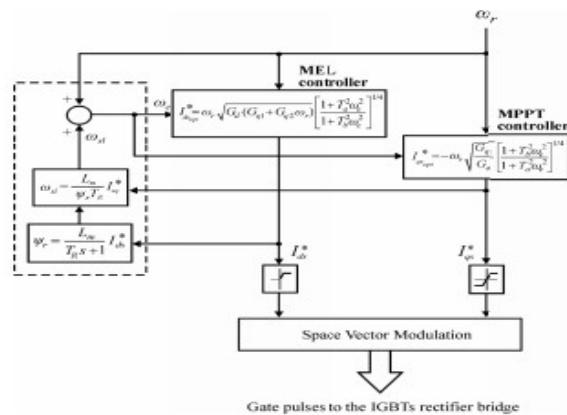


Fig 6 Real and Reactive power optimal control for WECS

To achieve most potency of the full WECS, each MEL and MPP, severally, ought to move at the same time. Therefore, the optimum solutions that verify the d- and q axis parts of the induction generator stator coil current area unit provided by

$$I_{d\text{opt}} = \omega_r \sqrt{G_d G_q} \left[\frac{1 + T_a^2 \omega_e^2}{1 + T_b^2 \omega_e^2} \right]^{1/4}$$

And

$$|I_{q\text{opt}}| = \omega_r \sqrt{\frac{G_q}{G_d} \left[\frac{1 + T_b^2 \omega_e^2}{1 + T_a^2 \omega_e^2} \right]^{1/4}}$$

Where

$$G_d = \sqrt{1 + \frac{R_r L_m^2}{R_s L_r^2}}$$

$$T_a = L_m \sqrt{\frac{c_{Fe} (L_r - L_m)^2 + c_{str}}{3(R_s L_r^2 + R_r L_m^2)}}$$

$$T_b = L_m \sqrt{\frac{c_{Fe}}{3R_s}}$$

and

$$G_q = L_r \frac{\rho \pi R^5 C_{p\text{opt}} - 2c_m n^3 \lambda^3 \text{opt}}{3p L_m^2 n^3 \lambda^3 \text{opt}}$$

III. SIMULATION SETUP & RESULTS

The simulation circuit for the matrix converter is provided below in Fig 7:

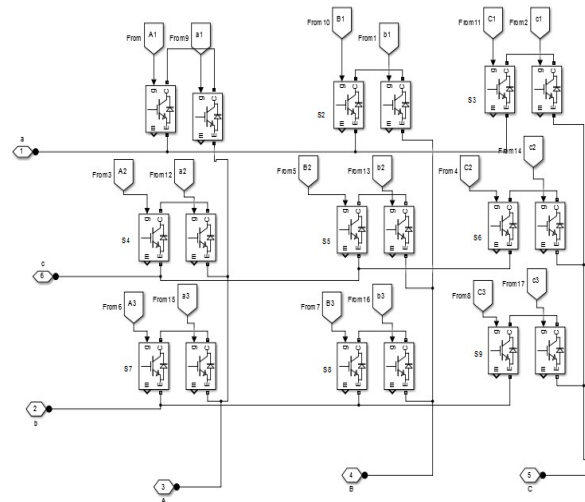


Fig 7 Simulation circuit of Matrix converter

In this, initially the reference frequency is given as 50 Hz and input frequency is also 50Hz. The input and output voltage waveforms with fo=50 Hz is provided below in Fig 8:

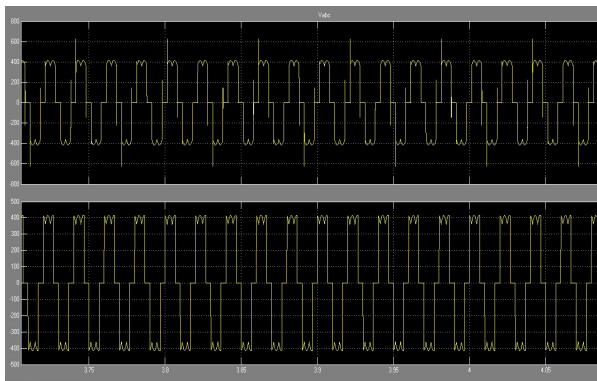


Fig 8 Matrix converter's Input and Output voltage waveforms for fo=50Hz

Then, the reference signal frequency is changed to 100Hz while the input frequency is remained same as 50Hz. The input and output voltage waveforms with fo=100Hz is provided below in Fig 9:

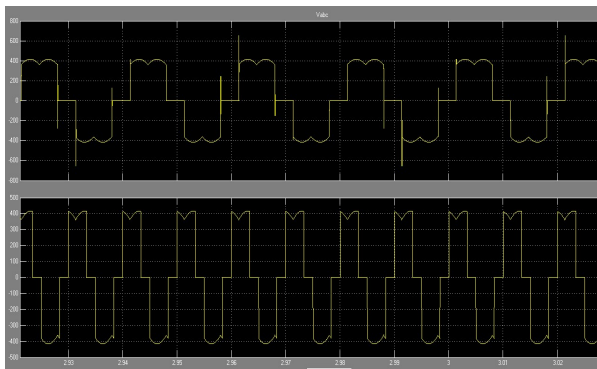


Fig 9 Matrix converter's Input and Output voltage waveforms for fo=100Hz

The simulation circuit for the proposed Matrix Converter based Wind Energy Conversion System is provided below in Fig 10:

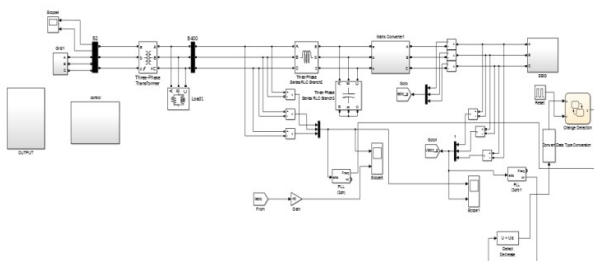


Fig 10 Simulation circuit of proposed system

In this, PMSG is used for generating electrical power of 35KVA from the wind energy with the help of wind turbine. The rated frequency of PMSG is 50Hz and voltage is of 400V. It is then provided to Matrix Converter which provides the output voltage with fixed rated frequency with the help of control circuit in which the real and reactive power injection is also controlled. The control circuit of the proposed system is provided below in Fig 11:

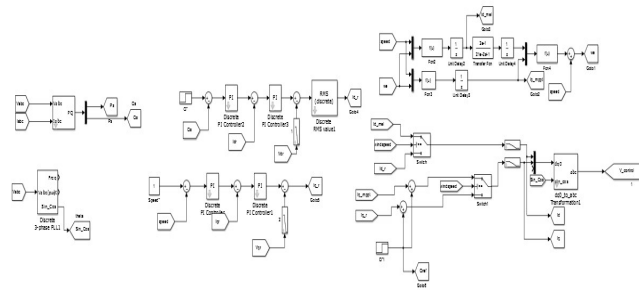


Fig 11 Proposed MPPT based WECS control circuit

In this, the speed and reactive power control loops is used for real and reactive power injection of the proposed system. Then the inner current loops are used to obtain the direct axis and quadrature axis voltage which is subjected to inverse park transformation. Also, if the wind speed is below 5 m/s, then the mppt control is used for generation of inner currents (Id and Iq). The wind speed is varied from 18m/s to 14m/s at t=2s and again it is reduced to 10m/s at t=4s. The input voltage and output voltage waveforms of the matrix converter are provided below in Fig 12:

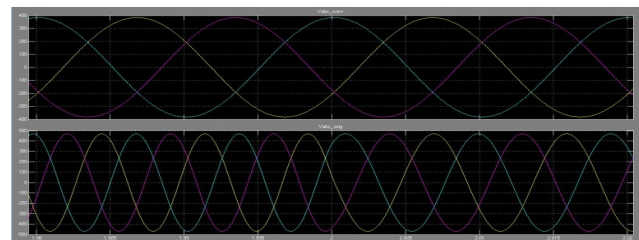


Fig 12 Output Voltage and Input Voltage waveforms of matrix converter

In the above graph, the output voltage and frequency is constant when the frequency of input voltage is varied at t=2s. This can be verified by the frequency waveforms of input and output voltages provided below in Fig 13:

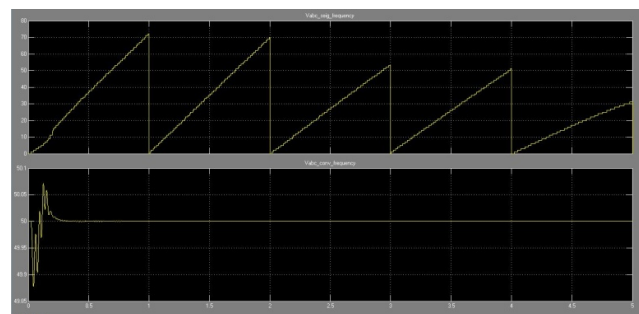


Fig 13 Frequency of input and output voltages of matrix converter

In the above graph, the frequency of output voltage is remained constant as 50Hz while the frequency of input voltage varied from 70Hz to 50Hz at t=2s and again to 30Hz at t=4s. The frequency variation at input side of matrix converter is due to change in wind speed. The real and reactive power generated from WECS is provided below in Fig 14:

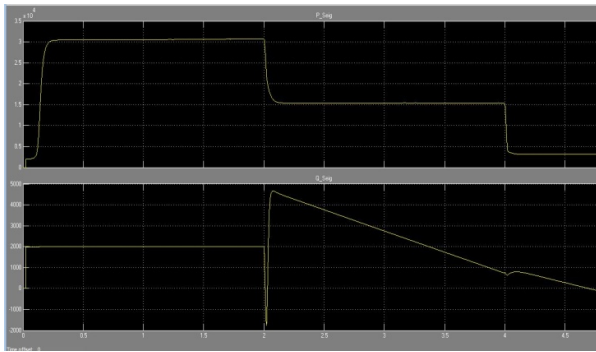


Fig 14 Real and Reactive power waveforms

Here the real power generated from the induction generator is varied according to the wind speed and the reactive power is generated when wind speed is high and then when the speed is reduced, the reactive power starts to reduce and reaches zero.

IV CONCLUSION

In this, the wind energy conversion system with matrix converter is designed and simulated for different wind speeds. The operation of matrix converter is analysed and simulated. The control circuit is designed for extracting maximum power and also to inject reactive power to the grid system. The voltage and frequency of the matrix converter is regulated with varying voltage and frequency of the generator voltage.

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ELEMENTS OF COST OVER RUN, DELAY & RISK INVOLVED IN CONSTRUCTION MANAGEMENT.

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ABSTRACT

Construction Industry is a field that involves construction, modification, restoration and treatment of various edifices. Success of every project is depend on time and cost. The aim of project management is to complete the scheme within specified time and anticipated budget. Delay in achievement of project leads to overrunning of cost the project. This article deals with uncertainties like heavy rain and pandemic covid - 19 encountered during the execution of multi-storied building. With the application of project management tool as Microsoft Project is employed for planning and scheduling of the building. The main objective of this study is to identify the cost & delay factors and the effect on the project completion by studying on-going project. By analysing the reasons for cost & delay, possible recommendations are given. The major factors identified in this study are delays due to approval problem from government, changes in the staff, deficient management of engineers, lack of human resources and delay in procuring materials, untimely release of funds, and problems in drawings. The most important causes were delays in the major effects of delay are cost impact, postponement in work, change in labour allocation etc. Not all delays can be rectified, but few of them can be overcome by improving management responsibilities.

We made an attempt to minimize the delay with the help of MS Project tool by applying some techniques like resources enhancement, project crashing, reducing dependencies and effective tracking the critical path

Keywords: Construction Management, Cost Overrun, Delay, Management responsibilities.

1. INTRODUCTION

Civil Engineering is one in every of the mother branches of engineering that has its roots from past. Caves were the oldest kind of shelters and also the wood logs ordered across the banks of a stream fashioned a bridge. Any with time and growth in trendy science and technology this stream widened its scope and is understood as “Construction Industry” in today’s world. Housing industry could be a field that involves construction, modification, renovation and rehabilitation of assorted structures. It’s become one in every of the leading employment sectors in our country. With the expansion in infrastructure has to fulfil the human’s desires this trade grew in 3 dimensions and has equipped itself to require up any challenge of the trendy world. Introduction of contemporary machinery has conjointly motor-assisted within the growth of construction sector. Additional the introduction of the ideas like “Time price of Money”, the applied scientist understood the requirement of projection completion within the shortest potential time. This made-up the method for a brand new field in applied science branch that is understood as Construction Project Management”. As an excellent demand for construction with new technology within the short time, the requirement for Fast-track construction has become more and more common within the current state of affairs and Fast-track construction is employed for many building comes. With the applying of this technology the length and value of the construction are often reduced. The typical time needed to create multifamily housing varies with the full variety of units within the building.

However the lag within the construction or execution of project can contribute additional delay within the completion of labour that has to be truly calculated. Most of the development comes face serious issues in overrunning of price and time. Price and Calendar square measure the foremost necessary parts for the success of any Project because the total project prices square measure terribly high. Resource Management is additionally thought-about as a crucial parameter for the project success. The resources have influence on the project type starting until the top of project and thence ought to be properly managed. All the problems associated with the resources which might be just in case of estimation, procurance, storage, supply, transportation etc ought to be addressed in time to forestall a Delay in Construction.

1.1 Construction Delay

Delay within the Construction is taken into account as break within the completion of labour with relevancy a time mentioned at the beginning of the work. It directly affects the project price and so impact the success rate of the project. It becomes the responsibility of the engineer to stop the delays in construction. If just in case the delays are invincible than the engineer ought to develop associate alternate commit to minimize the delay in construction.

1.2 Causes of delay in Construction

The delay could also be caused because of several reasons that are as follows:

- a. Inefficient management
- b. Construction implementation failure
- c. Style problems
- d. Scope increase
- e. Failure in coordination
- f. Economy failure
- g. Natural calamities.
- h. Epidemics/pandemics

1.3 Microsoft Project software system

Microsoft Project software system may be a ware developed by Microsoft for the project management. This helps project managers monitor the project through the creation of a schedule, assignment resources to the activities, managing the budget and evaluating the employment. The MS Project can develop budgets supported allocation of labour and resource levels. Since the number of resources allotted to tasks and assignment work is calculable, the value is decided by software system that's proportional to the speed of labour hours, rolling up to the extent of task to each summary task and at last to the extent of the project. Plus consists of individuals, instrumentation and resources and every plus can have a calendar of its own with individual levels indicating that days and shifts. Each resource could also be allotted in multiple plans to individual or multiple tasks, and therefore the application schedule perform supported the resource availableness. The MS Project establishes timeline crucial and important and significant and demanding chain for critical route. Schedules could also be resource stratified, and during a Gantt map very important chains are visualised.

1.4 A number of the necessary views in MS Project

- a. Gantt Chart View: this is often a default read which supplies data regarding tasks, length of every task, beginning and finishing dates and resources allotted thereto specific task.
- b. Resource Sheet view: This elaborates all offered recourses allotted to a project during a sheet format. It doesn't tell that tasks are assigned to that resource.
- c. Resource Usage view: This teams the tasks against every resource.
- d. Task Usage view: It shows details regarding every task that that task is assigned to whom and dealing schedule of every resource. d. Calendar view: Tasks bars seem on the times they're scheduled to start out.
- e. Network Diagram view: It shows relationship among tasks and conjointly the dependencies.

1.5 MS Project capabilities and options

- Helps in Developing and managing the project schedule.
- Allocating and managing the project resources.

- It permits to share resource with a typical resource pools.
- Helps in Managing the earned worth.
- Capability to achieve numerous reportage desires with the assistance of inbuilt and custom reports:
- Ability to manage multiple comes with program project:
 - Provision of various views which might be customized:
 - Project timeline view:
- Groups, Filters and Highlights can facilitate at the side of task management.

1.6 Microsoft Project advantages

- Through the introduction of light and early warning signs, concentrating on important route ne'er loses and retains understanding of the conflicts.
- It is user friendly and is simple to find out.
- With the effective use of various calendar will optimize the resources utilization over the project within the cluster mistreatment shared resource pool.
- Neutral displays and emails is used directly by making custom-made birds-eye read.
- It's accustomed assess impacts terribly quickly with varied alternatives.
- Simply users will integrate MS-Project with alternative tool that helps to speak with various stakeholders.

2. OBJECTIVES

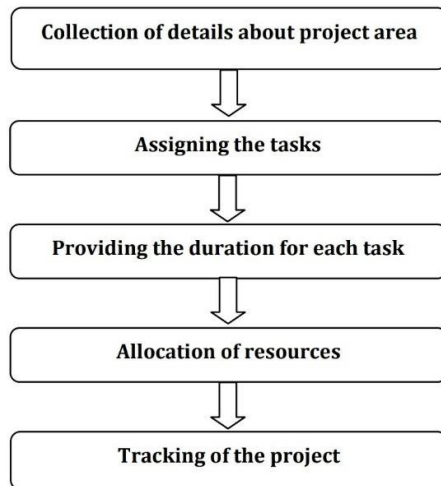
- To arrange and schedule the activities for business ejaculate residential building of G+3 with basement mistreatment Microsoft Project.
- To spot the entire numbers of days needed to finish the business ejaculate Residential building.
 - to spot the lag section and to schedule the activities considering the lag caused thanks to serious rain between July - August 2019 and delay thanks to Covid-19 between March – might 2020.
- To summarise the entire delay of the project.
- Applying Advance planning technique, to compensate lag section of project.

3 METHODOLOGY

A multi-storied business ejaculate residential building that is beneath construction is taken into account for gift study. The study of the building focuses on the delay caused thanks to uncertainty within the construction work thanks to serious rain and pandemic like Covid-19. Principally we tend to square measure concentrating however the delay was occurred and the way to beat the delay while not inflicting a lot of difficulties within the work is to be determined by applying the MS Project. An analysis of coming up

with and planning is disbursed for the business ejaculate residential building of G+3 with basement by applying Microsoft Project computer code and therefore the total period for the development is set. The primary delay thanks to rain is considered in the prepared schedule and the total number of days to complete the project with delay is identified. Then the second delay is considered which is occurred due to pandemic disease is also considered and total time required to complete the project along with delay is determined.

The methodology is conducted by considering the following steps:



3.1 Methodology involves following steps:

Assortment of details concerning the location area: Firstly the location details were collected, the collected details are:

- Project Name: Sai residence
- Location – Nagarbhavi, Bangalore
- Building entrance at North-East direction.
- Project space – 1050 Sq.ft.
- Variety of project: industrial body fluid Residential.
- No of stories: G+3 with basement.
- begin of the project: Nov 2018.

3.2 Study Analysis:

• Unremarkably construction is applied in ancient method wherever heap of issues can arise like paper work, resource allocation, improper programming, time management, environmental problems etc.

• To beat the higher than issues, project management will be applied accurately and effectively by applying management techniques like Microsoft Project software system.

3.3 Execution of project:

- To start with, knowledge is collected for an advertisement body fluid residential G+3 with

basement and is analysed. In step with the collected knowledge the tasks are performed victimisation Microsoft Project software system as follows:

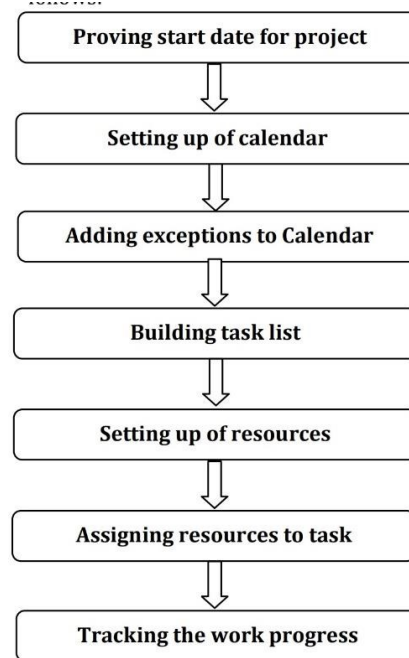


Fig-2: Execution in MS Project

4. STAGES of labour

For the convenience of the execution of this work is split into four stages, that ar as follows:

- STAGE I: Project length while not the impact of any delay
- STAGE II: Project length considering the impact of significant Rain
- STAGE III: Project length considering the impact of Pandemic Covid-19.

5. RESULTS AND DISCUSSION:

This work takes associate account of the development delays occurring throughout the execution of the Basement + G+3 industrial body fluid residential building that may be a case study thought of. The foremost hurdles encountered in project execution were significant Rains throughout July-August 2019 and therefore the lock-Down because of Covid-19 throughout March-April 2020. These delays were thought of in reframing the project schedule and a very best try is formed to limit the increasing in project length by will increase the quantity of resources, project bally, reducing dependencies and effectively chase the essential path.. The results of this study are mentioned during this chapter.

STAGE I : Project Duration without the effect of any delay

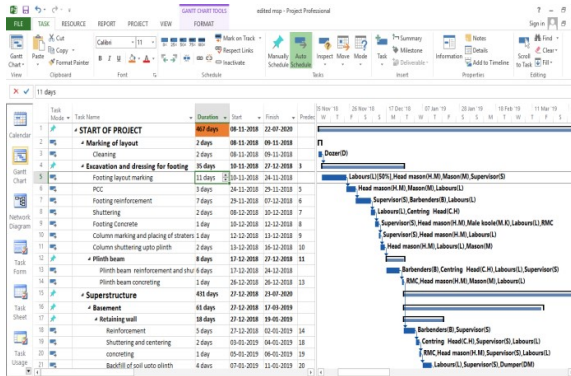


Fig – 3: Planning and scheduling using MSP

➤ RESULT

- Proposed Start Date: 08.11.2018.
- Planned Finish Date: 22.07.2020.
- Total Duration: 467days.

STAGEII: Project Duration considering the effect of Heavy Rain.

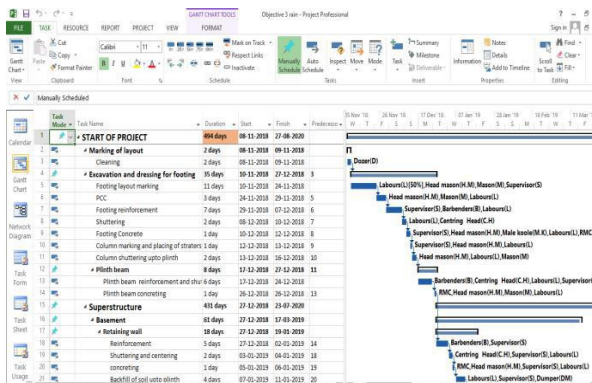


Fig -4: Delay due to heavy rain

➤ RESULT

- Proposed Start Date: 08.11.2018
- Delayed Finish Date: 27.08.2020
- Total Duration: 494days.

STAGE III: Project Duration considering the effect of Pandemic Covid-19

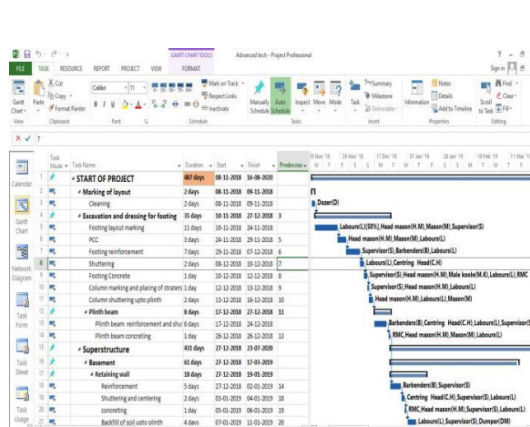


Fig – 5: Delay due to Covid -19

➤ RESULT

- Proposed Started Date: 08. 11.2018
- Delayed Finish Date: 27. 08. 2020
- Total Duration: 526.

Pie-Chart Representing the Different Stage

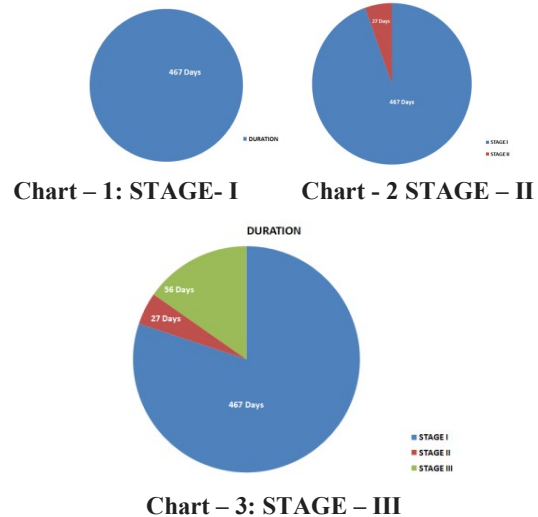


Chart – 1: STAGE- I Chart - 2 STAGE – II

Chart – 3: STAGE – III

6. CONCLUSIONS

- The right use of project management strategies can minimize the development time while not compromising the standard and potency of the project.
- The utilization of MS Project software package for coming up with, planning and chase is additional economical than ancient strategies of change that offer a correct scheduled path.
- We are able to verify the period and resources needed for individual activity by applying MS-Project prior to.

- Time management and resource management square measure thought of to be the key factors that square measure simply caterpillar-tracked throughout construction with the appliance of project management tool as MS project.
- From this report, of course, the development of G+3 business humour residential building with basement is to be completed inside 467 days inside 22-07-2020. The delay occurred double throughout the development because of uncertainty within the construction that caused the whole delay of eighty eight days in finishing the project.
- With the appliance of Microsoft Project, the project is rescheduled by considering each uncertainties, which is able to be completed by 13-11-2020 in line with the rescheduling of the project.
- The association between the successor and also the forerunner is reinforced by mistreatment some advanced techniques in project management software package, task relationships square measure changed, and constraints square measure more to scale back construction delay.
- Resources sweetening, project bally, reducing dependencies and effective chase the crucial path square measure used to reduce the delay in construction
- The rescheduling of the project is formed with the utilization of MS Project techniques and also the overall completion amount is shortened by 68days with the completion date of 16-08-2020

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SELF-RELIANT INDIA-PATHWAY TO A ROBUST ECONOMY: PERCEPTION OF COST ACCOUNTANTS ON STRENGTHENING PUBLIC SECTOR UNDERTAKINGS UNDER DEPARTMENT OF INDUSTRIES & COMMERCE OF KERALA STATE

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ABSTRACT

The Indian Economy is a mixed one, now our policy makers rely largely on Private Sector to accomplish its objectives especially after Covid-19 pandemic situation in our country. The Public sector undertakings especially in a consumer state Kerala have greater role in the alarming situations. But they have to recognize the role of modern management, cost reduction techniques and Cost Accounting Principles and Practices. The cost is very important in the pricing and marketing environment during Covid-19 situations across the globe. This Research paper analyses Perception of Cost Accountants on Strengthening Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state by Streamlining the Cost Accountancy system.

Key Words: Cost reduction techniques, Cost Accounting Principles and practices, Perception of Cost Accountants.

INTRODUCTION

The Public Sector Enterprises in Kerala, especially Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala needed not only superior technical know-how but also better Corporate Governance practice including Cost accounting and Cost Governance to compete with multinational companies and private enterprises especially in the post covid-19 period. Since, injection of funds from either government or market is quite difficult under the present Economic slowdown thanks to COVID-19. Besides, GDP estimates show negative trends. At that juncture, the best solution is to adopt cost reduction techniques as per Cost Accounting and its concepts.

Cost Accounting is concerned with ascertainment, estimation and presentation of Cost. It has various tools and techniques like operating costing, Marginal costing. Throughput Costing, Business process Re-Engineering, Standard Costing, Kaizen Costing etc to calculate costs and its presentation in appropriate forms which may be suitable to various stake holders. There is regulatory framework such as Institute of Cost Accountants of India has been constantly monitoring the cost Governance in our country. It has an important role in the financial regularity and financial discipline. Through the application of Cost Accounting principles and cost Accounting standards, one can not only survive but also, compete with similar concerns even in the period of structural economic slowdown. Public Sector Undertakings (PSUs) under Department

of Industries & Commerce in Kerala state are slowly, but gradually adopt modern cost practices

Statement of the Problem

Cost is an important factor in deciding the price. Therefore, Public Sector Undertakings under Department of Industries and Commerce of Kerala state have to implement Generally Accepted Cost Accounting Principles in their daily manufacturing or service operations. Only Ten firms under Department of Industries and Commerce have been functioning with operating profit results. Efficiency in management and efficient utilisation of available resources with proper cost reduction techniques will certainly help the enterprises to achieve their mission and vision.

Auto Mobile industry across the globe successfully uses Kaizen Costing technique to reduce their cost and thereby make profits to satisfy their Triple-Bottom line objectives. Therefore, PSUs may use costing Techniques and Practices to attain their basic objectives. Hence, the researcher wants to understand the perception of Cost Accountants and existing costing system of public sector undertakings under Department of Industries and Commerce in Kerala State

OBJECTIVES

1. To understand the Perception of Cost Accountants on Strengthening Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state by Streamlining the Cost Accountancy system.

2.To understand the about existing Costing system of PublicSectorUndertakings (PSUs) under Department of Industries & Commerce in Kerala

Hypothesis

To test association between perception of Cost Accountants and demographicVariables.It was assumed that perception of Cost Accountants is independent(not associated) of demographic variables of the respondents.

REVIEW OF LITERATURE.

The Government of Kerala (2017) has found certain disparities in the pay structure of different PSUs of Kerala and constituted an expert committee to study

and formulate on this aspect.The Ministry of Corporate Affairs (2017 Sep 10) has issued an order for the Relaxation of additional fees and extension of last date of filing of CRA-4 (Form for filing of Cost Audit Report) for FY 2019-20 under the Companies Act, 2013.

The Following are the major public sector undertakings (PSUs) under department of industries & commerce in Kerala. Chemical Sector, Electrical Equipment, Ceramic& Refractories, Electronic Sector, Development and Infrastructure, Engineering, Textiles, Traditional / Welfare Units and Wood & Agro-based.

Table No. 1

MAJOR PUBLIC SECTOR UNDERTAKINGS (PSUs) UNDER DEPARTMENT OF INDUSTRIES & COMMERCE IN KERALA

S. No	Name of the sector	Actual		Selected	
		Units	Percentage	Units	Percentage
1	Chemical Sector	7	16.67	3	15
2	Electrical Equipment	4	9.52	2	10
3	Ceramic & Refractories	2	4.76	1	5
4	Electronic Sector	2	4.76	1	5
5	Development and Infrastructure	4	9.52	1	5
6	Engineering	5	11.91	2	10
7	Textiles	9	21.43	5	25
8	Traditional / Welfare Units	8	19.05	5	25
9	Wood and Agro-based	1	2.38	0	0
	Total	42	100	20	100

Source: Department of industries and Commerce (Complied)

<http://www.keralaindustry.org>

Sample size of the Study

This research paper is based on primary data and secondary data. In order to address the research problem, a primary survey was conducted in line with demographic variables of the respondents in different parts of Kerala with a total sample size of 100(out of

819) who are Active members of Institute of Cost Accountants of India and for this a structured questionnaire was developed covering a variety of inter related aspects, such as respondent's gender, age, education,experience and annual income.The different aspects of units in the population are as follows:

Table No.2

Kerala Chapters of Institute of Cost Accountants of India

SL. No.	Name of Chapter	Total Active Members
1	Thrissur	169
2	Kozhikode Malappuram	50
3	Palakkad	50
4	Kottayam	50
5	Cochin	350
6	Thiruvananthapuram	150
	Total	819

(Source: Primary Data)

METHODOLOGY OF THE STUDY

Data obtained through survey were analyzed using suitable statistical tools and testing of hypothesis (Chi-Square Test). The data measured through Nominal scale is analyzed using Chi-Square Test. Besides to collect Secondary data a sample of 20 Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala has been selected on the basis of systematic Sampling and Random

Sampling. Websites of the selected 20 Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala is the source of secondary data

DATA ANALYSIS.

Secondary data in respect of the following Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala has been selected for analysis and interpretation.

Table No. 3

PROFIT MAKING UNITS DURING 2018 -2019 (ACCOUNTS FINALIZED)

Sl. No	Name of the Company	Name of Sector	Turnover (Rs .in Crs)	Net Profit &Loss (Rs .in Crs)
1	Kerala State Industrial Development Corporation Ltd	Development & Infrastructure	38.09	25.66
2	Forest Industries (Travancore) Ltd	Wood and Agro-based	31.81	0.04
3	Kerala State Electronics Development Corporation Limited	Electronics	410.26	13.81
4	Malabar Cements Ltd	Chemical	226.46	2.55
5	The Kerala Minerals and Metals Ltd	Chemical	727.04	11.35
6	Travancore-Cochin Chemicals Ltd	Chemical	243.10	27.47
7	Kerala Small Industries Development Corporation Limited	Development & Infrastructure	199.08	1.95
8	Kerala Artisans' Development Corporation Limited	Traditional/welfareunits	17.33	0.16
9	Transformers and Electricals Kerala Limited	Electrical Equipment	181.82	3.97
10	Traco Cable Company Limited	Electrical Equipment	135.84	1.34
	Total		2210.83	88.30

Source: Audit Report No.1,2020 (PSUs), Kerala by Comptroller and Auditor General of India

https://cag.gov.in/sites/default/files/audit_report_files/Appendices_of_Report_of_Report_no_1_of_2020_Public_Sector_Undertakings_Government_of_Kerala.pdf

The above table shows that ten units under the Department Industries and Commerce of Kerala state have been operating with profits. All other Thirty-two enterprises in the Department of Commerce and Industries of Kerala state are still in loss. Therefore,

efficiency and efficacy are the need of the hour as far as the PSUs are concerned. They have to make sure that no stones have left unturned. Here, the entire Costing mechanism can play a big role in the restructuring mechanism of those PSUs.

Table No. 4
DETAILS ABOUT EXISTING COSTING SYSTEM

Sl. No	Selected units of the study	Name of Sector	List of existing Cost Accounting Records	Proposed systems *
1	Kerala Minerals & Metals Ltd	Chemical Sector	Full Cost Records and Accounts	Form CRA-1
2	Malabar Cements Ltd.	Chemical Sector	Full Cost Records and Accounts	Form CRA-1
3	Travancore Cements Ltd.	Chemical Sector	Tender /Quotation	Form CRA-1
4	Traco Cable Company Ltd.	Electrical Equipment	Tender /Quotation	Form CRA-1
5	UnitedElectrical Industries Ltd.	Electrical Equipment	Tender /Quotation	Form CRA-1
6	Kerala Clays and Ceramic Products Ltd.	Ceramic & Refractories.	Tender /Quotation	Form CRA-1
7	Kerala State Electronic Development Corporation.	Electronic Sector.	Tender /Quotation	Form CRA-1
8	Kerala Industrial Infrastructure Development Corporation.	Development and Infrastructure	Tender /Quotation	Form CRA-1
9	Metal Industries Ltd.	Engineering	Tender /Quotation	Form CRA-1
10	Steel and Industrial Forgings Ltd.	Engineering.	Tender /Quotation	Form CRA-1
11	Alleppey Co-operative Spinning Mills Ltd.	Textiles	Tender /Quotation	Form CRA-1
12	KeralaState Co-operativeTextile Federation Ltd	Textiles	Tender /Quotation	Form CRA-1
13	Malappuram Co-operative Spinning Mills Ltd.	Textiles	Tender /Quotation	Form CRA-1
14	Sitaram Textiles Ltd.	Textiles	Tender /Quotation	Form CRA-1
15	Trivandrum Spinning Mills Ltd.	Textiles	Tender /Quotation	Form CRA-1
16	Kerala Artisans Development Corporation Ltd.	Traditional / Welfare Units	Tender /Quotation	Form CRA-1
17	Kerala State Bamboo	Traditional /	Tender /Quotation	Form CRA-1

	Corporation Ltd.	Welfare Units		
18	Kerala State Cashew Apex Industrial Co-operative Society.	Traditional / Welfare Units.	Tender /Quotation	Form CRA-1
19	Kerala State Handloom Development Corporation Ltd.	Traditional / Welfare Units	Tender /Quotation	Form CRA-1
20	Kerala State Handloom Weavers Co-operative Society Ltd.	Traditional / Welfare Units	Tender /Quotation	Form CRA-1

Source: Website of the Entities

*CRA-1 as per Companies (Cost records and audit) Amendment Rules 2019

The above table shows that only two of the selected entities maintains Full Costing Records and Accounts. All the selected entities use Tender/Quotation which is one of the important costing tools as per modern costing concepts.

Testing of Hypothesis

Table No. 5

RELEVANCY OF COST ACCOUNTING SYSTEMS

	Male	Female	Total
1.Relevant	37 (77)	34 (65)	71(71)
2.Not Relevant	11(23)	18 (35)	29(29)
Total	48 (100)	52 (100)	(100)

Source: Primary Data. The bracket represents parenthesis

Chi-Square Test can be used to analyze the above data.

Ho: The two attributes namely opinion towards relevancy of cost Accounting systems in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state and sex are independent.

The Chi-square statistic is 1.6591. The p value is 0.197729. Not significant at $p < 0.05$. The Chi-square statistic with Yates correction is 1.1395. The p value is 0.285749. Not significant at $p < 0.05$

Calculated value is less than table value. Therefore, the two attributes are independent.

Table No. 6: ATTITUDE TOWARDS APPLICATION OF COST ACCOUNTING STANDARDS

	Experience (Below 10 years)	Experience (Above 10 years)	Total
1 Favourable	41(67)	19(49)	60(60)
2.Not Favourable	20 (33)	20(51)	40(40)
Total	61 (100)	39 (100)	100 (100)

Source: Primary Data. The bracket represents parenthesis

Chi-Square Test can be used to analyze the above data.

Ho: The two attributes namely Attitude towards Application of Cost Accounting Standards in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state and experience are independent.

The Chi-square statistic is 3.3908. The p value is 0.06552. Not significant at $p < 0.05$

The Chi-square statistic with Yates correction is 2.6639. The p value is 0.102647. Not significant at $p < 0.05$.

Calculated value is greater than table value. Therefore, the two attributes are dependent.

Table No. 7

**ATTITUDE TOWARDS APPLICATION OF COST GOVERNANCE
EDUCATIONAL STATUS**

	Professional Education only	University Education and professional education	Total
1. Favourable	40 (57)	18 (60)	58 (58)
2. Not Favourable	30 (43)	12 (40)	42 (42)
Total	70 (100)	30(100)	100(100)

Source: Primary Data. The bracket represents parenthesis

Chi-Square Test can be used to analyze the above data.

Ho: The two attributes namely Attitude towards Application of Cost Governance in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala State and Educational status are independent

The Chi-square statistic is 0.0704. The p value is 0.790794. Not significant at $p < 0.05$

The Chi-square statistic with Yates correction is 0.002. The p value is 0.964734. Not significant at $p < 0.05$

Calculated value is less than table value. Therefore, the two attributes are independent.

Table No.8

**ATTITUDE TOWARDS MAINTENANCE OF COST ACCOUNTING
RECORDS AND AGE**

	Age Below 40	Age Above 40	Total
1. Favourable	21 (66)	49 (72)	70 (70)
2. Not Favourable	11 (34)	19 (28)	30 (30)
Total	32 (100)	68 (100)	100 (100)

Source: Primary Data. The bracket represents parenthesis

Ho: The two attributes namely Attitude towards maintenance of Cost Accounting records in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala State and age are independent.

Chi-Square Test can be used to analyze the above data.

The Chi-square statistic is 0.4289 The p value is 0.512519. Not significant at $p < 0.05$

The Chi-square statistic with Yates correction is 0.1773. The p value is 0.67374. Not significant at $p < 0.05$

Calculated value is less than table value. Therefore, the two attributes are independent

Findings

1. There are total 42 (Forty-two) Public Sector Undertakings (PSUs) are working under Department of Industries & Commerce in Kerala.

2. Only 10 (Ten) of them are profit making ones

3. Cost Governance system in those Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state are not satisfactory.

4. They give importance to only Tenders and Legal requirements. They do not give importance to sound practices of Commerce and management. Still, they are working for profit. They are not the Non-profit making organizations

5. Maintenance of their website is not satisfactory

6. There is no positive relationship between opinion towards relevancy of cost Accounting systems in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state and sex.

7. There is no positive relationship between attitude towards Application of Cost Accounting Standards in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state and experience

8. There is no positive relationship between attitude towards Application of Cost Governance in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala and Educational status

9. Attitude towards maintenance of Cost Accounting records in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala state

and Registrational status in Institute of Cost Accountants of India are independent.

SUGGESTIONS

1. Professional management should be implemented in Public Sector Undertakings (PSUs) under Department of Industries & Commerce in Kerala State.

2. The Kerala Government should implement G20/OECD Principles of Corporate Governance with respect to Public Sector Undertakings under the Department of Industries & Commerce in Kerala State.

CONCLUSION.

The performance of Public Sector undertakings under Department of Commerce and Industries is not satisfactory in Kerala. They do not give much importance to Cost governance and cost efficiency. Their website maintenance is very poor and they are still working under administrative control of Government Servants. Sound Costing and Financial Principles are to be embedded in their DNA is the need of the hour.

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**POLICING A SMART CITY: A CASE STUDY OF KOLKATA AND BHUBANESWAR,
INDIA¹**

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ABSTRACT

The initiative of smart policing in India (2016) with the intention of urban transformation and modernization has several thrust areas and projects to be put into action. Policing is a very explicit and visible arm of governance. The police in a smart city has to be livid, active and agile. The policies of the police management should be such that the safety and security of the residents is taken care of and there is more mass involvement in governance of a smart city. The present case study focuses on two very important smart cities of eastern India and identifies the programmes and endeavours of their police commissionerates to make smart policing a reality. Further an attempt has been made to explore the views of the residents about the obstacles to smart policing as a suitable aid to policy implications and reform.

Keywords: smart city, smart policing, urban police, urban transformation

¹The study is a sponsored research project by IMPRESS Indian Council of Social Science Research(ICSSR), New Delhi, India

1. INTRODUCTION

The two smart cities of Kolkata and Bhubaneswar are unique in their own own. While Kolkata has a British colonial history and is an old city about 350 years of age, Bhubaneswar is a relatively new city with a huge potential. The Commissionerates of these two cities are also distinct. Bhubaneswar shares the commissionerate with its twin city Cuttack and was established in 2008. The Kolkata Police is about 165 yrs old with its headquarters at Lal Bazaar. Kolkata is one among the four main metropolitan cities in India. It is densely populated situated in the banks of the Hooghly and is considered to be the main industrial hub of eastern India and the gateway to the north eastern part of the country. Odisha has one commissionerate in the state, while West Bengal has 7 commissionerates operational in the state: Asansol- Durgapur, Barrackpur, Bidhannagar, Chandan nagar, Howrah, Kolkata and Sealdah.

The 21st century police in India has to keep pace with the newer dimensions of crime, newer trends in crime and decriminalization of the so called otherwise considered offences. Social Movements, people's rights, the rise of the civil society are making a call for new smart policing. The recent announcement of Bhubaneswar and Kolkata among the first 20 smart cities in India has aroused a lot of expectations from the police and the governance of the city. The present research endeavour to explore what the people in Bhubaneswar and Kolkata opine about the challenges to smart policing initiatives for urban transformation.

2. Conceptual Underpinnings

(A) Policing is a characteristic of social control processes that involves vigilance and sanctions to guarantee the safety of the social milieu (Morin 2013, 288-93). Policing is a reciprocal process, which requires an equilibrium between police powers and the rights of the citizens. Arrest or the use of coercive force is police technique, which reflect the values of the community that are tempered through the structure of the police organization. Community values, impediments of organization and individual's decisions are correlated with policing decisions (Langworthy & Travis, 2002 :7)

To ensure efficient policing for crime prevention the following eight principles have to be taken into account: (a) government leadership, (b) socio economic development and inclusion (c) cooperation and partnership between administrators, non governmental organizations and community organizations (d) sustainability/accountability (e) developing a knowledge base through multidisciplinary approach (f) norms/rule of law/conformity towards laws (g) interdependence between national and international law enforcement agencies and (h) acknowledgement of different needs of men and women and the vulnerables in the society (UNODC, 2011:15-16).

Risk management is a key activity of policing. Public police consecrates their actions with other policing agents to manage risk (governance) and safety to the society. In the latter part of the 20th century the concept of risk surpassed from the appraisal of warning or peril to the idea of risk as blame, liability and responsibility. With crime remaining as the core of risk management, it also implies the management of risks from road accidents and other hazards related to the use and condition of the street or the ecosystem. (Ericson & Haggerty 1997: 3; Ferret & Spencehauer, 2009:150-164). The police goals can be classified as : environmental, organizational and individual. Environmental or community influences involve the legal structure in which the police work for the community. Organizational influences are the authoritative top management which seek to fulfill specific goals for the skillfulness and continuance of the organization and to appease its members. Individual influences are job security, pay or peripheral benefits which benefit members (Roberg et al. 2001:76-91; Buslik, 2012:237-241).

(B) Smart City

The smart cities in India are looking for smart policing which will be proactive, people friendly, tech savvy, transparent and accountable to the cause of the people and the city at large.

A smart city aims to provide core infrastructure and decent quality of life to its residents, a clean and sustainable environment. It intends to develop the entire urban ecosystem represented by four pillars of development -institutional, physical, social and economic as follows: (a) Adequate water supply, (b) Assured electricity supply, (c) Sanitation including solid waste management, (d) Efficient urban mobility and public transport, (e) Affordable housing, especially for the poor (f) Robust IT connectivity and digitalization (g) Good governance - e-governance and citizen participation, (h) Sustainable environment, (i) Safety and security of citizens (j) Health and education. At present 100 smart cities have been identified in India for urban transformation within five years from 2016 to 2021. The first twenty smart cities are as follows: Bhubaneswar, Ahmedabad, Bengaluru, Chennai, Coimbatore, Delhi, Ghaziabad, Hyderabad, Indore, Jaipur, Kanpur, Kochi, Kolkata, Kozhikode, Lucknow, Mumbai, Nagpur, Patna, Pune, Surat.³

(C) Smart Policing involves the following: Electronic Surveillance through CCTV cameras placed at strategic locations; Virtual monitoring of incidents, riots and decision making without much legwork in the streets; Direct monitoring of law and order by top level of officials; Special monitoring of events like fair, festivals and religious processions; Security alarm in public places and vehicles; E-filing of FIR such as theft of vehicle and phone; Real time monitoring of security/patrolling teams.

³<http://smartcities.gov.in/upload/uploadfiles/files/What%20is%20Smart%20City.pdf> visited on 12.9.2020

Smart Traffic System includes Automatic Traffic Lights, Online Traffic Monitoring, Emergency kiosks/counters, Advanced Information System.⁴

To make smart policing more effective there is an emphasis on police personnel and the approach towards policing. The police station is the main focus of Smart Policing which are also required to be SMART- people friendly, transparent and accountable to generate a feeling of comfort and approachability among those who make a visit to them (Pradeep, 2015: 160-161).

3. Policing the Smart City of Kolkata

The Kolkata Police is functional with 9 divisions and 80 police stations (including 8 women police stations). It has the following units (a) Armed Police (b) Cyber crime Police station (c) Detective department (d) Central Division, (e) East Division (f) East Suburban Division (g) North and north Suburban Division (h) Port Division (i) South Division (j) South West Division (k) South East Division (l) South Suburban Division (m) Special Branch (n) Special Task Force (o) Enforcement Branch (p) Headquarters Force (q) Kolkata Police Directorate (r) Reserve Force (s) Security Control Organization (t) Traffic Police (u) Wireless Branch.

The Kolkata Police provides the online link to (1) Know FIR status (2) Write to CP (3) Know your Police Station (4) Missing Person (5) Missing Vehicle (6) Report a Crime (7) Most Wanted.

The Kolkata Police has initiated several community policing programmes.

(A) Nabadisha is a educational and health care programme for the neglected street children. 40 such schools across 38 police stations with about 2500 students are running across the city providing free education, food and health check up, courses in Sports and Fine Arts .

(B) Probaho is a blood donation camp organised every week in liasion with Central Blood Bank marking about 800 camps successfully conducted.

(C) Friendship Cup Football Tournament to reach out to the people especially the youth at the grass root level.

(D) Kiran is a computer training programme for under priviledged children having 2500 children already completed the course.

(E) Pronam is a legal and medical help programme for senior citizens.

(F) Kolkata Goalz is a programme to encourage younger people in challenged situations for a promising future.

(G) Sampark is an awareness drive for the young population about the law and order rules of the city.

(H) DIAL 100 to connect with senior police officials

(I) Jana Sanjog Sabha are community meetings with the local residents under the police station. There is a thana level advisory committee with the noted residents and the officer in charge of the police station to discuss the law and order, problems and disputes of the locality.

(J) Sukanya is a self defense trainig programme for girl students to combat violence against women.

(K) Helplines like Child Line Day/Night (1098), Control Room (100/1090), Medical 9830079999, Senior Citizen (9830088884), Traffic (1073/2000/2001), Women In Need (1091).⁵

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⁴ <http://smartcities.gov.in/content/>; <http://smartcities.gov.in/content/innerpage/cities-profile-of-20-smart-cities.php>; <http://www.bprd.nic.in/SmartPolice1.aspx> and <https://www.thehindu.com/news/national/prime-minister-narendra-modi-bats-for-smart-policing/article6648405.ece> visited on 12.6.2020.

⁵ <http://kolkatapolice.gov.in> visited on 20th March, 2021.

Table 1. Crime Scenario in Kolkata 2017-2019

Crime	2017	2018	2019	% share to total
IPC+ SLL cognizable Crime	21969	21481	21481	2.5
Murder	64	55	55	2.7
Kidnapping and Abduction	374	378	378	2.5
Crime Against Women	1975	2178	2178	4.8
Crime against Children	643	574	574	2.7
Atrocities against Scheduled Caste	14	14	14	0.8
Atrocities against Scheduled Tribes	0	3	3	1.2
Crime against Senior Citizen	36	44	44	0.9

Source Crime in India, NCRB, New Delhi, 2019.

The table indicates the crime scenario of Kolkata between 2017-2019. Although there is a decreasing trend in IPC+SLL cognizable crimes, the crime graph shows a rise in most of the crime posing challenges to the city commissionerate.

4. Policing the Smart City of Bhubaneswar

The Police Commissionerate of Bhubaneswar and Cuttack was established under Section 4 of the Odisha Urban Police Act, 2003 with effect from 1st January, 2008. It has six special units namely

(a) Armed Police with 1245 personnel. It includes signal, recreation, menial, hospital and ministerial staff. It has been operational from 1975 and was placed under Commissionerate, 2007.

(b) Courts of Executive Magistrates exercises and performs the powers and duties of a district magistrate.

(c) Mahila Police Stations register, investigate, enquire violence against women and children.

(d) Energy Police Stations, two in number in Khordha and Cuttack under the commissionerate for registration, investigation, charge sheeting of offences punishable under Electricity Act, 2003.

(e) Training includes Urban Police and Traffic Training put under commissionerate since 2008.

(f) Red Cross has its regional branch opened in the Commissionerate on 2008 with the objective of meeting out the needs of the weaker sections of the society by mobilizing resources from humanity.

The commissionerate has also undertaken an array of community policing initiatives:

(a) AMA police or Our Police has been launched in 2013. It provides three tier organizational structure: AMA Police Beat, AMA Police Samiti and District Advisory Committee.

(b) Police Public Interface to initiate discussions with the 5 to 20 members of the local community.

(c) Special Police Officers to promote law and order and a sense of security. There are 295 women SPOs under Women Empowerment and Gender Sensitive Policing.

(d) Senior Citizen Security Cell

(e) Community Traffic System with more than 400 Student Traffic Volunteers (STV)

(f) APOSSA YOJANA to promote SPORTS in Slums and Young and Juveniles against Narcotics Abuse.

(g) Online registration of complaints/ E FIR for motor vehicle theft Cases.⁶

The crime scenario⁷ in the smart city of Bhubaneswar in the last three years is as follows:

⁶<http://bhubaneswarcuttackpolice.gov.in> visited on 23rd March 2021.

⁷http://bhubaneswarcuttackpolice.gov.in/wp-content/uploads/2020/08/Crime_2020.pdf; http://bhubaneswarcuttackpolice.gov.in/wp-content/uploads/2020/08/Crime_2019.pdf; http://bhubaneswarcuttackpolice.gov.in/wp-content/uploads/2020/08/Crime_2018.pdf visited on 20th March, 2021.

Table 2. Crime Scenario in Bhubaneswar, 2018-2020

Type of Crime	2018	2019	2020
Murder	43	39	49
Dacoity	27	49	34
Robbery	194	266	388
Burglary	229	337	350
Theft	1555	1905	1862
Swindling	584	650	518
Rioting	102	62	67
Rape	122	149	113
MV Accident	653	650	517
Miscellaneous Case	3710	4122	3776
Cigarettes & other Tobacco Products Act, 2003	5654	4981	1363

The above table narrates the crime trends of the top smart city in India. It shows an increasing trend in most incidents of crime. Even though the year 2020 was a year of the pandemic due to COVID 19, the crime rate was quite high. There were series of lockdown and educational institutions, malls and business areas were shut down most part of the year. However the violation of COTPA, 2003 was lowered to a great extent as most people were within the indoors in the year 2020.

Bhubaneswar Municipal Corporation has launched 'MY CITY MY PRIDE APP' to empower people to bring about urban development, mobilize the cities and bring transparency in administration. Citizens can register complaints relating to civic amenities like sanitation, street lighting, drinking water and sewerage. Their complaints are forwarded to the designated officials who solve the issue. MCMP app can help share, connect residents with administrators and clap/praise/appreciate successful efforts (Tripathy, Chauhan & Kambete, 2017:310-313).

5.Revelations by the Populace of Kolkata and Bhubaneswar

A.Methodology Adopted

The present research is an exploratory case study where primary data has been collected through direct face to face interview of residents of the city of Bhubaneswar and Kolkata. Government reports have also been referred as primary data. Secondary data is collected through books, journals, newspaper reports, websites and encyclopedia. The capital cities of the eastern Indian states of Odisha and West Bengal that is Bhubaneswar and Kolkata is the area of the study. The sampled residents are aged between 18 years to 60 years from the city of Bhubaneswar and Kolkata. Non-Probability convenience sampling techniques is used to collect the sample. Non-probability sampling may be used effectively in studies that seek to explore ideas

that are still underdeveloped (Baker 1999, 138). A total of 400 residents (200 male and 200 female) with an equal representation from both the city of Bhubaneswar and Kolkata is the sample of the study.

B. Opinion of the Residents of Kolkata and Bhubaneswar

(a) About the Smart City Police

- 54 percent males and 56 percent females in Bhubaneswar feel that the city police is good. However the Kolkata residents have a mixed response towards their opinion about the police. 41 percent of the residents of the city of Bhubaneswar are happy about sharing a cordial relationship with the police. However the Kolkata residents mostly prefer not to comment about the relationship between the people and the police.
- When asked whether the relationship with the police has changed with the passage of time 80 percent of the Bhubaneswar residents and 58 percent of the residents of Kolkata answered in the affirmative. 57 percent of the residents in Bhubaneswar believed that it has become more cordial, 45 percent of Kolkata residents agreed to it. However 35 percent of the people from Kolkata felt that police public relationship has deteriorated in the recent years. In both the cities we find that a considerable section of the population has visited the police station and the percentage is higher among the male residents. The residents in both the cities have remarked that the response that they received in the police station was good. However the percentage of people in Kolkata who were not happy with the response is significantly higher than in Bhubaneswar. More than 80 percent of the male

residents of both the cities males have visited the site of the commissionerate of the city police.

- A good number of the residents are aware about online FIR and Traffic Information like missing vehicles from the website.
- In Kolkata the community policing initiatives are quite publicized and that may be the reason why their is awareness about the initiatives. In Bhubaneswar there are not much programmes and hence people are not aware. However both the cities know about the community meetings that the police undertake and the medical facilities like blood donation camp and helplines that the police offer in relation to health services.
- 83 percent of the male residents of Kolkata have interacted with the city police. In Bhubaneswar the percentage is higher among the female residents which is more than the women residents of Kolkata who have interacted with the city police. More than 85 percent of the male residents of both the cities are satisfied with the interaction with the city police. The satisfaction level among women residents is less than 80 percent.

(b) Challenges to Smart Policing

- The smart city project in India is a highly publicized one. In view of that the residents of both the cities are quite aware about what the smart cities promise to be. The idea of smart policing emanates from the smart city vision. The issues that most of the residents have stressed in respect of smart policing are online services, upgradation, physical agility and better organization. 34 percent of the male residents of Bhubaneswar and 56 percent of the female residents that Bhubaneswar that steps are being taken by the commissionerate to initiate smart policing. In Kolkata 38 percent of the residents have confirmed that smart policing initiatives have been undertaken but a significant 40 percent of the respondents are oblivious of the fact. The measures undertaken by the city police includes patrolling, 24x7 helplines providing several community and security services, well equipped police force.
- 64 percent of the residents of Bhubaneswar and 72 percent of Kolkata claimed that crime rate is showing an increasing trend in the city. Most were of the opinion that there is an increasing trend in newer dimensions of crime and cybercrime. Very few were of the opinion that crime rate is decreasing. 75 percent of the residents of Bhubaneswar have remarked that there is a change in crime trends in the city. However about 90 percent of the residents of Kolkata grumbled about a shift in crime trends in the metro city. The residents of both the cities have pointed out that there is an increasing trend in cybercrime and property crime. However crime against women is

considered as a rising problem by the Kolkata residents in greater percentage as compared to Bhubaneswar.

- In Bhubaneswar both men and women (70%) have claimed that property crime is most rampant followed by cybercrime. However crime against women is not a common crime. In Kolkata however we find that 25 percent of the residents have claimed violence against women as quite frequent. However property crime is the most common and third is cybercrime.
- A significant percentage of population that have complained that no measures have been undertaken in both the smart cities to check the increasing crime trends. Others have witnessed that patrolling, investigation and CCTV⁸ vigilance have improved in the cities to check the increasing crime trends.
- 60 percent of the residents of Bhubaneswar are not satisfied with the measures undertaken to combat increasing crime trends. In Kolkata 40 percent of the respondents are unhappy with the progress made.
- The people of both the cities are weary of the fact that the police does not involve the people in crime prevention. This brings to light that the concept of community policing is still not a reality in these two smart cities. The concept of neighbourhood policing is still not operational. About 60 percent of the residents of the cities regretted that community meetings are not held in the neighbourhood.
- The residents of Bhubaneswar especially women (65%) were of the opinion that traffic management is good. Most males (48%) were of the opposite opinion. In Kolkata 49 percent of the women complimented the police to be efficient traffic managers. However, 58 percent of the males were not satisfied with the performance of the traffic department. However nearly 65 percent of the residents of both the cities were aware that the police is using sophisticated technologies to control the traffic situation.
- More than 60 percent of the residents of Bhubaneswar and about 50 percent of the residents of Kolkata are not aware whether the city police offers to register online First Information Report (FIR). More than 75 percent of the residents of Bhubaneswar and 60 percent of the residents of Kolkata are unaware whether the city police offers to register online General Diary.
- Even though the people are satisfied with the security services that the city police is offering to resident VIPs⁹ the same level of satisfaction goes down as the target groups are professionals and

⁸Close Circuit Television

⁹Very Important Persons

much less for the common people. Similarly the collaborative community service that the police perform with local NGOs¹⁰ does not appear to be satisfactory for the people. Some of the initiatives that have caught their attention are awareness programmes and road safety camps that the police organize with some NGOs. However the residents of Kolkata about 70 percent are happy the collaborative efforts are successful. In Bhubaneswar about 40 percent of the residents are not aware whether these events are successful or not and about 34 percent have replied in the affirmative. About 80 percent of the residents of both the cities are clueless in identifying the loopholes in these collaborative community services.

- The people of Kolkata (about 36%) feel that political interference is serious challenge faced by the Kolkata Police . However the residents of Bhubaneswar feel that lack of updated technology is a serious impediment to smart policing.

6. CONCLUSION AND RECOMMENDATION

From the findings it is clear that the concept of smart policing and smart city is in its formative stage in both the cities. There is awareness among the people and the police about recent developments and they have a strong opinion in setting the goals to smart policing . This is a positive direction and administrative initiatives in this regard will receive a lot of support from the people and the police at large. The challenges that have been put forward by the residents of the two cities of Kolkata and Bhubaneswar and has been supported by the police personnel explores the issues that are creating obstacles to police administration. These set forth the goals that are to be considered to eradicate the challenges to policing a smart city. Further, the future of policing involves inclusion of sophisticated Information and Communication Technologies (ICTs) and new models of urban policing like intelligence-led policing and predictive policing. The philosophy of restorative policing also adds hope as a new approach to policing a city. More so, police accountability, inclusive policies, expertise in social skills can help us bring forth a police organization that is truly smart and a city which offers safety and sustainable living to its residents.

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¹⁰Non Governmental Organizations

EXPERIMENTAL STUDIES ON STRENGTH BEHAVIOUR OF NATURAL FIBERS INCORPORATED GEOPOLYMER CONCRETE

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ABSTRACT

To enhance the strength parameters and applications of GGBS based geopolymer concrete using Sisal and Banana which are natural fibers extracted from plants, these fibers are good in both physical and mechanical properties which can be used effectively and these are chemical free fibers. Many engineering properties like Split tensile, Flexural strength are improved with the addition of different percentages of fibers. They contribute good resistance towards the cracking and increases the life span of concrete, they act themselves as a natural admixtures to provide additional properties to the concrete. In this experimental study to find out the performance of geopolymer concrete, different percentages of both Banana and Sisal fibers (0%, 0.5% and 1.0%) of having 30mm in length were used and GGBS was brought from the thermal power plant that uses to produce geopolymer concrete. The mixing of both Sodium Hydroxide and Sodium Silicate was used as alkaline solution maintaining alkaline liquids to GGBS of ratio 0.45. Sodium Hydroxide concentration was kept to 8M. The curing condition of geopolymer concrete was ambient curing. M30 grade of ordinary cement concrete is casted using grade 53 of Ordinary Portland cement. Compressive strength, Split tensile strength and Flexural strength of fibers without geopolymer concrete, fibers with geopolymer concrete and ordinary cement concrete was tested at different ages and then compared

Keywords: Banana Fibre, Sisal Fibre, GGBS, Sodium Hydroxide, Sodium silicate, Material properties, Hardened concrete properties

1. INTRODUCTION

Concrete is one of the most used construction material which makes best bridges, poles, roads etc. Approximately for production of 1 ton of cement the environment has to consume 1 ton of CO₂. CO₂ alone contributes 70% of global warming. Several investigations were done to enhance then cement utilization in concrete in order to handle the global warming effect. GGBS is a byproduct that occurs from blast furnaces to make iron. Whereas GGBS is one material which can replace the cement and it is also ecofriendly product that reduces the environmental damage, it is rich in calcium silicate hydrate which can improve appearance of the concrete, strength and durability. The main components of this material are MgO (1-18%), Al₂O₃ (8-24%), SiO₂ (28-38%) and CaO (30-50%). The main purpose of using fibers in concrete is to enhance the mechanical properties like tension, spalling, impact, fatigue, thermal shock and toughness.

So many studies were conducted in recent times to study the behavior of concrete using fibers as reinforcement. In this study natural fibers (banana and sisal) were used as reinforcement to geopolymer concrete and the fibers were added in different fractions such as 0%, 0.5% and 1.0% of volume

2. LITERATURE REVIEW

Azizul Islam [1] presented the effect of fiber on the mechanical properties and the impact resistance of oil palm shell geopolymer concrete (OPSGC) prepared with ground granulated blast-furnace slag (GGBS) and

palm oil fuel ash (POFA) as binders, The fiber added OPSGC with the addition of the 0.5% of steel fibres the split tensile strength has been increased about 19-38% and similarly the flexural strength about 13-44% when compared to the non fibrous OPSGC and the first crack load of Geopolymer concrete increases upto 1.5-3.5 times compared with non fibrous OPSGC. Due to the energy absorption capability of uncrushed produced higher final impact energy on comparing with the crushed OPS specimens

Samuel Demie [2] The characteristics of interfacial transition zone (ITZ) made with fly ash based self-compacting geopolymer concrete (SCGC) was studied under the influence of multiple superplasticizer dosage on microstructure characteristics and compressive strength and also their correlations. Concrete specimens were made with multiple percentages of superplasticizer dosage maintaining 3%, 4%, 5%, 6% and 7% cured at 70°C kept for 48 hrs. The better results were found at the maximum percentage of superplasticizer presence and with the decrease in the thickness of ITZ such that the compressive strength of the concrete increases and also enhanced the development of microstructure at the ITZ of concrete

Tanakorn Phoo-ngernkham [3] Described the effect on adding nano-SiO₂ and nano-Al₂O₃ on the properties of high calcium fly ash geopolymer pastes. Nano-particles were added to fly ash at the percentages of 0%, 1%, 2%, and 3% by weight and the concentration of sodium hydroxide was 10M, sodium silicate to sodium hydroxide weight ratio was 2.0. The alkaline liquid/binder ratio was 0.60 and curing at ambient

temperature of 23°C were used in all mixtures. The results showed that there is a decrease of setting with the addition of nano-SiO₂ to flyash, whereas on the other side with the addition of nano-Al₂O₃ there is only slight reduction in the setting time

Omar A [4] Using flyash as only material the current study presented the effect of increase in temperature on geopolymer paste, mortars, lightweight aggregate geopolymer concrete (LWAGC) and also the mechanical, thermo-physical and macro/micro structural properties of the geopolymers after and before the exposure to the high temperatures of 400, 600 and 800°C were investigated and simultaneously upon the exposure to the increased temperature the changes in the structure of geopolymeric gel and the reflections of the geopolymers to high temperatures were also investigated. The geopolymers which are not exposed to high temperatures the physical properties shows that LWAGC shows lower density and water absorption than the mortar and geopolymer paste, whereas the mechanical properties shows that the mortar and geopolymer paste subsequently acquires high strength than that of LWAGC because of the lightweight aggregate low strength and porous microstructure. At high temperatures of 600 and 800°C, the deterioration of the bonding zone is absorbed because of the dehydration of the structural water, the unreacted silicates and the microcracks showing the difference in the thermal expansion between the LWA and geopolymer paste

3. EXPERIMENTAL PROGRAMS

3.1 Materials used:

- GGBS
- Sodium Hydroxide
- Sodium Silicate
- Fine Aggregates
- Coarse Aggregates
- Banana Fibers
- Sisal Fibers
- Cement (OPC 53 grade)
- Extra water

4. EXPERIMENTAL INVESTIGATION

4.1 Casting of concrete

1. Moulds preparation

The internal and external surface of the mould is cleaned thoroughly and the screws are tightly fixed and oiled, it has to be checked that mould is moisture free.

2. Concrete mixing

Once the materials are collected in correct proportions i.e. cement, fine aggregate, coarse aggregate and water

for conventional concrete specimens and GGBS, fine aggregate, coarse aggregate, sodium hydroxide, sodium silicate, extra water, banana fibers and sisal fibers for geopolymer concrete specimens. They all are mixed in the required proportions with hands in time intervals. Workability and slump tests were conducted after the mixing of the concrete.

3. Concrete placing

Now with the help of trowel the concrete is placed in three layers of same depth approximately, to avoid the segregation the concrete is remixed in the mixing pan with shovel. The concrete mix has to be placed in the moulds within 30 min of its preparation.

4. Concrete compaction

To remove air voids from the fresh concrete, compaction has to be done correctly, proper compaction makes the concrete more durable and in increase density.

5. Specimen curing

Before the testing the specimens has to be cured, the moulds were placed at room temperature after demoulding for different time periods (7,14,28 days).

4.2 Tests on fresh concrete

A. Workability

It determines the homogeneity which can be mixed, placed and finished, the water cement ration determines the workability of the concrete

B. Slump Test

It is one of the most common method which uses to measure the concrete consistency at site of work, it is not preferred for very wet or wet dry concrete. Before lifting up the cone the top surface of the slump cone was leveled off and the slump of the sample was immediately measured

4.3 Tests on hardened concrete

A. Compressive strength

The compressive strength test was performed on hardened GGBS based geopolymer concrete cube specimens of size 15 x15 x 15 cm.

All the cubes were casted and tested at age of 7days, 14days and 28 days. Compressive strength was calculated by

$$F_{ck} = P/A(N/mm^2)$$

Where, A = loaded area

P = Ultimate load (N)



Figure 1

B. Split tensile strength test

The concrete cylinders were casted in order to determine the tensile strength of the concrete using

$$2P/\pi DL \text{ (N/mm}^2\text{)}$$

Where, P = Ultimate load

D = Diameter of cylinder (mm)

L = Length of cylinder (mm)



Figure 2

C. Flexural strength test

The flexural strength of GGBS based geopolymer concrete and OPC concrete were performed for 28 days under ambient curing condition and the flexural strength was calculated by using the below formula

$$F_b = 3PL/bd^2 \text{ (N/mm}^2\text{)}$$

Where P = Ultimate load

L = Centre to centre distance between supports (mm)

b = Breadth of the specimen (150mm)

d = Depth of the specimen (150mm)



Figure 3

4.4 Mix Proportions for Geopolymer Concrete

Molarity	8M
Alkaline solution/GGBS	0.45
Sodium silicate/sodium hydroxide	2.5
GGBS	290.4
Sodium hydroxide	68
Sodium silicate	170
Fine aggregate	675.5
Coarse aggregate	1145.5
Extra water	22

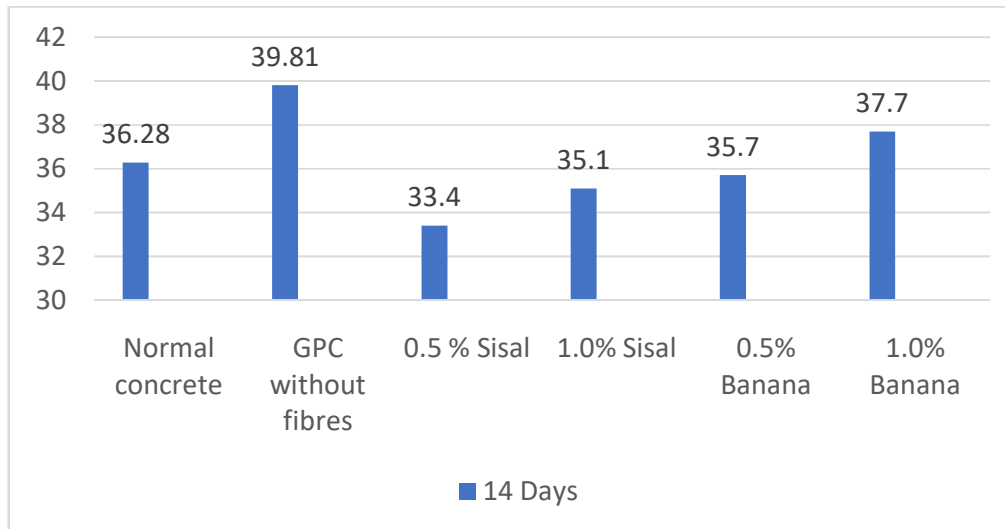
The alkaline solution was prepared by mixing 320gm(8x40= 320) of sodium hydroxide in one liter of distilled water at regular intervals of time period and keeping it for 24hrs which is kept at room temperature, after 24hrs NAOH liquid is mixed up with sodium silicate and again kept for 24hrs before the concrete mix

Compressive Strength Test

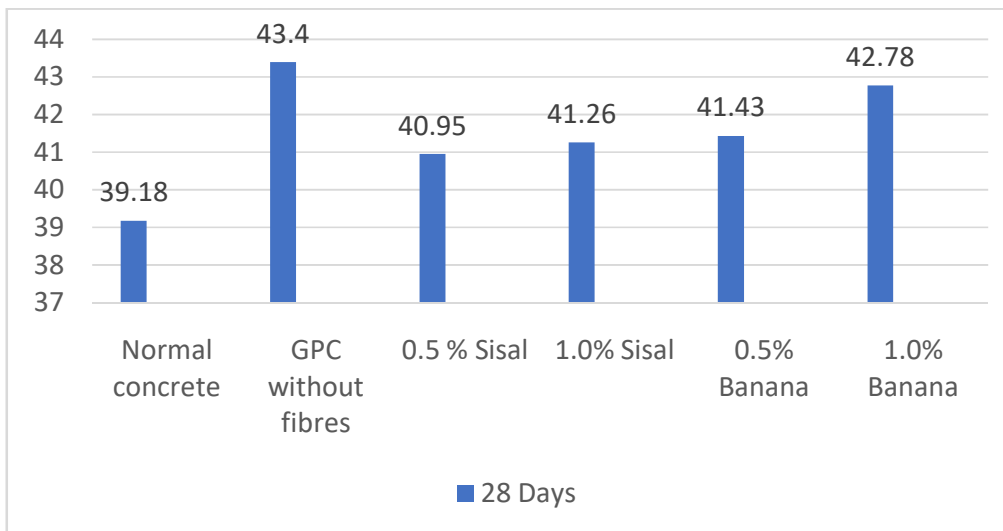
The specimens were tested in CTM to verify the compressive strength at different ages. As the percentage of fibers increases the strength of the concrete also varies. Fig 5 represents the compressive strength of specimens at different ages

For 14 Days:

5. TEST RESULTS:

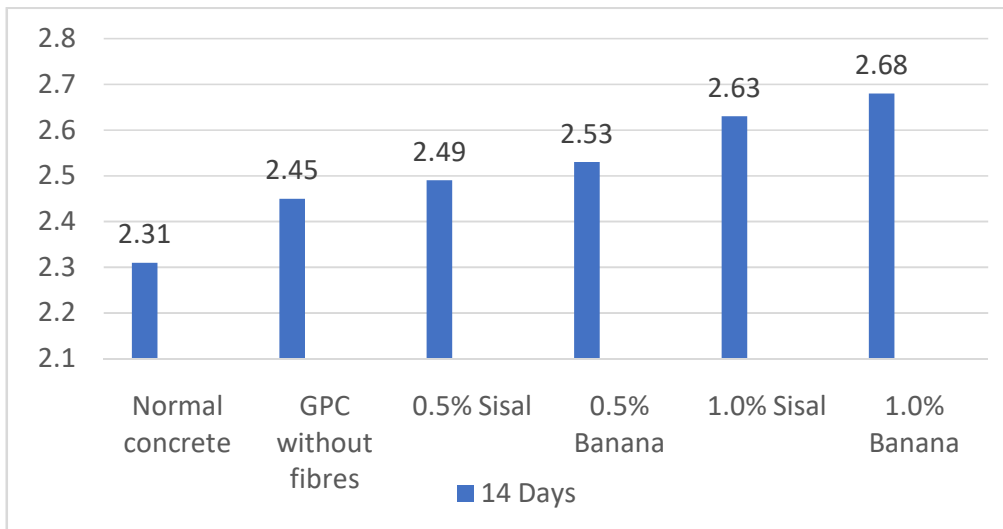


For 28 Days:

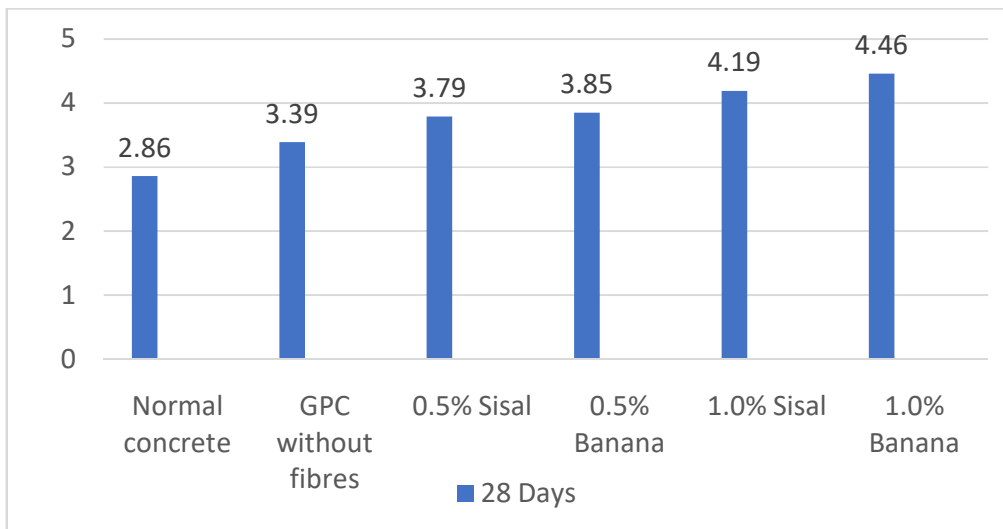


Split Tensile Strength:

For 14 Days:



For 28 Days:

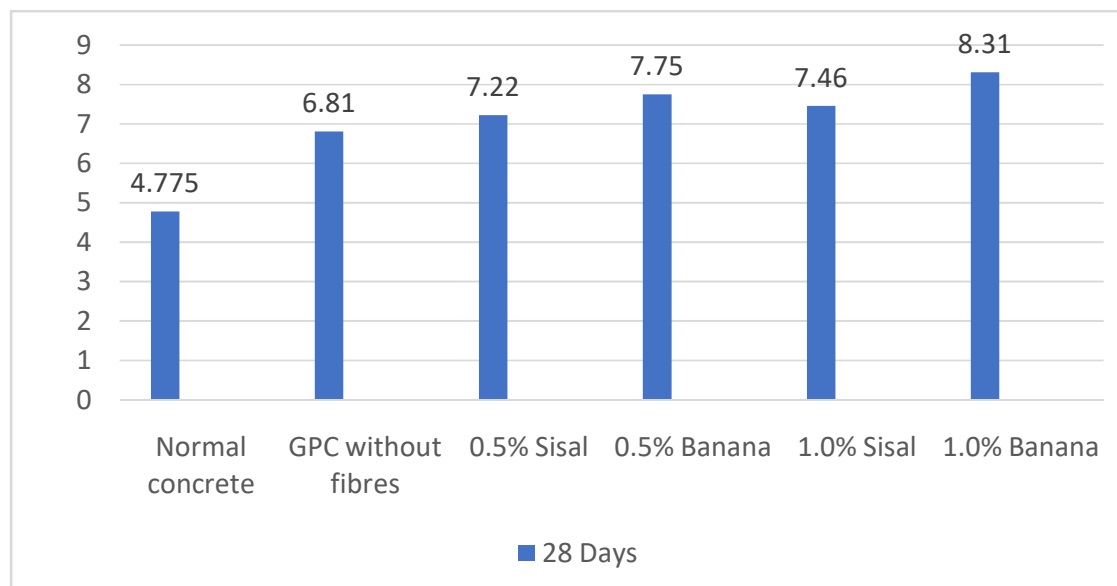


1) As the percentage of fiber increases the strength of concrete also increases and attains maximum strength.

2) Banana fibers gives better results in all aspects.

Flexural Strength:

For 28 Days:



The Flexural strength for fiber added geopolymer concrete for 28 Days shows 74% increment when compared with fiber free geopolymer concrete

6.RESULT AND DISCUSSION

- The mix ratio of M30 grade was obtained from code book IS 10262:2009.
- The maximum compressive strength was attained at 28 Days of ambient cured moulds having 1% volume of banana fiber which is even more than sisal fiber and GPC (Geopolymer concrete) without fibers, normal concrete.
- The maximum split tensile strength was obtained at 28 days of ambient cured samples at room temperature having banana fibers of 1% volume, which is more than sisal fibers, normal concrete and GPC without fibers.
- The maximum flexural strength occurred at 28 days of ambient cured prism (0.15x.015x0.7) having high percentage of banana fiber, which is more than sisal fibers, normal concrete and GPC without fibers.
- For Conventional Concrete:

Maximum compressive strength is 39.18N/mm²

Maximum split tensile strength is 2.86N/mm²

Maximum flexural strength is 4.775N/mm²

- For Geopolymer Concrete without fibers:

Maximum compressive strength is 43.4N/mm²

Maximum split tensile strength is 3.39N/mm²

Maximum flexural strength is 6.81N/mm²

- For GPC with 0.5% sisal fibers:

Maximum compressive strength is 40.95N/mm²

Maximum split tensile strength is 3.79N/mm²

Maximum flexural strength is 7.22N/mm²

- For GPC with 1.0% sisal fibers:

Maximum compressive strength is 41.26N/mm²

Maximum split tensile strength is 4.19N/mm²

Maximum flexural strength is 7.46N/mm²

- For GPC with 0.5% banana fibers:

Maximum compressive strength is 41.43N/mm²

Maximum split tensile strength is 3.85N/mm²

Maximum flexural strength is 7.75N/mm²

- For GPC with 1.0% banana fibers:

Maximum compressive strength is 42.78N/mm²

Maximum split tensile strength is 4.46N/mm²

Maximum flexural strength is 8.31N/mm²

7.CONCLUSION

The below conclusions were made based on the test results

- 1) The compressive strength of ambient cured concrete having 1% of addition of banana fibers has shown good strength than the sisal fibers and lower percentage of fibers and also fiber free geopolymer concrete.

- 2) High percentage of banana fibers has shown better results than the sisal fibers in split tensile strength which indicates the increase in ductility.
- 3) With increase in the fibers volume the flexural strength also increases for both banana and sisal fibers, but banana fibers has shown better performance than sisal fibers that indicates it's having great withstanding ability towards the high flexural loads.
- 4) Based on the minimal cracks developed in the tested specimens shows that both the natural fibers were effective to the cracking of the concrete.
- 5) Banana fibers has shown better results than the sisal fibers in all aspects

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CONSUMER ATTITUDE TOWARDS MARKETING OF HOUSE HOLD PRODUCTS OF LG WITH SPECIAL REFERENCE TO KANNUR TOWN (KERALA).

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ABSTRACT

Due to covid 19 pandemic people experienced new habits like work at home ,shop at home etc. But it is assumed that their old habits will return in modified form. It should be noted that the marketers never stopped advertising during this tough period, which reveals the significance of advertising in marketing process. In today's competitive world interaction between the business and consumer is indispensable. Today business environment is really competitive and it is a difficult task to attract the customers. Recently we have witnessed a tough situation of lock down due to corona virus. In India ,government announced a nation wide lock down on march 24 and it extended up to may 3. We have witnessed the second wave of covid in 2021 too. In this situation it is relevant to understand the brand preference of consumers towards various household products. The study also reveals the factors influencing the purchase of household products of LG electronics. Due to lock down situation people were compelled to give up their old habits and accepted the new .Globally We have witnessed more than10% growth in online shopping during lock down period . LG is a amiable brand name in minds of customers in case of refrigerator and air conditioner. It should be noted that the number of shoppers who visit the shops have been considerably reduced due to fear of second wave of covid.

Keywords: Consumer, Household products ,Brand Name

INTRODUCTION

Innovation and competition are the two peculiarities of the modern era. Household industry is the one of the growing and leading industries in India. It paved way for increase the number of manufacturers. As part of survival they have tried to introduce heterogeneous products from their competitors. The number of working women have been considerably increased due to education .Now a days people widely depend on these modern equipments to reduce their work load in busy life. Household appliances are modern equipments which reduce the work load of women from routine kitchen work. Hence the significance of house hold equipments have become inevitable. The use of house hold products have made life more effortless and comfortable. LG,SAMSUNG,WHIRLPOOL,IFB,VOLTAS, BLUE STAR and IFB are the major players in the home appliances market. Air conditioner, Refrigerator and Washing Machine are the selected house hold products for the study. The study is conducted in Kannur town which is located in northern part of Kerala state.

REVIEW OF LITERATURE

Dr,G Sugunavalli(2019) attempt to study the the consumer preference towards LG home appliances. The data collected from 250 respondents in Coimbatore city by using questionnaire. The study **Tharani C et al.(2017)** have made study about the consumer awareness towards home appliances. The study conducted in Coimbatore city among 110 people of which 47 male 63 female. The purpose of the study was to analyze the awareness of electronic goods. Majority of respondents have awareness about household appliances.

Among all house hold appliances ,television is highly preferred.

Dr.P Pinkapani(2018) has made a study on household goods and Indian customer satisfaction. The study is undertaken to assess which type of household goods the customers are using and ascertain their rate of satisfaction. In order to make the study convenient consumer appliances are classified into white goods and brown goods. The study is undertaken among 155 respondents at Bangalore. The conclusion of the study is customers are very much satisfied with wifi service, printers,blue tooth and Air conditioner in study area.

also aims to see the problems faced by consumers while using LG home appliances. The researcher concluded that LG brand satisfy the consumers due to it's superior quality.

STATEMENT OF THE PROBLEM

Consumers have great opportunity to select a product from a variety of products due to the availability of foreign products as well as the products manufactured in India. In the home appliances market consumers are in dilemma with different brand names. This study aims to understand the consumer's preference towards different brands of home appliances.

OBJECTIVES

- 1 To study consumer behavior towards different brands of house hold products
- 2) To identify consumer preference towards LG brand of select house hold products.

2 To analyze the factors influencing the consumers to purchase house hold products.

LG - An Overview

Koon in hwoi is founded Gold star (Today’s LG) in october1958 and it’s head quarter is at Seoul, South Korea. Gold star ,a south Korean company established to produce electronic goods and home appliances for the nation. They manufactured Korea’s first radio, television, washing machine , refrigerator, Air conditioner etc. Later gold star merged with Lucky company and their name renamed as Lucky-Gold star in 1990.In 1995 Lucky Gold Star acquired U.S based Zenith. Then changed it’s name to LG Electronics .Today LG produces ,television, refrigerator, smart watch, smart phone, tablet computer etc..

LG electronics entered in India in the year of 1993 by tie up with Bestavision ,a Delhi based firm. But this joint venture was not successful. Later their re entry was in 1997 with setting up it’s manufacturing units in Noida, Delhi. Today LG has become an indispensable brand in India.

GEOGRAPHICAL LOCATION FOR THE STUDY

Kannur is a city and municipal corporation in Kannur district., state of Kerala. It is the administrative headquarters of kannur district. Kannur is commonly

known as the ‘ Manchester of Kerala’. According to 2011census kannur city has a population of 56823 of which 26298 are males and 30525 are females. It has an average literacy rate of 96.23%.

METHODOLOGY

To fulfill the objectives , the researcher has used both primary and secondary data .The primary data were collected from the consumers through the questionnaire. The secondary data were collected from the various journals, news papers, magazines and dailies.

SAMPLE SIZE

The researcher adopted convenient sampling technique. Hundred respondents have been selected for the study.

LIMITATIONS OF THE STUDY

- 1 The study was limited to 3 house hold appliances only viz air conditioner, refrigerator and washing machine. No other house hold appliances have considered.
- 2 The study covers only Kannur town
- 3 The size of sample is 100 only due to lack of time
- 4 Some sellers were not ready to disclose the full information about their products.

DATA ANALYSIS AND INTERPRETATION

Table 1 - FACTORS INFLUENCING PURCHASE DECISION

Factors	Frequency	percentage
Television	42	42%
Friends and relatives	27	27%
News paper	21	21%
Websites	6	6%
Digital board	4	4%
TOTAL	100	100%

Table 1 shows the factors leading to purchase decision of house hold appliances.42% of people says that they have got information from television,27% of respondents were influenced by their friends and relatives. News paper was

the source of information for 21%.The remaining 6% of people got information from websites and 4% from digital board respectively.

Table 2 -REFRIGERATOR HELD WISE DETAILS OF RESPONDENTS

Brand	Frequency	Percentage
LG	34	34%
WHIRL POOL	28	28%
SAMSUNG	14	14%
VOLTAS	6	6%
OHER BRANDS	18	18%
TOTAL	100	100%

Table 2 reveals that 34% of customers prefer LG refrigerators and Whirl pool refrigerators are in second place with 28% of customers .Samsung refrigerator is

preferred by 14% of respondents and Voltas by 6%.The remaining 18% of respondents prefer some other brands.

Table 3- WASHING MACHINE HELD WISE DETAILS OF RESPONDENTS

Brand	Frequency	Percentage
Whirl pool	39	39%
LG	33	33%
Samsung	16	16%
IFB	3	3%
Other brands	9	9%
Total	100	100%

Table 3 discloses that 39% of customers selected Whirlpool washing machine while 33% of respondents prefer LG, 16% select Samsung washing machine, 3%

customers use IFB and the remaining 9% prefer some other

Table -4 AIR CONDITIONER HELD WISE DETAILS OF RESPONDENTS

Brand	Frequency	Percentage
LG	28	28%
VOLTAS	24	24%
BLUE STAR	18	18%
IFB	9	9%
Other brands	21	21%
Total	100	100%

Table 4 reveals that 28% of respondents preferred LG air conditioners, 24% showed their preference towards Voltas . while 18% of respondents use Blue star air conditioners and 9% of respondents prefer IFB. The remaining 21% of respondents preferred some other brands.

FINDINGS

1 Among all respondents, majority (42%) purchased house hold appliances on the basis of information from television ,while 27% respondents were influenced by their friends and relatives. News paper could inspire 21% of respondents. But websites and digital board could influence a small percentage ie,6% and 4% respectively.

2 In case of refrigerator, 34% of respondents use LG refrigerators and 28% use Whirlpool refrigerators. The percentage of Samsung customers and voltas are 14% and 6% respectively. The noticeable one is that 18% of respondents use some other brands.

3 As regards Washing machine 39% of respondents selected Whirlpool washing machine and 33% of respondents preferred LG.

4 28% of respondents preferred LG air conditioners, 24% showed their preference towards Voltas and 18% of respondents use Blue star and 9% preferred IFB air conditioners. The remaining 21% of respondents preferred some other brands.

CONCLUSION

The study discloses that people in Kannur town has relevant knowledge about different brands of house hold appliances .They know the distinct features of each brand name. Mainly two factors viz television and friends have disseminated plenty of knowledge among respondents regarding peculiarities of each brand. The study reveals that majority of customers realized Whirlpool as their most preferable brand in case of washing machine. LG is a amiable brand name in minds of customers in case of refrigerator and air conditioner. It is noted that installment schemes adopted by sellers have a great role in attract the customers to purchase selective brands. It should be noted that the number of shoppers who visit the shops have been considerably reduced due to fear of second wave of covid.

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STRESS MANAGEMENT AMONG WOMEN FACULTY MEMBERS IN HIGHER EDUCATIONAL INSTITUTIONS

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ABSTRACT

The word Stress originated from the Latin language. This means hardship, adversity, and affliction. Stress can be psychological, physical, or emotional. In recent years, the landscape of higher education has grown much more competitive. Education sector considered as a stressful occupation especially for women faculty because of heavy workload, other responsibilities associated with the roles, interactions with Students and colleagues and work life balance typically lead to difficulties and pressures, resulted in stress among women faculty working in Higher Educational Institutions. Therefore, the present study is addressing the reasons causing stress among women faculty working in selected higher educational institutions focusing on demographic factors, personal factors, to study the impact of stress on their performance and also to know the coping mechanisms practicing by them to get rid of the stress. The study has been conducted by way of a planned and systematic collection of data using a self-structured questionnaire, that has been analyzed and interpreted. Finally, the study is helpful to suggest the measures to get rid of the stress faced by them.

Keywords: Stress, Morale, Efficiency, Demographic factors, Personal factors Coping mechanisms.

INTRODUCTION

Stress has been recognized as one of the most well-known risks of current occasions. It has turned into a major trendy expression and a real worry of a definitive human. The qualities of life have experienced radical changes in the course of the only remaining century are as yet moving at a twister pace. The effect of Globalization, the persistent innovative advancements and up degrees, the success win race speed of quick track callings, and the regularly changing lifestyles of modernization greatly affects numerous human advancements over the world. Stress is defined in Merriam Webster Dictionary as “A physical, chemical or emotional factor that causes bodily tension and may be a factor in disease causation or a state resulting from a stress; especially one of bodily or mental tension resulting from factors that tend to alter an existent equilibrium”(AraxiaMankyan, Elisa Almo,2011).

Status of women has ascended contrasted with recent years. Yet, it is likewise a reality that lady isn't totally independent yet. Consistently, she encounters numerous problems, particularly on the off chance that she is a working lady. In present world, professional women in the education area are progressively stood up to with an issue of contention between a career role and picking a similarly requesting role at home. There are stresses related with the two choices and with adjusting between them. Stress is inescapable in human life. Working women face stress at their workplace. The women faculty experience different impacts of stress and the degree of stress fluctuates because of numerous causative factors.

In India, stress is a common issue among teachers in advanced education system. They may confront pressure, anxiety, dread, weight, strain and stress in their everyday life to have the option to contribute adequately in the field of education. A couple of

different factors, for example, job uncertainty, expanding over-burden, accountability without satisfactory expert, deficient offices and lack of acknowledgment may likewise add to stress in these teachers. Further, women training professionals may likewise be exposed to confront common stressors by means of; dissatisfactory working conditions, overabundance remaining burden, long working hour, poor relationship with friends/associates and lack of required assets. Inadequate cash as compensation and lack of regard in the public eye eventually drops down the psychological prosperity of working women. It influences the showing capabilities on one side and creates "stress" on the other.

LITERATURE REVIEW

Doss, C. A. V., Rachel, J. J., AbuMadini, M. S., and Sakthivel, M. (2018) decided and thought about in their examination, the occupational stress level and professional burnout between 220 teachers. The result was determined by applying chi square test, understudy independent t test and ANOVA and it uncovered that Stress level and burnout level fluctuates essentially among male and female teachers. Poor working conditions, time weights, student bad conduct and poor working conditions anticipated burnout among the teachers.

Malik, N. A. A., Bjorkqvist, K., and Osterman, K. (2017) considered —Factors related with Occupational Stress among University Teachers in Pakistan and Finland! to distinguish psychosocial components related with occupational stress. Correlation and MANOVA were connected to test the results. Great working conditions, social help at work, and advancement and improvement openings were appraised as altogether better by the Finnish example. Male university teachers discovered more elevated amounts of work environment harassing. No huge

contrast was found between stress side effects in two nations.

Tribhuvan S (2017) examined the stress and job fulfillment among perpetual and brief teachers. Non-likelihood purposive inspecting was utilized, and information was gathered from 120 teachers. Devices like Teacher Job Satisfaction Questionnaire (TJSQ) and Occupational Stress Index (OSI) was utilized to gather the information. A negative correlation was secured between position fulfillment and occupational stress among teachers.

Banerjee, S., and Mehta, P. (2016) in their investigation worked after securing the precursors of position stress and their impact on job execution as far as both disappointment and shirking among the faculty members. The information was gathered from 110 faculty educating in B-Schools in Andhra Pradesh. Factor Analysis was performed to recognize significant factors influencing stress level and Regression examination was done to discover the effect of stress on job execution. The results uncovered that instructing stress prompts job evasion, though work over-burden stress and poor relational connections lead to job disappointment.

Chen, Wei-Qing (2009) has proposed that gastric/ulcer like health problems, age, educational capability, marital status has been positively connected with occupational stress and 'inward conduct' adapting techniques, however negatively connected with 'outside/social conduct' adapting strategies.

Research Gap

The previous studies so far reviewed, were limited to occupational stress, occupational safety, occupational sickness in industries, organization, and quality of work life balance. Apart from the occupational factors, even personal factors cause stress among women. And, there have not been comprehensive studies found on stress management and its effects on women faculty in higher educational institutions. Hence there is a need to study stress management among women faculty in Higher Educational Institutions in the Selected area of Telangana State. The present study covered the factors causing the stress, impact of stress and coping mechanisms to manage the stress among them.

Objectives of the study

- 1.To examine demographic factor's role in causing stress to the women faculty members.
- 2.To identify the personal factors responsible for stress among the women faculty members
- 3.To evaluate the impact of stress on the performance of women faculty in the select Institutions.

Research Design and Methodology

Research Design: Quantitative and Descriptive Research

Sources of Data Collection: Data was collected from both primary and secondary sources.

Primary Source: A structured questionnaire was used to gather the primary data. In addition, the information is gathered through personal interaction. In the questionnaire the scores for the select factors of stress are assigned based on Likert's Five-point scale.

Secondary Source: The secondary data sources of the present research included review of Books on Stress, Journals, Annual Reports, Publications, Website, etc.,

Sample Size: The study is confined to select Higher Educational Institutions of Hyderabad in Telangana State. The data has been collected from 75 women faculty members by using simple random sampling technique. The analysis and interpretation of collected data results is done using a self-structured questionnaire. The study is focused on demographic factors, personal factors which are causing stress among the women faculty of the selected higher educational institutions. The basic analysis of the data has been done using simple percentage method and later the results also presented by tables and graphs. Factor analysis of the selected factors is presented. The correlation between selected factors and the stress faced and impact of stress on performance and Practice of stress management techniques using chi-square also verified with the help of defined hypothesis.

FINDINGS AND DISCUSSIONS

From the study, majority of the respondents felt that demographic factors are affecting their work and causing stress to them. Age, gender discrimination at workplace, level of educational qualification and income levels are the major demographical factors causing stress.

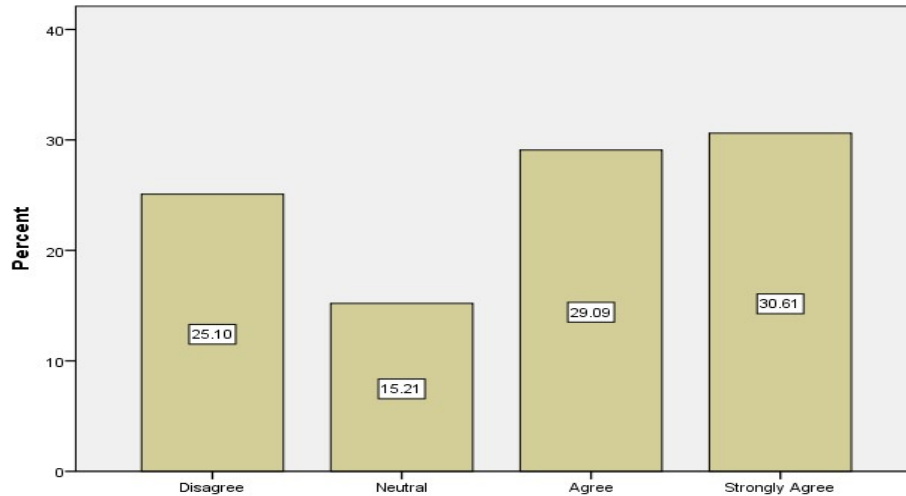
Section -I

Demographic Factors

Table No: 1-Age as a causing stress

Response	Frequency	Percentage
Disagree	18	25.1
Neutral	12	15.2
Agree	22	29.1
Strongly Agree	23	30.6
Total	75	100.0

Figure No 1– Age as a factor causing stress



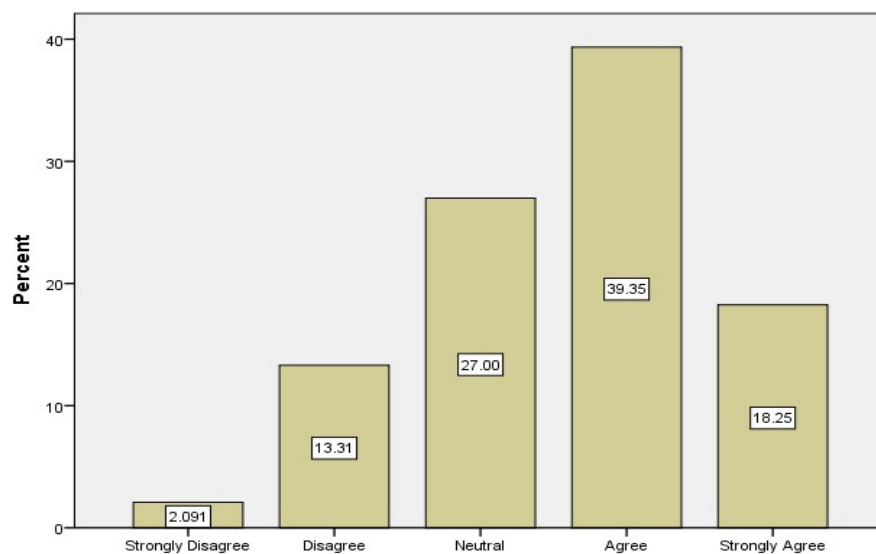
Inference: The above table presents the data related to response on age affecting the work and causing stress to the respondents. From the data it is clear that 30.61% of respondents have strongly agreed, 29.09% of respondents have agreed, 15.21% of respondents

have neutral opinion and 25.10% of the respondents have disagreed with the statement. More number of women faculty of higher education institutions in the state of Telangana have stated that their work is being affected by age and causing them stress.

Table No: 2-Gender as factor causing stress among respondents.

Response	Frequency	Percentage
Strongly Disagree	2	2.1
Disagree	10	13.3
Neutral	21	27.0
Agree	29	39.4
Strongly Agree	13	18.3
Total	75	100.0

Figure No 2 – Gender as factor causing stress among respondents



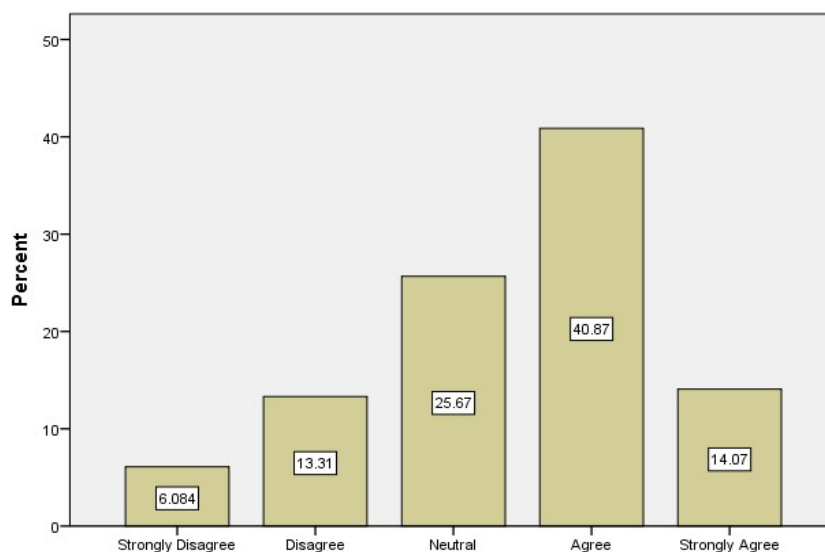
Inference: The above table presents the data related to response on their gender at workplace causing stress. From the respondents 18.25% have strongly agreed, 39.35% of respondents have agreed, 27% of respondents have neutral opinion and the percentage of

disagree is 13.31% and the percentage of strongly disagree is 2.091%. Many women faculty of higher education institutions stated that they are facing stress at workplace on the basis of gender.

Table No: 3-Educational Qualification as a factor causing stress

Response	Frequency	Percentage
Strongly Disagree	5	6.1
Disagree	10	13.3
Neutral	19	25.7
Agree	30	40.9
Strongly Agree	11	14.1
Total	75	100.0

Figure No: 3- Educational Qualification as a factor causing stress



Inference: The above table presents the data related to response regarding educational qualification have an impact on their performance and cause stress. From the respondents 14.07% have strongly agreed, 40.87% of respondents have agreed, 25.67% of respondents have neutral opinion, 13.31% of the respondents have

disagreed and 6.08% of respondents have strongly disagreed. More number of women faculty of higher education institutions stated that educational qualification have an impact on their performance and causing stress to them.

Table No: 4- Income levels as a factor causing stress

Response	Frequency	Percentage
Strongly Disagree	5	5.9
Disagree	7	9.7
Neutral	18	24.9
Agree	43	57.4
Strongly Agree	2	2.1
Total	75	100.0

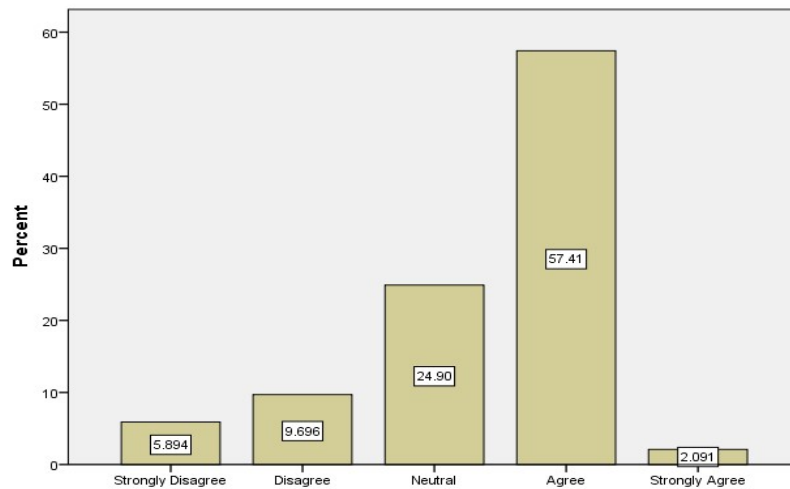


Figure No: 4- Income levels as a factor causing stress

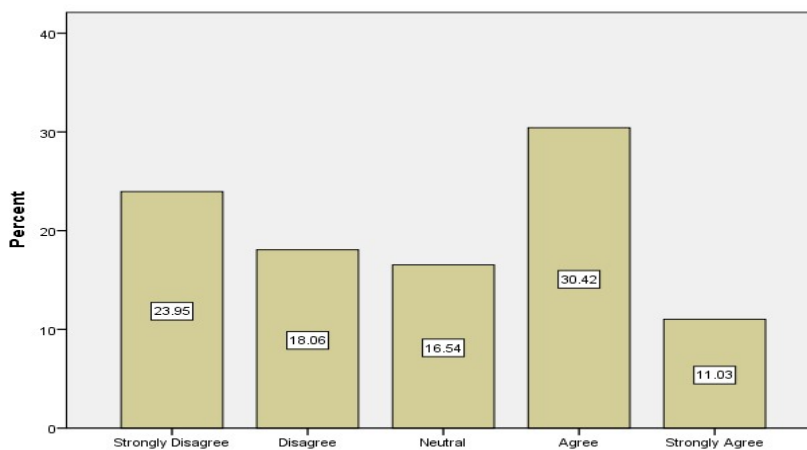
Inference: The above table presents the data related to response regarding income level causing stress to them. From the respondents 2.091% have strongly agreed, 57.41% of respondents have agreed, 24.90% of respondents have neutral opinion, 9.69% of the

respondents have disagreed and 5.59 % of respondents have strongly disagreed with the statement. More number of women staff of higher education institutions in the state of Telangana has stated that income level when compared with colleagues causing stress.

Table No: 5-Gender Discrimination in institution as a factor causing stress

Response	Frequency	Percentage
Strongly Disagree	18	24.0
Disagree	814	18.1
Neutral	12	16.5
Agree	23	30.4
Strongly Agree	8	11.0
Total	75	100.0

Figure No: 5-Gender Discrimination in institution as a factor causing stress



Inference: The above table presents the data related to response regarding gender discrimination at workplace causing stress to them. From the respondents 11.03% have strongly agreed, 30.42% of respondents have

agreed, 16.54% of respondents have neutral opinion, the percentage of disagree is 18.06% and percentage of strongly is 23.95%. More number of women faculty of higher education institutions in the state of Telangana

has stated that gender discrimination at workplace causing stress.

Among the Personal factors considered for the study, it is found that some of the factors are causing stress to the women faculty like, lack of freedom to practice their occupation, not being able to balance between work and personal life, problem of role conflict, family getting disturbed with the schedule of job, no enough

time to allot to themselves or for hobbies. There are certain personal factors which are not causing stress to the respondents. These involve performing job without interference of their family, spending more time with the family, receiving the respect and honor in the family due to the profession/ job.

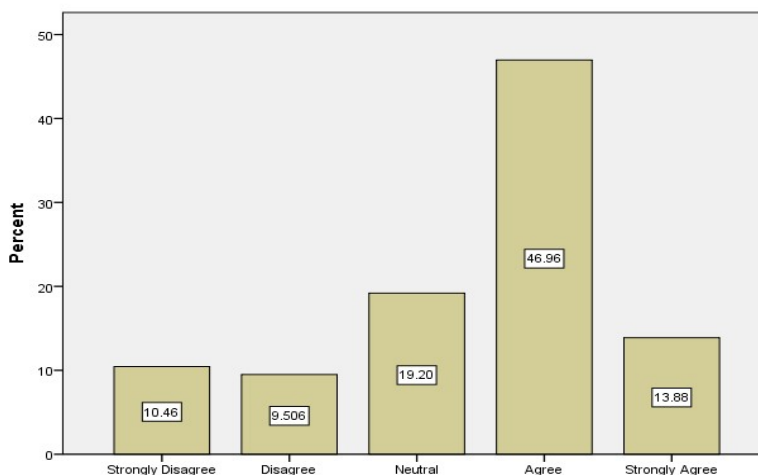
Section – II

Personal Factors

Table 1-Performing work without interference of family

Response	Frequency	Percentage
Strongly Disagree	8	10.5
Disagree	7	9.5
Neutral	14	19.2
Agree	36	47.0
Strongly Agree	10	13.9
Total	75	100.0

Figure No: 1: Performing work without interference of family



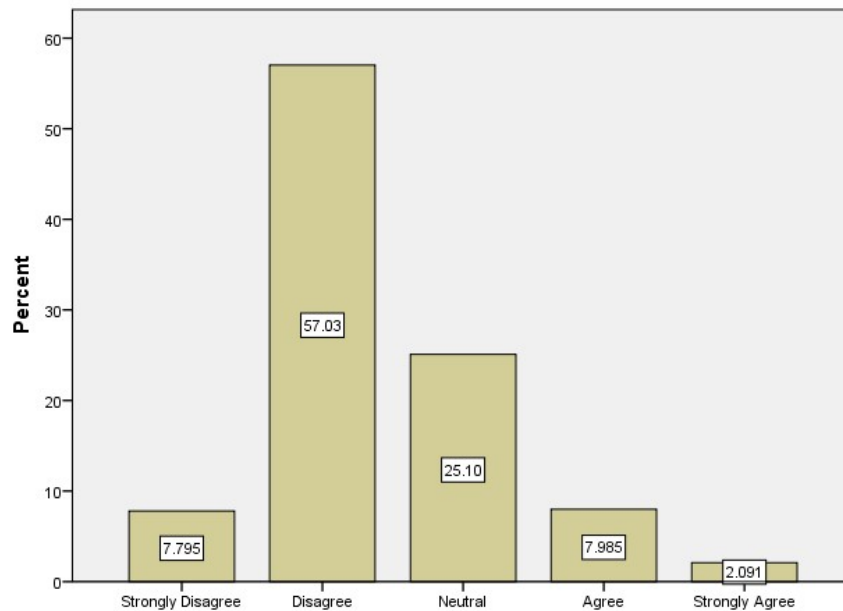
Inference: The above table presents the data related to response regarding whether they are doing their job at the institution without inference of their family. From the respondents 13.88% have strongly agreed, 48.96% have agreed, 19.20% have neutral opinion, percentage

of disagree is 9.506% and percentage of strongly disagree is 10.46% . More number of women faculty members of higher education institutions stated there is no interference of family members while doing their job.

Table No: 2-Balancing of work life

Response	Frequency	Percentage
Strongly Disagree	6	7.8
Disagree	43	57.0
Neutral	18	25.1
Agree	6	8.0
Strongly Agree	2	2.1
Total	75	100.0

Figure No: 2-Balancing of work life



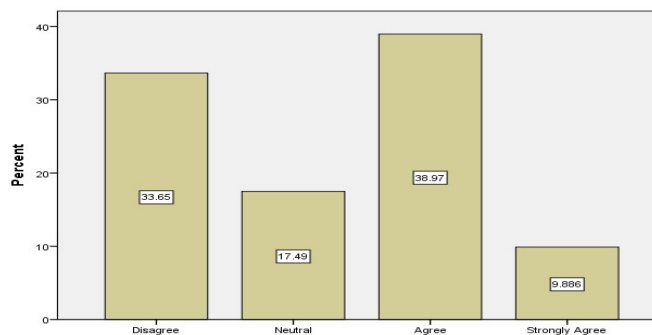
Inference: The above table presents the data related to response regarding whether they are able balance their work life. From the respondents 2.091% have strongly agreed, 7.985% of respondents have agreed, 25.10% of respondents have neutral opinion, 57.03% of the

respondents have disagreed and 7.795% of respondents have strongly disagreed with the statement. More number of women faculty of higher education institutions stated that they are not able to balance between the wok and personal life.

Table 3- Allotment of proper time needed to family

Response	Frequency	Percentage
Disagree	25	33.7
Neutral	13	17.5
Agree	30	39.0
Strongly Agree	7	9.9
Total	75	100.0

Figure No: 3-Allotment of time needed to family



Inference: The above table presents the data related to response regarding allotment of time to family. From

the respondents 9.896% have strongly agreed, 38.97% of respondents have agreed, 17.49% of respondents

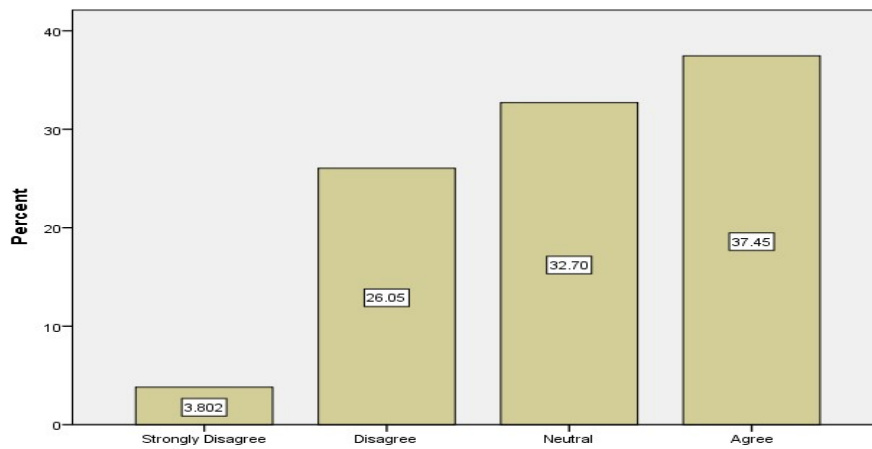
have neutral opinion and 33.65% of the respondents have disagreed. More number of respondents has stated

that they are spending ample time with the family.

Table No:4- Opinion on role conflict at work

Response	Frequency	Percentage
Strongly Disagree	3	3.8
Disagree	19	26.0
Neutral	25	32.7
Agree	28	37.5
Total	75	100.0

Figure No: 4-Feeling of role conflict at work



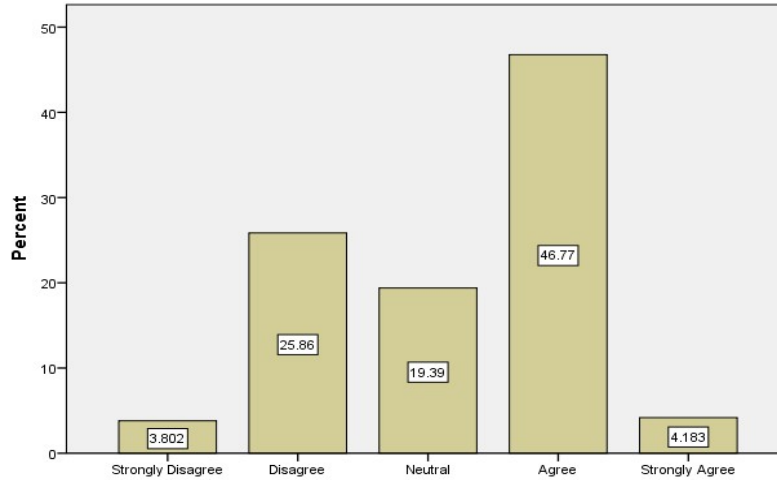
Inference: The above table presents the data related to response regarding whether they feel role conflict often. From the respondents 37.45% of respondents have agreed, 32.70% of respondents have neutral

opinion, 26.05% of the respondents have disagreed and 3.802% of respondents have strongly disagreed with the statement. Majority of respondents has stated they are facing a problem of role conflict and causing stress.

Table No: 5- Family is getting disturbed with the schedule of work

Response	Frequency	Percentage
Strongly Disagree	3	3.8
Disagree	20	25.9
Neutral	14	19.4
Agree	35	46.8
Strongly Agree	3	4.2
Total	75	100.0

Figure No: 5- Family is getting disturbed with the schedule of work



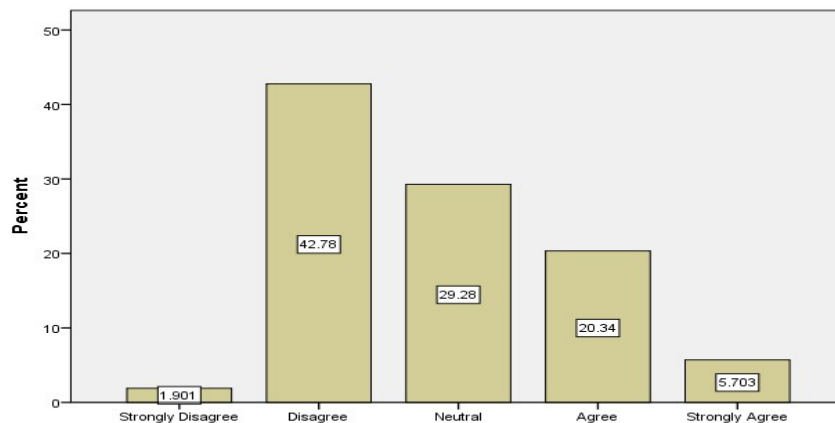
Inference: The above table presents the data related to response regarding whether their family is getting disturbed with the schedule of their job. From the respondents 4.183% have strongly agreed, 46.67% of respondents have agreed, 19.39% of respondents have

neutral opinion, 25.86% of the respondents have disagreed and 3.802% of respondents have strongly disagreed with the statement. More number of women staff respondents felt their family is getting disturbed with the schedule of job.

Table No: 6- Allotment of enough time for hobbies after completion of work at office

Response	Frequency	Percentage
Strongly Disagree	1	1.9
Disagree	32	42.8
Neutral	23	29.3
Agree	15	20.3
Strongly Agree	4	5.7
Total	75	100.0

Figure No: 6-Allotment of enough time for hobbies after completion of work at office



Inference: The above table presents the data related to response regarding whether they have enough time to allot to themselves or for hobbies after completing the schedule of work at office. From the total respondents 5.703% have strongly agreed, 20.34% of respondents have agreed, 29.28% of respondents have neutral opinion, 42.78% of the respondents have disagreed and 1.901% of respondents have strongly disagreed with the statement. More number of women faculty felt that they do not have enough time to allot to themselves or for hobbies after completing the schedule of work at office.

CONCLUSION

Stress is a fact of life, which cannot be avoided anywhere including workplace. Due to technological revolutions in education sector, staff especially women faculty is under more pressure and facing work stress. The aim of the study is to find the causes of stress among women faculty members of higher educational institutions in select districts and its impact on their performance. The present study revealed that women faculty is undergoing stress and most of the women faculty is practicing some of the stress management techniques. Effective stress management techniques will reduce stress by improving working conditions and employee empowerment. It can be concluded that though stress is a growing challenge, it has substantial benefits when managed efficiently through appropriate stress management techniques.

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IMPRESSION OF FOOD AND SERVICE QUALITY AND ITS IMPACT ON CUSTOMER SATISFACTION IN FINE DINING RESTAURANTS: A CASE OF CHANDIGARH CITY

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ABSTRACT

In the modern-day, because of the fast pace of life and no time in hand, people are looking for food options resulting in the rapid growth of the foodservice industry. At this juncture, many food lovers are looking for full-service restaurants where the food is served on order and taken care of by the waiting staff throughout their meal experience. Restaurants are thriving to attract customers but most of them are not successful in this business due to improper management and service failure. Therefore, the objective of this study is to establish the effect of food and service quality on customer satisfaction in full-service restaurants. A quantitative research methodology was conducted to scrutinize the mingled impression of food and service quality attributes on customer satisfaction. 200 diners took part in this survey. Multiple Regression analysis was applied to check up the hypothesis. The outcome suggests that customers are more satisfied with food quality than service quality. The result of this study has many operational uses for the full-service and other types of sit-down restaurants of Chandigarh city. It will direct them to progress in the domain of weak execution which will further lead them ahead in achieving customer satisfaction and their retention.

Keywords: Fine dining restaurant, food quality, service quality, customer satisfaction, food quality, service quality, perception

INTRODUCTION

Fine dining restaurants are mostly found in restaurant chains or luxury hotels. In the olden days, it has big fame among the high-class high-income group and there was a trend of eating in the fine dining restaurants once/twice a month. Nowadays, upscale restaurants are gradually losing their charm as the dominating nature and growth of quick-service restaurants throughout the nation. This is because of the advancement of food technology, increased income, both parents working, micro family, globalization, sharing of knowledge, and after all lack of time, resulting in changing food habits of the new generation.

Fine dine or full-service restaurants are the top class among all types of restaurants where the customers are escorted by the restaurant hostess, escort to seated, and handed over to the deputed team members. The atmosphere is formal and emphasizes given in the interior decoration, upholstered furniture, cosy seating, elegantly decorated tables with high-quality tableware, sparkling glassware, authentic food, and a wide range of menu varieties. A complete table service/silver service is provided by the well-uniformed waiting staff. Gueridon service/ Flambe service is also provided by some of the top-class, specialty restaurants. Where the semi-cooked food is brought by gueridon trolleys and the final touch is given by the service personnel, in front of the customer that gives a dramatic effect to the view of the food lovers. Greater emphasis is given to Music, lighting, furniture, and fixtures, and other decorative artifacts are of unique categories. Expensive menu cards are provided to the patrons that reflect the image of the restaurant, which is often handcrafted and well description is given below each food item. The service team that follows a protocol, each team member is designated for different tasks but works together in full cooperation and harmony.

(Ryu et al., 2012), indicated that food attributes namely freshness, eye appealing dishes, yumminess, nutritive,

and menu variety enhance customer satisfaction. (Rafael Modestus Ziku, et al., 2019), describes that service quality, food quality, and restaurant ambiance are precursor of customer choice in foodservice businesses. Restaurant employees must be polite and helpful nature, have menu knowledge, food suggestive technique, ability to solve customers' requests, and serve food on time. Food quality attributes such as proper presentation, authentic food, eye appealing, good quality and portion size, unique flavour, and mouth-watering dishes. Ambiance such as interior designing, well-maintained temperature, well table layout and seating plan, interesting music and sound systems, neat and clean waiting staff, and dining hall are concerned. (Ali Nasir et al., 2014), found that classic food taste, well garnished and presentation of the dish, novelty, fragrance, ample choice from the card, and nutritional aspects that satisfy the customers and leave positive behavioural intention towards the restaurant.

According to (NaeyhunJin, et al., 2019), found that based on customers' practical experience, superior service quality and proficiency of service staff and management's part influence customer satisfaction in meal experience. Additionally, an artistic and pleasing atmosphere and employee's ability to engage customers and make them escape from the boring time are other attractions that ultimately bring more customers to the organization. Price is never a factor for the customer if they get to be involved in such a joyful and memorable dining experience. (AzureenRozekehi, et al., 2016), authors revealed that menu diversity, novelty, and innovations of dishes are few of the food attributes that influence customer preference in full-service restaurants. Food served authentically, its garnish, accompaniments, temperature, colour, flavour, texture, and overall eye-appealing and uniqueness that surprises customers and

provoke them to order more. Creatively prepared with fresh ingredients, healthy and tasty dishes whose flavour stimulates the appetite of the food lovers. Customers' perception about fine dining restaurants means who serves specialty cuisines and is committed to providing a royal dining experience.

Importance of this research

Readiness to bestow upper-level services plays a significant contribution in foodservice businesses. Due to quality of service is fragile to the endurance and economically beneficial for the service firm. High quality of service is also an advantageous strategy for upscale restaurants. (Namkung and Soo Cheong, 2013), confirmed that food quality and customer satisfaction have a very close relationship and have a significant role in characterizing customer predominance motives. Extensive impact of food quality, restaurant ambiance, and comfortable seating detachedness on more purchase and returning intention (Sulek and Hensley, 2004).

The objective of the Study

The purpose of this study is to unearth the impact of food quality and service quality on customer satisfaction and the association between service quality and customer satisfaction in the full-service restaurants.

Hypothesis

H₁: Food quality influence customer satisfaction in fine dining restaurants.

H₂: Service quality impacts customer satisfaction in fine dining restaurants.

H₃: Service quality positively and significantly associated with customer satisfaction.

REVIEW OF LITERATURE

Influence of food quality in full-service restaurant

According to (Naeyhun and Sang-mook lee, 2014), authors found that three elements namely experiential quality of food, service and restaurant ambiance are the fortune teller that influences customer choices in fine dining restaurants. Similarly, (Nor Azureen Rozekhi, et al., 2016), authors revealed that menu diversity, novelty, and innovations of dishes which influence customer satisfaction. High-quality food and authentic taste along with a modern touch in services and equipment which has a productive outcome and customers positiveness towards the meal experience, (Anshul Garg & Maria Amelia, 2016). In upscale restaurant customers look forward other than spectacular food, notwithstanding tasty and yummy food is a prime concern, waiting staffs service quality attributes namely warm welcome, menu knowledge, clean uniform, neatness, communication skills, ability to win over customer, reassurance, are distinguishing and key concerned in customer satisfaction (Mhlanga, et al., 2014).

Impact of service quality on customer satisfaction

In the restaurant business, customers negotiate service quality and food quality and they assess both factors in their meal experience. Previous learnings have confirmed that service quality is a delicate part. Waiting staff's services are the primary and dominant forecaster of customer delight in fine dining restaurants (Onesimo Cuamea and Jorge Carlos, 2017). In a high-end restaurant, excellent service quality is the prime requirement of customers than other features like food and ambiance (Andaleeb and Conway, 2006). A study by (Al-Tit, 2015) revealed that food and service quality directly influence customer satisfaction. According to (Lee, 2004), revealed that that determinants element of customer satisfaction is food quality, food server's competency, timely delivery of product and services, location, physical environment, value for money, that enhance customers returning patronage.

Food attributes and its consequences on customer satisfaction

In pursuance of (R. Kannan, 2017), described that food taste and presentation are important giver to diners and positively influence customer satisfaction and behavioural intent. Food quality attributes means there are many elements included namely, taste of the food, colour, flavour, texture, temperature, quantity, accompaniments served along the food, quality of the dish in which the food is served, decoration, and presentation of food.

Customer satisfaction

In the cutthroat food service industry, it has grown to be more and more critical to apprehend purchaser needs and wants as a way to offer the purchaser with the great feasible product. Customers are the kings of the foodservice industry, so emphasizing customer satisfaction is a continuous and regular task of any restaurant. In full-service restaurants, customer satisfaction is a big challenge for restaurant operators.

According to (Hsin Kuang Chi, et al., 2019) found that if eating place deliver good carrier quality, extraordinary emblem photograph and understand of patron, clients will experience happy with the service they have got received. Moreover, folks who are happy with a given carrier may have nice feedback to the others and emerge as repeat clients. (Johnson & Fornell, 1991), described customer assessment of collective satisfaction with a product and service, that straightway influences post-consumption occurrences behavioural intention namely change of mood, repeat patronage, and faithfulness.

Many factors predict customer satisfaction in upscale restaurants, but the key elements are service standard, physical setup, quality of dishes, and cost of food and beverage items (Sabir, et al., 2014). Service quality is the core product after food of a restaurant which is intangibly rendered the waiting staff that determines customers likes and dislikes and also mediate between product quality and customer satisfaction. Sometimes, in the cases, when the

products are not up to the standard but the excellent services provided by the waiting staff, manage to compensate the overall dining experience. (Ladhari et al., 2008), revealed, with the growth of food outlets and the rising competition, magnitude of retaining customer which influence the requirement to confer high-quality service and satisfy customers.

Association Between Service Quality and Customer Satisfaction

In the past decades. Concept of restaurant services and consumer satisfaction are focused more on by the marketers and academicians. There are many similarities in these two constructs but recent studies by (Dabholkar, 1995), found that these factors have a different meaning for customers at the latest and trends, though they intersect for age-long consumers, the reason being customer satisfaction assessment of perception changes and growth over time. (A. Manorselvi and Anu B, 2021), authors revealed that menu variety, efficient and polite waiting staff with an assistantship and anticipate and fulfil customers' needs affects customer satisfaction. Further, different cuisines such as continental, oriental, Mediterranean, and locale foods such as regional cuisine and those unique dishes are most preferred. Service staff should be a pleasant and welcoming attitude and they must have social bonding ability with the customers. Thus, waiting for staff has a positive role in satisfying guests.

(Naeyhun, et al., 2015), found that the brand image of A-class restaurants, tailor-made services, service excellence, and the artistic ways of creating service delivery must be of a high degree. The image of the restaurant and the services provided must be matched in fine dining restaurants. Consequently, upscale restaurants patron's satisfaction and loyalty depend on their perceived experience of restaurants' tangibles and intangible products and are indifferent and unique unlike other categories of food outlets. The restaurant's theme and staff's performance along with the food, equipment, décor, sound, light, colour, and smell that enhances the concept and feel of the theme restaurant.

(OnesimoCuamea and Jorge Carlos, 2017), authors revealed that waiting for staff services is the primary and dominant forecaster of customer delight in fine dining restaurants. After that menu price and time taken to deliver food items to the restaurant patrons are other factors that influence customer satisfaction in upscale restaurants. Restaurant employees should decorate the dining table with all the necessary cutlery, crockery, and glassware, artistically folded napkins, provide condiments and accompaniments before the food arrives on the table. Food and beverage price should be reasonable and match the standard and the portion size of the dishes. There should be minimum time taken by the waiting staff to deliver food. Complimentary snacks items must be served along with drinks and before the service of the main course. Customers must be informed about the delivery time of foods and orders should be taken accordingly so that diners do not feel idle.

Determinants of customer satisfaction

(Naeyhun and Sang-mook lee, 2014), authors found that three factors namely experiential food quality, service quality, and restaurant ambiance are the fortune teller that influences customer choices in fine dining restaurants. Perceived food quality means the customer's previous dining experience what they had in other such types of restaurants. Service quality attributes restaurant employees' positive attitude towards customers, their appearance, elegant look, smiling face, neat and clean uniform, menu knowledge, understand customers' needs and desires. Physical atmosphere qualities such as furniture and fixtures, design and layout of the restaurant, quality of tableware such as cutlery, crockery, glassware, and linen all must harmonize the theme of the restaurant. All these factors are the customer preferences and predictors of the brand image of upscale restaurants. (Al Tit, 2015), found that service attributes have a prime role concerning customer preferences in the foodservice industry. Same in the case of food quality that ultimately influences customer satisfaction in their dining experience. Food authenticity which customers used to have from their previous experiences from different places that recall the taste and realize its originality when they dined in a news outlet.

Customer Perception of service quality

The food service staff's quality and the way of their conduct always attracts the customers to the restaurant in which they fulfil the customers' requests, starting from warm welcoming at arrival, provide them with appropriate and comfortable seating, they describe menu and its availability, changes in the dish on request, explain about today's special menu, children special dishes, provide menu suggestions, timely delivery, proper distribution of food, accurate billing, that obviously lead to memorable dining experience to the customers. (Bernhard et al., 2020), authors found that reliable waiting staff their continuous assistance in serving food throughout mealtime and the physical atmosphere positively influence customer perception and repurchase motivation in full-service restaurants.

Beside service quality attributes, product quality is equally important for the customers' dining experience and these factors act as a mediating role in customer delight and future purchase intention. A study by (Ching-Shu Su, 2011), found that sound, light and artifacts, colour of wall paints and paintings, and incandescent lamps have significant impacts on the customers feeling of being in ethnic restaurants. Service staff's uniform, attitude towards service delivery, music, light, interior decoration, physical settings, the smell of the restaurant all have the relevance of feelings of being in the atmosphere of a different culture. The way of service of food, the body language of the server, facial expression, attitude towards the customers have combined effects on

customer delight and revisit motive in the ethnic food outlet.

According to Anshul Garg & Maria Amelia, (2016), revealed that Employees' service quality influence most in satiating customers in the upscale restaurants. Followed by spectacular food and a pleasant atmosphere. High quality food and authentic taste along with a modern touch in services and equipment which has productive outcome and customers positiveness towards the meal experience. Magnificent food with mind blowing view and friendly atmosphere attracts customers again and again and speak positive word of mouth to their friends and families. Waiting for staff's warm welcome, comfortable seating, timely delivery, problem-solving, keep customers' requests, timely and accurate billing are some of the services which customers want in every dining experience.

(Naeyhun and Jerusalem, 2015), describe that waiting staffs elegant look and positive reflection throughout service confrontation, so that induce trust, indebt Ness, well-disposed, exchange conduct and transmission in fine dining restaurant customers. Further, restaurant personnel's gracefulness and demonstration of certain sensations will enhance

consumers' dining interest and loyalty to the upscale restaurant. Waiting staff's attire, makeup should match and harmonize with the theme and atmosphere of the restaurant.

Research Methodology

A quantitative survey method was used to discover the impression of food quality and service quality on customer satisfaction in the full-service restaurant settings in Chandigarh. This paper studied and based on SERVQUAL tool to evaluate the food and service quality. Likert scale questionnaire was developed to know the responses from the targeted customers. Customers had seven options to choose from the scale. Two hundred questionnaires were distributed personally to the dinners in different full-service restaurants, mostly in the peak hours of dinner time on the weekends, so that the maximum result could be achieved.

There were two sections in the questionnaire Part-A is about the demographic profile of the respondents and Part-B measured included food quality attributes and service quality attributes

Research Model

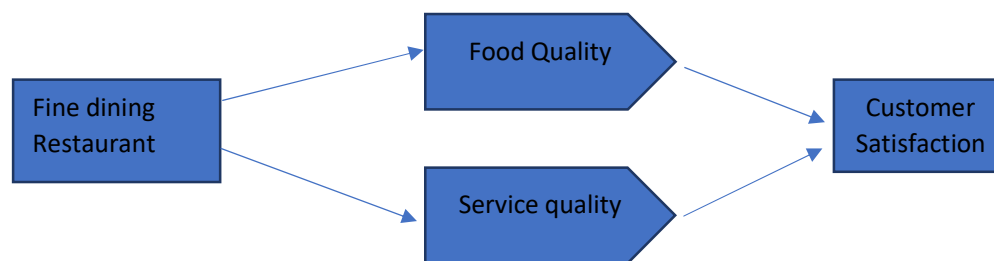


Figure 1: Theoretical framework of the study

Data Collection

Field survey was conducted by means of the questionnaire as the main instrument for data collection. To check the reliability, a pilot study was conducted for which 40 questionnaires were distributed to the restaurant managers, chefs, and customers of different fine dining restaurants between the target areas. Amendments made in the development procedures of the final questionnaire. The survey process has begun in January and February 2021. It took seven weeks to complete the whole process with the help of hotel school graduates (Job trainees),

restaurant employees, and by personal efforts. Among 200 distributed questionnaires only 140 properly filled up data were collected and analysed in the SPSS version 21.

Regression Analysis and Interpretation

To check up the objective, effect of food quality and service quality in the fine dining restaurants multiple regression analysis was performed to find out the correlation between variables. An analysis of SPSS version 21 was performed so as to derive an accurate regression analysis result.

	R	R square	Adjusted R square	Std. Error of the estimate	Change statistics				
					R square change	F change	df1	df2	Sig. F change
1	.742	.631	.628	.37127	.688	183.213	2	137	.000
a. Predictors: (Constant), Service quality, Food quality									

Table: 2

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	St. Error	Beta		
1	Constant	-.131	.235		-.553	.555
	Food quality	.615	.088	.512	7.060	.000
	Service quality	.426	.078	.376	5.337	.000
a. Dependent variable: Customer Satisfaction						

The multiple correlation coefficient is 0.742 that calculates the level of connection in the middle of the actual values and the predicted values of the Customer satisfaction. Since the predicted values are came into the possession as a linear amalgamation of two variables those are Food quality (X1) and Service quality (X2), the coefficient value of 0.742 reveals that the connection between Customer satisfaction and the two independent variables is significantly positive.

The Coefficient of resolution R-square calculates the goodness-of-fit of the ejective Sample Regression Plane (SRP) in view of the ratio of alteration in dependent variables described by the equipped sample regression equation. Thereby, the value of R square is 0.631 merely denotes in respect to, 63% of the difference in Customer satisfaction is stated by roughly calculated SRP for the reason that uses Food quality and Service quality as the independent variables and R square value is significant at 1 % level.

The multiple regression equation, $Y = -.131 + 0.615 X1 + .426 X2$

In the above equation, coefficient of X1 is 0.615 constitutes partly impact of service quality on Food quality, keeping other variables as static. Positive sign estimation indicates that such impact is positive as family expenditure could rise by 0.615 for every increased unit in Food quality and this figure is significant at 1% level.

The coefficient of X2 is 0.426 constitutes partly impact of service quality on Customer Satisfaction, keeping other variables as static. Positive sign estimation indicates that such impact is positive as family

expenditure could rise by 0.426 for growth of each unit in service quality and this figure is significant at 1% level.

Formulated on standardized coefficient, Food quality (0.615) is the major and significant factor determinant of Customer satisfaction, following that Service quality (0.426).

The independent variables product and service quality both have important and positive impact on customer satisfaction as the P value is far less than the 0.005. The T statistics of food quality is 7.06 and T statistics of service quality is 5.33. Unstandardized coefficient Beta value result also shows the higher on food quality than the service quality.

DISCUSSION AND CONCLUSION

This paper investigates the impression of food and service quality on customer satisfaction and the association between service quality and customer satisfaction in the fine dining restaurants. Findings suggested that effect of food quality is higher than service quality on customer satisfaction. Additionally, both the variables are significantly and positively influence customer satisfaction. The findings call for undoubtedly connected between food standard, level of service quality, and customer delight. Service quality is positively and significantly impacting customer satisfaction. Fine dining restaurant guests are interested in food standard attributes namely serving temperature, relish, quality, consistency, recency, quantity, authenticity, ingredients used, flavour, texture, and presentation are equally important and influence customer satisfaction. In the present scenario

customers are health conscious and are looking for healthy options in the menu. Cooking style and the type of cooking oil used are more concerned. Upscale restaurant operators have to keep up the quality standard of food items as always to maintain and attract more customers.

On the contrary, restaurant service delivery has less impact on customer than level of food standard. What's more, they need to upgrade the service style and the way it is delivered to customer. The physical settings, spacious seating area, interior decoration, light, music and theme of the restaurant that gives a unique feeling of pleasure and overall satisfaction, particularly for the families. Food and beverage orders should be taken carefully and exactly what the customers want, with proper combination with each course and timely delivery of food items, so that diners don't feel ideal in between the courses. Food and service standard are main predictors and having the power of quality in deciding customer satisfaction of food service outlets. The service quality primacies of customer satisfaction are warm welcome and greetings, staff attitude, seating comfort, timely delivery of food, cleanliness of the dining area, correct billing, and safety and hygiene.

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DESIGNING OF TYPICAL SLITHERING PLATFORM FOR HELICOPTER USING COMPOSITE MATERIALS

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ABSTRACT

One of the important operations the defense services (especially army) have to carry out during a specific mission is to transport armed troops to remote places where there is no access by road in quickest possible time. Army aviation uses the helicopters for the said mission where in the Troops are carried in the helicopter to a predetermined destination and are made to slide down the helicopter with the helicopter in hovering condition at about 200 feet to 300 feet above the ground. This operation of sliding down from the helicopter is called as slithering. SLITHERING operation essentially needs a SLITHERING BOOM firmly attached to the helicopter structure, an end fitting to attach the rope and a platform for the troops to stand before sliding. The aim of the project is to design a platform using composite materials approximating it on a simply supported beam to carry a load of 300 Kg i.e., two armed troops of 150 Kg each.

Keywords: Slithering; Composite Materials; Helicopter; Platform.

Introduction

Whenever it is not possible to reach certain areas by motor able road by the defense people, particularly for army, it is a general practice to take the troops in a helicopter in a hovering condition, the troops will be asked to slide down at the desired destination. This operation is called slithering operation. Slithering operation can be carried out both on skid and wheel landing gear of helicopter versions.

- Extended platform used for troops to stand before sliding and to avoid injury due to hitting of skids, when sliding down.
- A boom to hang the rope on which troops can slither down.
- A suitable rope capable of withstanding the load of two troops at a time.
- Anchoring point as a safely measure.

In the present project attempts has been made to design and developed an extended platform using composite materials and compare the advantages over metallic (conventional material) platform consisting of sheet stringers in axial and transverse direction in semi monocoque constructions. The sandwich composite constructions design not only reduces the weight but also minimizes the

number of components hence enhances the safety. Use of advanced composite materials like carbon and honeycomb core provides the required strength, stiffness and dynamic properties at a minimum weight penalty.

Literature Review

Advanced Composite Main Rotor Flex Beam

The flex beam connects the main rotor to the main rotor blade. The composite flex beam is used in the bearing less rotor hubs in the main rotor system of the helicopter with evolution of advanced composites, the flexibility of designing bearing less or hinge less rotor systems become a reality

Design Details

During the design of flex beam the following consideration are needed,

- Flap-lag-torsion deformation must be accommodated through the flex beam.
- There should be balance between manoeuvrability and dynamic vibrations.
- Hub size must be kept at a minimum in order to reduce the weight and hub drag.
- In order to maximize in-plane damping, the optimum tailoring at the

damper and in-plane flex beam deformation must be obtained.

- Flex beam design criterion includes rotor shaft/mast/hub impedance characteristics.
- Cross-section of flex beam.
- Composite material type and configuration.
- Hub and blade attachments and configurations..
- Material used: S2-fiber glass impregnated with a 350F curing (toughened epoxy resin system)

Composite Fuselage

An innovative composite fuselage design concept was developed, which will meet the structural and flight loads requirement and satisfy the design goals for less weight and crash worthiness. The fuselage is fabricated using a composite sandwich construction and consist of a relatively rigid upper section or a passenger's cabin, including a stiff structural floor and a frangible lower section which encloses the crash energy system. Due to the very high stiffness and strength of the fuselage there is very less chance of structural collapse.

Design Aspects

- Upper section of the fuselage is fabricated by a stiff composite sandwich construction and is designed to provide a protection shell.
- Frangible outer shell is fabricated using a relatively compliant composite, enclosing the energy absorption structure beneath the floor and forming the lower fuselage.

Material Used

The fuselage specimen was fabricated in a two-stage process using a two-piece costume-built mandrel or mold. The first stage the upper section fuselage. Since upper section consists of a composite sandwich design, three steps are employed in fabrication.

1. The fuselage skins.
2. The foam cores.
3. Outer skin.

Helicopter Avionics Bay Door in Thermoplastic Composites

A simple panel reinforced with a bead stiffened pan, forms the basis of the design with paste adhesive bonding and key to a simple and cost-

effective assembly technique. Carbon/PPS unidirectional tape is selected for the design, which carry mission loading and its effective structure current field environment.

The application is targeted to reduce fabrication and labour cost. Structures are carbon/epoxy construction designed to reduce weight and cost over original metal design. The bi-hold composite doors will replace all the convectional door material. There is a 60% reduction in weight compared to metallic alloy material-based doors and cost is 25%-35% less.

Design Details

- It has a large external panel subjected to the transient loading which occurs during the firing of the Hell firing missiles.
- It has multi-purpose latches, which must keep the door closed under mission loading.
- It must protect the equipment from the external environment.

Material Used

- Carbon/PEEK (polyether ether ketone) tape.
- Carbon/PPS (polyphenylene sulfide) tape.
- Carbon/Nylon tape.
- Carbon/PEI (poly ether amide) tape.

Honeycomb Sandwich Structure

A typical honeycomb sandwich structure consists of three different layers-facings, core and adhesive.

Facings

Almost any material can be used for sandwich facings from plywood to carbon tape fiber composites. Some of the most commonly used materials are aluminum, mild carbon steel, stainless steel, woven carbon epoxy and woven Kevlar epoxy. The selection of the facing material is dependent on the panel requirements such as strength, stiffness, damage tolerance, environmental conditions, appearance and cost. The specific strength should be as high as possible to produce the lightest sandwich if bending stresses or panel deflections are the critical design parameters. (Specific strength is obtained by dividing the stress or modulus by the material density). In many applications a thin skin would work

structurally to handle the loads and deflection requirements but would not withstand the damage to which it would be subjected.

For damage tolerant sandwich panels, the facing material and thickness also depend on

the type and density of the honeycomb. If the face is subjected 10 falling objects and other rough treatment then a higher face thickness is required. The thickness therefore depends on how severe the impacts are.

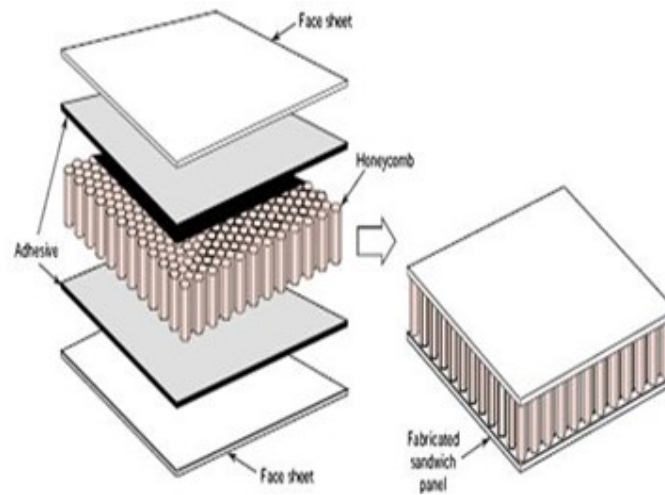


Figure 1

Core

The core forms the central part of the honeycomb structure. It consists of a series of hollow hexagonal cells placed in a neatly arranged array between the two facings and are connected to the facing with the help of adhesives. The basic cell shapes are the hexagon, square and flex core. Some variations of these configurations are the over expanded, under expanded and reinforced cores.

Adhesives

Adhesives, as they apply to sandwich structures, are a somewhat different family of materials not required to bond an open cellular core to a stiff and continuous facing. Although these differences are less important with some of the newer modified epoxy materials, they remain basic, and must be understood by the designer and fabricator in order to avoid the otherwise inevitable problems.

Applications of Honeycomb

Honeycomb sandwiches are one of the most optimized structural members. They have 20-200 times more specific stiffness compared to the solid plates. They are the constructions of choice in aerospace industry for a large number of components. The face sheets resist all the bending moments as membrane stresses while core supports the transverse shear loads. In a

typical spacecraft almost all the major structural elements are honeycomb sandwiches. The primary reason in using honeycombs is to save weight. However, smooth skins and excellent fatigue resistance are also attributes of a honeycomb panel. Honeycombs retain a smooth surface even under repeated loads. Another real plus for sandwich construction is its fatigue resistance. The reason for the greater fatigue resistance of the honeycomb panel is that, unlike other structure that uses rivets, which are stress risers and cause premature failure, the honeycomb panel facings are continuously bonded to the core and therefore no stress concentrations are present.

But as mentioned before the main reason for using honeycomb is to reduce the weight of the structures. The reduction of weight may not seem to be an important criterion but in the aerospace industry this is of critical importance, both in terms of performance and cost. It is a fact that a reduction of a single kilogram in weight in an aircraft would result in the saving of thousands of rupees. Reduced weight would also mean that the structures could be made bigger and fitted with better equipment. Honeycombs also have other advantages such as energy absorption, air directionalities, light diffusion and radio frequency shielding.

The uses of honeycomb structures are as varied as they are unique. These include Aircrafts, Spacecraft, and Satellites, Bulkheads in ships. Race cars and Sports equipment.

The major usage of honeycomb is for structural applications, Honeycomb's beneficial strength-to-weight and stiffness-to-weight ratios compared to other materials and configuration are unmatched.

Honeycomb's long-standing traditional application is in aircraft. Some of the aircraft parts that are made from honeycomb include:

- Helicopters
- Missiles
- Satellites
- Space shuttle
- Satellite launch vehicle

Why Honeycomb?

Why and when should a honeycomb sandwich structure be used? The basic reason is to save weight; however excellent fatigue resistances are also attributes of honeycomb panel.

This table compares the strength and stiffness values of different honeycomb structures made using a 1.6mm thick piece of aluminum split into half as the top and bottom of the sandwich. The sandwich on the far right is 37 times stiffer than the flat aluminum sheet and 9 times stronger in flexural strength, yet it only weighs 9% more than the solid plate. However, it does cost more.

Process

This deals with the processes honeycomb must go through to be ready to be made into useful parts, within the aircraft and aerospace industry, spatial processing of honeycomb is normally defined as custom shaping the core to fit a customer's specific need this includes cutting to plan dimensions, perimeter trim, doublets relief, routine, chamfering, core splicing, carving, contouring, heat forming and roll forming.

Cutting

The most basic process is cutting a flat sheet of honeycomb from the expanded block or HOBE (honeycomb before expansion). This is done with horizontal or vertical band saws using special honeycomb blades. These saws must have vacuum systems because of the large amount of core material dust generator.

Plan dimensions are cut used die cutters, band saws, serrated blades knives and razor blade knives. The type of honeycomb, its density and slice thickness required determines which method can be used. All light density cores can be cut with two types of knives and the band saw. On these knight honeycombs sometimes, it is best to used double-backed tape on a template that is pressed on the core surface to prevent the core cells from moving during cutting. Heavy density honeycombs cut well on a band saw. Most cores can be die cut if their densities are high enough to stabilize the cell walls during cutting. Die cutting is best suited to high volume production of small parts where the cost of the die can be justified.

Splicing

When large core pieces or complex shapes are desired, small pieces can be spliced together with core splicing adhesives. Different core types, cell sizes and densities can all be easily connected if the complex shaped honeycomb part is made of spliced pieces the splices are made first and then the part is formed or carved. On flat panels the required spliced core. The spliced strip is usually placed between the two core slices and cured at the same time as the facings are bonded to the core. The best procedure is always to splice the honeycomb and bond the core to the edge closed - out. However, in some lightly loaded structure it is not always necessary to splice the core or attach the core to the closeout.

Machining

In complex shaped parts such as airfoils the honeycomb must be carved to some curvature this is done by contour cutters, three dimensional tracers and gantry, apex and numerically controlled NC machines. The axis cutting head is computer controlled and any surface that can be describes by x, y and z coordinates can be programmed and be produced via digital data tapes. Helicopter blades have very complex contours and must be cut with a programmed NC machine. For carving of expanded core apex or gantry type machines will produce straight-line elements. 3-D tracers will produce compound curvatures from master molds. While this method will provide excellent compound curvatures, it is slow and should be considered only for limited production run. Where flat doublets reliefs are

needed, hand routing is the most satisfactory method and least expensive. To machine chamfers several methods may be used including sawing, routing or crushing. Grinding and sanding can only be used on glass-reinforced cores.

Reinforced plastic and Nomex honeycomb core curved parts are heat formed. The core sliced is placed in an oven at approximately 600 F (316 C) for a very short time. This softens the resin and allows the cell wall to deform without breaking. The temperature and time are dependent and the type of honeycomb, density and slice thickness. After removal from the oven the core is quickly placed on a shaped tool and held there until it cools or sometimes the core is actually formed inside the oven. This is a much better procedure and a recommended method, but special fixtures must be built that can withstand very high temperature

Venting Core

In some space application the honeycomb cell must be vented to allow the entrapped air to escape. There are several methods used to vent the honeycomb cores. Aluminum honeycomb can have the foil perforated. Here needles on a cylinder, which rolls over the flat foil, puncture the foil. This operation is done after the node glue lines have been printed on to the foil after perforation hard rubber rollers flatten out the metal that was upset during perforation this results in the holes in the aluminum foils the holes in the nodes tend to be blocked by node adhesive when the block is pressed and cured the needles are in diagonal rows around the rolls.

Core Cleaning

When the core is manufactured care is taken throughout the process not to contaminate. After the slices are sawn to thicknesses, the dust is blown out using clean air with no oil present. The core should be ready for lay-up. The honeycomb should always be handles with lint - free cotton gloves so as not to get finger oils on the core surface if the core becomes contaminated during shipping or in the plant, it can be cleaned core can be vapour degreased, solvent flushed, or wiped with a lint-free cloth moisten with trichloroethane. After cleaning if possible, the core should be dries in an oven at 150 F (66 C) maximum. A hot air gun can be

used but be sure that the air temperature is below 150 F (66 C).

Manufacturing of Composite Platform

Platform is a plane horizontal sandwich structure; no special tool is needed. Items required for the composite platform are

- Top and bottom face sheets
- Core
- Edge members
- Adhesives (M-11, FM73)

The core is selected and it is cut into required size and the face sheets are also cut into required shape. Bottom face sheet is placed on a metallic plate. Put a layer FM 73, over which core of the required size is placed. Again, put FM73 layer and over which the face sheet is placed. Vacuum bagging covers entire set and air is sucked through vacuum pump.

The whole set up is pushed in to the autoclave where the temperature and pressure are maintained as required and are controlled. By following a cure cycle for the sandwich structure is cured in the autoclave. After curing the part is taken out from autoclave and deburring of the sharp edges are made. Insert potting is made to attach four brackets at the four corners.

Methods

Manufacturing of composites materials involve distinct operation that may vary depending upon available technology, existing facilities and personnel skill. The manufacturing process may also vary due to wide variety of composite materials and their applications. Most widely manufacturing methods are as follows

- Compression molding.
- Wet lay up
- Vacuum bagging
- Filament winding
- Autoclave

Design and Analysis

Design of Extended Platform Requirements

- Maximum length is governed by the clear opening of the Helicopter door.
- The distance of skid tube from the fuselage outer contour governs maximum width.

- Platform should cater for carrying two people at a time weighing 150kg each.
- Light in weight.

Platform can be designed in three ways,

- Machined.
- Sheet stringer construction.
- Sandwich construction.

Design Guidelines

Typical sandwich construction should cater for the following:

- Face sheets (Facings) of adequate thickness to withstand tensile, compressive, shear and combined stresses
- Induced by design load.
- Core of adequate thickness and shape (types like tube/flux/Hexa) to withstand compressive and shear stresses induced by design load.
- Appropriate adhesive to transfer the load between facing and core.
- The sandwich construction should also cater for deflection, local crushing, dimpling and buckling of face sheets, etc., under the design load conditions.

Design Aspects

The most important feature governing the choice of material and form of construction for a helicopter Component is its structural

integrity classification. This falls into the following three categories.

- Primary structure => whose failure would seriously endanger the aircraft safety. Typical components are main rotor, tail rotor. Control system components, transmission components, etc.
- Secondary structure => whose failure would permit continued flight capability. These components are doors, stabilizers etc.
- Non-critical structural components => failure of which has no safety implication but only minor effects on flight performance and handling characteristics. Typical components are fairings, access covers etc.

In general, the parameters governing the choice of a particular type or composite material for aircraft application can be grouped under the technical requirements and competitive unit cost. The type of fiber is mainly determined by the component structural classification and on basic fibre material cost, while resin choice is heavily dominated by environmental condition for which the component is subjected. The high impact resistance and durability require for components in airframe areas will influence both resin and fibre.

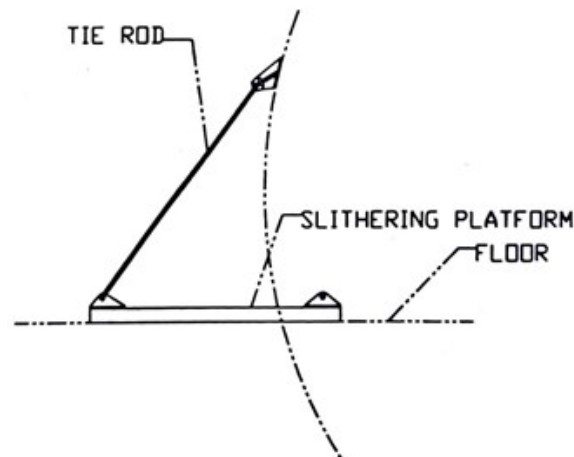


Figure 2

Advanced composite has directional properties in comparison which conventional metal which being isotropic in nature are uniform in all direction. In case of composite material, the load path is along the fiber rather than across

the fiber. Thus, in any structure component made of composite fiber are oriented in such a way as to sustain the applied load. Stress - strain diagram of composite material shows that the material is elastic up to sudden failure

whereas conventional metal exhibits the phenomena of plastic flow which allows it to yield before failure. Thus, composites exhibit brittle material characteristics as shown in fig. I.

The actual strength of composite material depends up on number of factors including number of plies, ply orientation, fiber material etc. a single filament of graphite can exhibit a tensile strength nearly six times the strength of conventional material like Al.

Results

Safety Precautions

- During composite manufacture and handling the following precautions should be observed.
- First and foremost, safety precautions to be observed while handling composites is that the work area should be ventilated properly.
- Personal working on composite should wear mask/safety glasses, impervious gloves and overalls.
- Personal working with composite should wear dust mask, face shield and safety glasses during the following operation:
- Hand gloves should be used especially while working with fibre.
- Use tools, which do not produce sparks to avoid risk of any. Underwent tire.
- During in-service repairs, the repair chart and the aircraft/component must be statistically grounded.
- Composites decompose during drilling or trimming operation at high speeds there by creating high fumes. Adequate precautions therefore, are observed.
- Material should be stored away from heat, sparks, open flame etc. and also, in a well- ventilated area with containers tightly closed.

Reuse of containers must be prevented.

All hazardous materials must contain identifying labels.

Quality Control

The primary purpose of quality control is to ensure that uniformity does exist in the fabrication process and that all intended

operations have been performed according to specified guidelines. Quality control must also verify that the correct materials are being used and proper procedures are followed. This is achieved by the following

1. Quality of incoming materials.
2. Control of in-process manufacturing methods and test performed to evaluate the end product to ensure conformity to requirement.
3. In addition, the quality control system may also include standards to be used for
 - Non-destructive and destructive testing.
 - Inspection techniques during the fabrication process.
 - Final acceptance of the product.

In general, some of the salient factors, which help in ensuring good quality control of the composite parts, are:

1. Constant refrigeration of resins before use-in order to minimize polymerization as the resins has limited shelf life.
2. Monitoring of material life cycle- as the properties change even if the material is stored properly.
3. Availability of the specific manufacturing equipment for handling and curing of composites before selection of the material.
4. Monitoring of cure cycle requirements, the cure cycle must be fast enough to suit production needs.
5. Low void or porosity content, that is less than 1% -2%.
6. Proper level of laminate consolidation i.e. proper distribution of resin content and fiber volume.

Conclusion

In this work using composite material reduction in weight is possible by cutting down some of the layers at the desired lengths following constraints like symmetry and ply orientation. The reverse factor which is obtained for fiber and matrix in the analysis is more than sufficient to take large loads in any extreme case. Weight reduction is about 60% when compared with steel and 30% when compared with aluminum alloy. The designed

platform has higher strength than the recommended strength as per design standards. The cost of producing the composite platform may be higher but prove to be useful on the following considerations.

- Design safety.
- Reduction in weight.
- More effective structure.
- Higher levels of functionality.

Future Studies

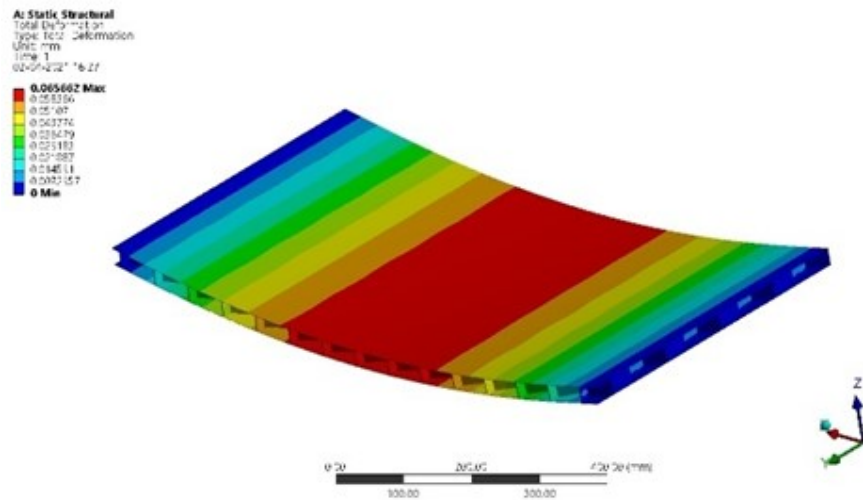
In the extended platform there is a scope for further reduction in weight, since the capacity is quite higher than required. Further optimization can be done in this regard without degradation in its strength values by converting the struts which are constructed by using hollow steel pipe into composites.

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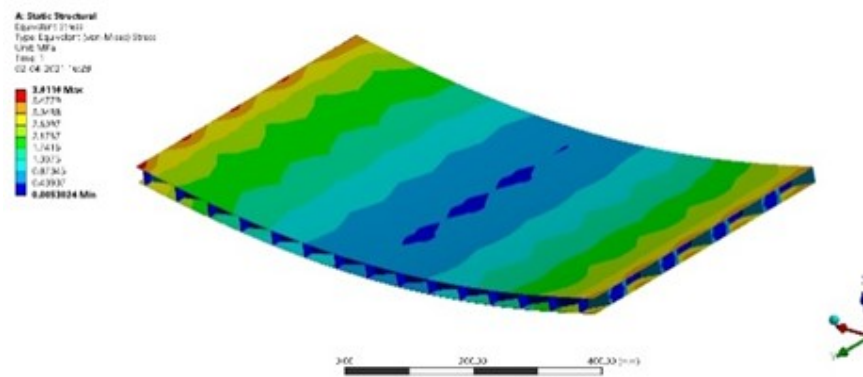
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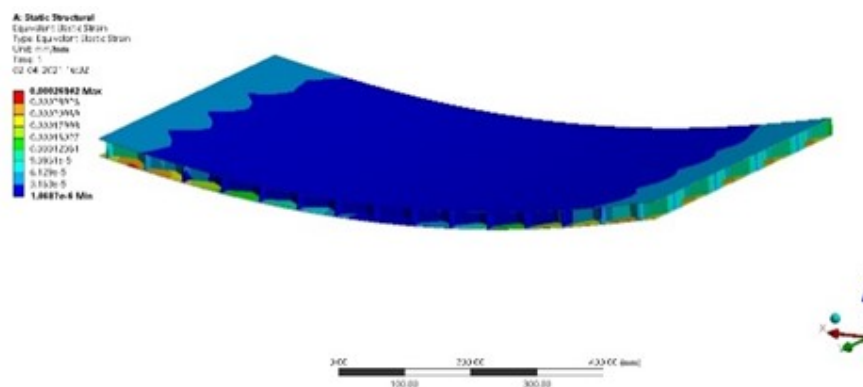
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Total Deformation of Platform



Total Stress on Platform



Total Strain on Platform

AO NAGA RELIGIOUS BELIEFS AND PRACTICES: A BIRD'S EYE VIEW

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ABSTRACT

Almost all the religions have certain system of beliefs and ideas. Religion gives certain ideas and values that act as a guiding principle of one's behaviour. The present paper attempts to explore the Ao Naga religious beliefs and customs in order to preserve their unique identity and dignity. Generally, the religion of tribes are animistic or primitive in nature and Ao Naga religion is of no exception as they believe that plants, animals and objects have spirits. The study will contribute to the understanding of Ao Naga religious beliefs and how religion pervades the whole life of the tribe and how with the passage of time, it engulfs the whole being of the individual and thus forming the tradition and culture of the land.

Keywords: Gods, spirits, Ao Naga religious beliefs, tradition, culture, identity.

Paper: Since time immemorial, religion has been occupying a central place in the life of humankind. And thus, "the influence of religion on cognitive, conative and volitional aspect of men" has become a significant point to study. (Imchen,1993) Religion encompasses the whole of Ao Naga to a great extent. The Ao believed that the whole universe is sacred and filled with gods. It would be inaccurate to consider only the emotional or spiritual aspects of man are religious. Religion gives certain ideas and values which serve as a guiding principle of one's behaviour. It is an established fact that the role of religion in the socio-cultural system of the people defines the role of religion in an individual's life.

Almost all religions have a unique system of beliefs and ideas. Symbols and rituals depict religious beliefs and concept. We can get a better knowledge of ceremonies and rituals after considering the belief system of a person. Religious beliefs and practices are storehouse of knowledge, wisdom, values and cultural ethos etc. Therefore, religion is regarded as an important factor in a society or culture. William A. Haviland, in *Cultural Anthropology*, opines:

Religion may be regarded as the beliefs and patterns of behaviour by which humans try to deal with what they view as important problems that cannot be solved through the application of known technology or technique of organization. To overcome these limitations people turn to the manipulation of supernatural being and powers.¹

Here religion can be comprehended as the beliefs and patterns of behaviour in conformity beyond humans themselves.

Regarding the definition of religion, Michael C. Howard in *Contemporary Cultural Anthropology* opines:

i) Religion is not merely a matter of belief. It also involves institutionalized patterns of behaviour- rituals, ceremonies and the like, which express and reinforce religious belief.

ii) Religion is also concerned with power, both sacred and secular. Religious belief entails acceptance of the existence of power that is neither a part of nature in its physical manifestation nor a creation of human society. An important part of religion is as the attempt to use or to come to grips with this power.²

Basil Pohlong opines that religion is not only as a system of belief or behaviour pattern, but as also concerned with power that can unites people together. He further says that this view is also shared by Emile Durkheim when he defines religion as "a unified system of beliefs and practices relative to the sacred things, That is to say, things set apart and forbidden beliefs and practices which unite into one single moral community called the church all those who adhere to them."³

The definition of religion in the book, *A Random House Dictionary of the English Language* states:

i) A set of beliefs concerning the cause, nature and purpose of the universe especially when considered as the creation of a super human agency or agencies, usually involving devotional and ritual observances and having a moral code for the conduct of human affairs. ii) A specific and institutionalized set of beliefs and practices generally agreed upon by a member of persons or sects. iii) A body of persons or institutions adhering to a set of religious beliefs and practices.⁴

The socio-political and cultural scenario of the Aos is depicted in their idea of God. The Aos had a well-established and systematised form of religious belief and practices. The paper will show the Ao's idea of God and their belief system.

The idea of God in Ao Nagas:

According to the Aos, they believe that the world is ruled by one supreme God, Lichaba Ali yangraba

Sangram, the creator of earth encompassing man and plants.

Classification of God:

1. Lichaba, the creator of God

In Ao Naga society, Lichaba is regarded as the creator of the earth. He is believed to be the lord of earth and vegetation. Everything in the world is ruled by him. And when he is displeased with man, he can bring natural calamities too. He can give blessings and punishment according to man's attitude towards him. Every year, they offer ceremonial sacrifices and prayers to Lichaba, the creator of God

2. Longtitsungba, Lord of Heaven

Longtitsungba is also known Aningsungba, ANing means Heaven and Tsungba means chief, or Lord. Sometimes Longtitsungba is also called Lata-Zuni Tsungrem. He is considered to be the god of sky. The heavenly elements such as the sun, moon, lightning, thunder, rain, storms, seasons, wind and all natural forces attributed to the solar system are controlled by Longtitsungba. The Aos pray to Longtitsungba to get plenty of rainfall by performing ceremonies and sacrifices at the time of drought. This ceremony is considered to be the most important one as their main occupation is agriculture. Priests perform a special ceremony at the time of drought by offering regular sacrifices of cocks, pigs, and eggs at the field.

3. Tiar, Tiaba, Pre-destiner

The Ao people considered Tiar is the God of providence, of man's fortune, at the time of his conception. He is linked to witchcraft and can predict a man's earthly fortune. He can give different kinds of spirits to man, animal and nature. As such some people get boar spirited, fox spirited etc. And it is believed that people who do not get any spirit will remain dumb and dull. Tiar is considered as the giver of life and also the destroyer of man's life as he is responsible for man's earthly fortunes and life. Therefore, individual and household offerings are performed at the times of sickness and ill-fortune. They offer cocks, eggs and pigs to him.

4. Meyutsung, Lord over the Dead

The Aos people consider Meyutsung to be the god of truth and justice and his judgement is final. It is believed that his judgement is assisted by N Ongangla, his wife. In order to give right judgement, Meyutsung, the god of truth and justice carefully observes everyone's deeds on earth. Justice, purity, high moral and ethical standards, honesty and humility are the qualities that he seeks from humankind. Because of such beliefs in Ao society, most Ao people possess the quality of truth and honesty. He discloses and never forgives every sin that people committed on earth at the entrance of Meyutsung. An Ao would therefore say, "let us see at the gate of Meyutsung," when one denies his own

Certain Ceremonies and Sacrifices

The Ao religion is replete with ceremonies and sacrifices. They perform public ceremonies and household or individual ceremonies throughout the year. Worship and sacrifices can be roughly classified into two types: a) Regular and b) Irregular.

A) Regular ceremonies

i) **Watsu Merok:** It is the ceremony of cleansing the village from epidemic such as cholera, small pox and dysentery. Zenza, the oldest of the village performs this ceremony at the village gate. The purpose of this ceremony is to eradicate the sickness and disease throughout the year.

ii) **Moatsu:** In Ao society, Mao refers to an open field or streets, and tsu, means to go round. Therefore Moatsu implies going to an open field accompanied with singing, dancing and drinking. This ceremony is last for six days and on the fourth day, a sacrifice is made by the priests for blessing and prosperity. On this main festive day of the Aos, they seek blessings and prosperity. It is the festival of mainly young boys and girls.

iii) **Tsungrem Mong:** It is the worship of Lichaba, the creator of the world. It is the most important and highest worship for Aos. In recent times, this has also come to be known as Tsungremong festive of the Aos, which is observed in the first week of August for three days. This is observed in order to invoke Lichaba's blessings for a good yield, and for protection of crops from all calamities.

iv) **Lichaba Za:** It is performed by priests three weeks after Tsungrem Mong to see whether the ceremony of Tsungrem mong is carried out properly or not.

v) **Ayim Kelemshi Mong:** It is related to village reconsecration. Praying to village deity such as Yim Tsungrem is the main purpose of this ceremony. They seek protection, blessing and prosperity and victory in war in this ceremony. They offer the biggest cow in the village accompanied with feast. The ceremony is attributed with singing and dancing by children and women round the village fire.

vi) **Sungkho Mesa:** It is a ceremony of cleaning jungle. When the new area of jungle is to be cut, this a one-day village ceremony is celebrated on certain spot for the protection from the evil eye, injuries and death during cutting of plants.

vii) **Sungkho Lepden:** This is ceremony of cutting of jungle. It is performed after the next day of sungkho mesa. In this ceremony they go to the spot and offer eggs or chicken.

viii) **Tekong kelem, Along kelem:** In this ceremony, the Aos worship mountains and stones. They believe that some mountains and large rocks possess sacred powers and therefore they worship for the protection and blessings.

ix) **Atsu/Tzuba kelem:** This is the ceremony of water or well. Aos believe in the water deity, Alachetla, and it was believed that when river overflows and destroys crops because of the anger of Alachetla. They offer sacrifices to Alachetla for the betterment of the village water resources.

x) **Kitsuk Yha.** When a fire broke out, it was believed that kitsuk Long caused such a calamity. Kitsuk Yha ceremony is performed by the high priest on behalf of the community to protect from such calamities.

xi) **Awabi:** This ceremony is related to health. When journey borne-disease, sicknesses and calamities broke out in the village, the Ao people performed such a ceremony.

xii) **Merok Mesa:** This is burnt cleansing ceremony. In this ceremony the priests and the representative clan offer pigs on behalf of the community after a new cultivation site is burnt off.

Some Irregular Ceremonies

The following ceremonies are some the irregular or emergency ceremonies practiced by the Ao Nagas:

i) **Nokho Mong, genna for death.** In Ao society, this ceremony is performed after the death of some famous persons like leaders, warriors or rich men. Amho, a one-day ceremony is observed in the village. Observing Amho by the households for male lasts for six days and it lasts for only five days for female.

ii) **Motsu Mong:** This ceremony is performed when the vegetation in the fields dry out.

iii) **Wara lepdang:** When diseases broke out, such a ceremony is observed by the whole community.

iv) **Menung Nok:** This ceremony is observed when an earthquake occurs in the village. They believed that such a calamity is caused only when Lichaba gets angry.

v) **Tsungi Tsungang mong:** This emergency ceremony is performed when heavy rain and hailstone destroys the village.

vi) **Sungo Naro Mong.** Such a ceremony is observed when the villagers killed some wild animals like tiger, elephant, or bear.

viii) **Menen Mong.** Comparing to the others ceremonies, this is the most tragic one. It is also expensive and involves both individual and community. They believe that wealth and property is a blessing from god and must share their wealth to others.

Ceremonies for Illnesses

The following ceremonies are related to health and illness. When people get ill, Aos perform sacrifices and offers to the god for good health. Sicknesses are categorized according to their nature and certain names are given to it.

Rakijar

This ceremony is related to protracted illness. It is believed that when the soul of the patient was influenced by Rakijar, the devils of different place. Offerings are made for such illness until the victim shows improvement from his illness.

Scapegoat- cock

It is associated for severe illness. The family priest with his assistants would go to the spot where the victim was supposed to have caught the illness. On that spot they have to kill and cook one cock and another one would be set free.

Kitsung Yha: This ceremony is performed by releasing a hen or a cock as a ransom for the patient to recover from the illness such as stomach pain, diarrhoea etc.

Temheja: This ceremony is associated to the illness of a child, Poktasem. Ceremonies were performed for such illness.

Amho: It is believed that a patient is caught by the devil's eye if he suffers sudden illness in the stomach or neck. Offerings and ceremonies are performed for such illness.

Tepufet: This ceremony is done when people suffer sickness like general weakness, loss of energy and appetite. A sacrifice is made by offering a cock by the household priest in front of the house near the public road.

Witchcraft and Tigerman: The Ao society still practices witchcraft. Witchcraft is linked with the Tigerman who are generally referred to as medicine man and diviner. For the Ao, the Tigerman occupies and even higher place than priests.

Taboos, Superstition and Dreams: In Ao society, taboos and superstitions are highly practiced. For an Ao, to break a taboo was unbelievable. The one who breaks the taboo will surely suffer some calamity. The life of Ao nagas are controlled by their religious beliefs and practices and therefore one cannot consider their taboos and superstition as outdated and unscientific.

Understanding of religious beliefs and practices has become an important part in preserving the dignity and identity of one's community. Traditional religious beliefs play an undeniable role in establishing the identity of a tribe by giving an insight into the tribe's history. Traditional beliefs are behavioural patterns passed down from previous generations through practices and customs. Many of these beliefs are often codified in the laws which play a vital role in the social life of the people. They are relevant with various traditional practices, daily activities and various stages of life like birth, marriage and death. These are handed down through the oral transmission like mythical stories and customary practices.

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SOCIAL MEDIA USAGE AND THE LIFESTYLE OF THE UNDERGRADUATE STUDENTS-A STUDY

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ABSTRACT

The trend of using social media has been growing among the students to such extent as shaping their lifestyles. The present paper studies about the usage and influence of social media among the undergraduate students. The present paper is designed by using descriptive survey method. Purposive sampling technique has been used to draw a sample of 100 students from two Undergraduate Colleges under Gauhati University, Assam, India. For the purpose of the study, the investigators used self-prepared questionnaire to collect the necessary data. The data was treated statistically by using simple percentage and graphical representation. It was found from the present study that Social Networking Sites (SNS) has a profound impact upon the youth in terms of their behaviour, hobbies, job opportunities, purchase of products, fitness activities, academics, fashion trends and their way of life.

KEY WORDS: Social Media, Social Networking Sites, Undergraduate, Lifestyle

1. INTRODUCTION

A recent dimension to the social aspect of man was added with the development of the Social Media and Social Networking Sites. There has been a growing trend in the use of world wide web (www) among the students to acquire knowledge and share information easily. Students all over are being seen to use the social media to gather information, view motivational thoughts, transmit knowledge, search for job opportunities and judiciously choose the products of daily use. Social media in its broader context, include web based technologies like You Tube, blogs and micro blogs, Social Network Sites like Facebook, WhatsApp and Instagram (Precious Chibuike Chukwuere;2017).

1.1 .JUSTIFICATION OF THE STUDY

In the recent years, social networking sites have emerged as the most powerful agent of sharing information and connecting people worldwide. The lifestyles of the youth today are more or less influenced by the social networking sites. Studies carried out in this area have shown the usage of social media by the students for the purpose of academics, social contact and way of life. It has become a part and parcel of their social culture. Hence it was thought necessary to study about the influence of social media in shaping the lifestyle of the undergraduate students.

1.2 STATEMENT OF THE PROBLEM

In the light of the above justification, the present study has been framed with the following title- Social media usage and the lifestyle of the undergraduate students-A study

1.3 .OBJECTIVES OF THE STUDY

The study has been undertaken with the following objectives-

- i. To check the usage of social media among the students.
- ii. To find out the influence of social media in shaping the lifestyle of the students.

1.4 DELIMITATION OF THE STUDY

- The present study is delimited to the undergraduate students of Guwahati only.
- The study is delimited to two Under Graduate colleges affiliated to Gauhati University, namely Pandu College and Lalit Chandra Bharali Colloge, Guwahati, Assam (India)

1.5 OPERATIONAL DEFINITION OF THE TERMS

- **SOCIAL MEDIA:** It refers to the social networking sites, web technologies and blogs in the present study.

- **UNDERGRADUATES:** It refers to the students pursuing their three year degree course under Gauhati University.
- **LIFESTYLE:** It refers to the way of life and behaviour of the respondents in the present study.

1.6 AREA OF THE STUDY

The present study has been carried out in Guwahati City, Assam, India

2. REVIEW OF THE RELATED LITERATURE

Chukuwuere, Joshua and Chukuwere Precious(2017) in their study on, “*The impact of Social Media on Social Lifestyle: A case Study of University Female Students*” found that social media refines the female students’ thought, interaction, communication, love life, and social lifestyle.

Dr. Kulandairaj(2014) in his study on “*Impact of Social Media on the Lifestyle of Youth*” found that social networking sites can enable youth to raise their voice against social issues and upload information for the welfare of the society.

3. METHOD OF STUDY

The present study employs descriptive survey method.

3.1 POPULATION AND SAMPLE

The target population of the present study includes all the undergraduate students pursuing three year degree course in the session 2020-2021 under Gauhati University. The sample for the present study consists of 100 undergraduates selected by employing Purposive Sampling technique from two colleges.

3.2 SOURCE OF DATA COLLECTION

The investigators used self-prepared questionnaires to collect the data for the present study.

3.3 STATISTICAL TREATMENT

The data for the present study were analysed statistically by using graphical representations and simple percentage.

4. ANALYSIS AND INTERPRETATION OF THE STUDY

Based on the data gathered by personally administering the self-constructed questionnaires to the respondents, the analysis was done using simple percentage:

OBJECTIVE-I: To find out the usage of social media among the students.

➤ *Regarding Use of Social Media*

The data collected revealed that all the respondents use Social Networking sites for various purposes. There was a positive reply from each and every respondent on the use of Social Media.

➤ *Regarding the most preferred application*

Figure-1 Below shows that the most preferred application among the students in WhatsApp, followed by instagram. It is also found that none of the students preferred to use Skype as a Social Networking Application.

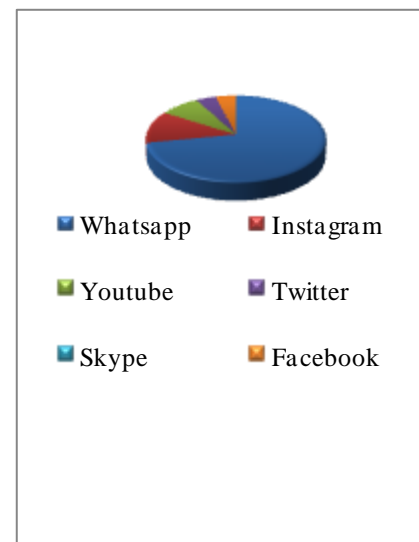


Figure-1: Showing the most preferred Application

➤ **Regarding the starting of the day with Social Media**

Table-1: Showing the way of starting the day with Social Media

Category	Frequency	Percentage
Update profile status	8	8
Commenting on Friends post	-	-
Playing games	8	8
Listening to Music	36	36
Watching videos	16	16
Chat with Friends	12	12
Check friends status	20	20
None of the above	-	-

It is found from Table-1 that, most of the students, that is, 36% started their day by listening to music followed by 16% who preferred to watch videos in the Social Media.

➤ **Regarding time spend on Social Media daily**

Table-2: Duration of time spent on Social Media

Duration	Percentage
Not everyday	8
Less than 10 minutes	4
10-30 minutes	28
30 minutes- 1 hour	20
More than 1 hour	40

It was found from Table-2 that, most of the students (40%) spends more than 1 hour in Social Media everyday followed by 28% who spend 10 to 30 minutes time in Social Media daily.

Regarding whether they are a member of any fan pages



Figure-2: Showing whether they are member of fan pages

It is found from Figure 2 that, majority of the students are members of fan pages. They thus use fan pages to access Social Networking Sites.

OBJECTIVE-II

To find out the influence of social media in shaping the lifestyle of the students.

➤ **Regarding whether Social Media impacted lifestyle**

➤

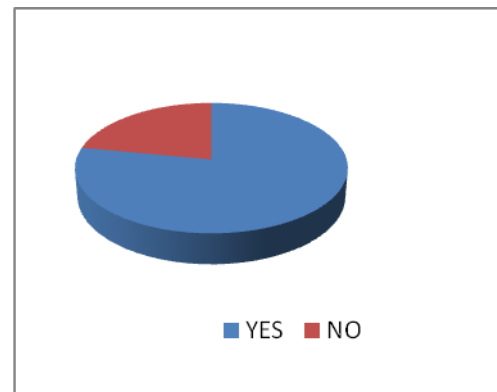


Figure-3: Showing whether Social Media impacted lifestyle

It is found from Figure-3 that majority of the respondents believed that Social Media had an impact on their lifestyle.

➤ **Regarding the lifestyle most influenced by Social Media**

Table-3: Showing lifestyle influenced by Social Media

LIFESTYLE	PERCENTAGE
Interest	24
Cultural Norms	8
Beliefs and Opinions	16
Associations	-
Social Position	24
Behaviour	28

Table-3 shows that most of the respondents(28%) are of the opinion that Social Media influenced their behaviour, followed by Their interest and Social Position(24%). None of them opined in favour of associations being formed as a result of Social Media.

➤ **Regarding influence of Social Media in daily activities**

Table-4: Showing how far Social Media influence daily behaviour

Daily Behaviour	Opinion(in Percentage)				
	SA	A	UD	DA	SD
Fitness activity and diet information	20	72	8	-	-
Career choice and job information	20	60	16	4	-
Hobbies	4	44	22	22	8

SA=Strongly Agree
 A=Agree
 UD= Undecided
 DA=Disagree
 SD= Strongly Disagree

Table-4 shows that most of the respondents(72%) agreed that Social Media influenced their fitness activities and provided diet information. Majority of the

respondents(60%) also agreed that Social Media helped them in their career choice and provided job related information to them. Again, most of the respondents(44%) were agreed that SNS influenced their hobbies. Thus it was found that Social Media had a profound influence upon the daily behaviour of the respondents.

➤ **Regarding influence of SNS in way of life**
Table-5: Showing whether Social Media influence way of life

Way of life	Opinion(in Percentage)				
	Alw ays	Of ten	Somet imes	Rar ely	Ne ver
By noticing advertisements	4	16	64	8	8
By purchasing products	4	12	56	16	12
By following fashion trends	18	56	14	12	-

It was found from Table-5, that most of the respondents (64%) opined that their way of life was sometimes influenced by the advertisements of brands and products in Social Media. Also majority of them responded that (56%) opined that they sometimes bought products through promotions in Social Media. The most respondents (56%) were of the opinion that they often followed the fashion trends in Social Media. Thus it is found that SNS to a great extent influenced the way of life of the respondents.

➤ **Regarding use of Social Media for academic purposes.**

Table-6: Showing use of Social Media in academic life

CATEGORY	PERCENTAGE
Disseminate knowledge to classmates	48
Academic discussions	-
Use Wikipedia	52

Table-6 shows that most of the respondents used Wikipedia (52%) for academic purpose while 48% used Social Media to disseminate knowledge to classmates. None of them agreed to have academic discussions in Social Media.

5. MAJOR FINDINGS OF THE STUDY

- i. Each and every respondent accessed Social Networking Sites (SNS).
- ii. The most preferred application among the students is WhatsApp.
- iii. Most respondents started their day with music in Social Media.
- iv. Most respondents opined to use Social Media for more than 1 hour daily.
- v. They are all the members of fan pages in Social Media.
- vi. They agreed that SNS influenced their lifestyle.
- vii. Their behaviour was mostly found to be influenced by Social Media.
- viii. Social Media had an impact on their fitness activity, career choice and hobbies.

- ix. Social Media influenced their way of life through advertisements, purchase of products based on promotions in Social Media and showing the fashion trends.
- x. The respondents also used Social Media for academic purposes with the help of Wikipedia and disseminating knowledge to classmates over Social Networking Sites.

6. CONCLUSION

The present study highlighted that Social Media had a profound impact upon the lifestyle of the Students. Their behaviour, way of life, fashion trends as well as daily activities including academic life and job oriented information found an impact of Social Media. However, too much dependency on Social Media and spending long hours in Social Media may hamper the study habits of the aspiring students. Thus, it is advisable that lesser time must be spent on Social Media rather than making it addictive and time consuming. The teachers, parents and counsellors may provide guidance in this respect.

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A STUDY OF STRUCTURAL BEHAVIOR OF STEEL STRUCTURE UNDER FIRE LOADS

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ABSTRACT

One or more vertical load carrying elements, mostly columns when seriously damaged as a result of any abnormal event such as blasts, fire, seismic forces etc., the building suffers progressive collapse. When the column is damaged, the gravity loads are transferred to the structure's neighbouring members and these members have to be resilient enough to carry the additional load. The present work investigates a rectangular three dimensional steel frame structure subjected to fire. SAP 2000 is used to perform progressive collapse analysis. The paper investigates and presents the variation of internal forces in the column exposed to fire and the neighbouring members of the structure. The ratios indicate the change in the nature of axial force, initially from compression to tension developing in adjacent column and overloading the fire exposed column in compression. The affected column distributes force on the neighbouring members that are larger than the forces originally carried by them, which may lead to failure of such members and initiate progressive collapse. The effect of fire has significant variations in the Demand Capacity Ratio (DCR), shear force and bending moment of beams connected to the affected column. Elevated temperatures and the stiffness of the surrounding structure are the factors that influence these forces.

Keywords: Demand Capacity Ratio (DCR), Fire, Internal forces, Progressive collapse (PC), SAP 2000.

INTRODUCTION

Progressive collapse of structures has been well-defined by many authors differently, but the fundamental concepts remains same. It is rather an unusual occurrence as a result of unpredicted loading such as blasts, seismic forces, gas explosions, construction or design errors, fire, hazardous materials, extreme environmental loads etc., on buildings. Initial localized failure of an element propagating to other components of structure, leading to larger structural failure results in collapse of the structure in a progressive manner [1-3]. Over the years, lot of research has been carried out on the progressive collapse of structures due to abnormal loading [4-6]. Massimiliano Ferraioli et.al. investigated the PC resistance of earthquake-resistant steel frames subjected to column failure. Two methods of vertical pushover analysis were considered. Different parameters were investigated and the results were used to evaluate the dynamic amplification factor for a more accurate estimation of the collapse resistance [7]. H.R. Tavakoli et.al. observed increase in the capacity of the structure to resist progressive collapse with increase in number of bays and storeys by conducting nonlinear static analysis of steel structures for progressive collapse under lateral loading [8]. Izzuddin BA et.al. mentions of threat-independent sudden loss of column as a suitable design scenario to account the failure effect of the column due to blast or impact [9]. Brian I. Song et.al. evaluated PC performance of an existing steel structure by actually removing 4 columns and also by carrying out analysis and noted that building was most liable to PC after all the four columns were removed [10]. Harinadha Babu Raparla et.al suggested that progressive collapse can be

studied by beginning from zero loads until total collapse [11]. Sezen.H, executed collapse performance of existing buildings of RC, masonry, steel structures and expressed that when there is sudden column loss, about 80% of the total load taken by the column will be carried by nearby columns and remaining 20% load of the detached member is taken by the interior columns [12]. As few works mentioned here, similarly many other researchers have made efforts in understanding the progressive collapse due to abnormal loading or sudden column loss. They have also focused to capture dynamic effects of a column failure. As per the General Service Administration (GSA) [1] guidelines, to account for dynamic effects the response need to be amplified by a load factor 2 for the static analysis with member removals. However, fire load is an exceptional situation which perhaps may not be effectively captured by this method as fire induces thermal forces and not dynamic effects.

In case of fire loads unlike the conventional method of removal of columns for progressive collapse analysis, the columns are subjected to fire loads and the effects of these damaged columns are studied by many researchers. K. Thiagarajan et.al. investigated progressive collapse due to fire loads applied at corner, middle and intermediate columns and established that the middle column deformed more than any other column at 800°C. Axial and shear forces in the heated column initially increased with increase in temperature but later these forces dropped down due to reduction in properties [13]. Vidyadhar Angadi et.al. analysed a steel structure to predict the sensitivity of structure to progressive collapse by fire loads. Corner, intermediate, edge and re-entrant

columns were subjected to 500°C at different levels. No progressive collapse occurred as the DCR values were within permissible limits [14]. Jainam Shah et.al. evaluated the progressive collapse considering columns at edge, intermediate, corner and re-entrant locations subjected to 550°C. The column at intermediate location, found to be more critical in comparison to other locations but the building was safe against PC as DCR were within the limit 2 [15]. Sushanth V Shetty et.al. performed PC analysis of steel structure subjected to fire damage. Fire effect in the column at ground floor had variations in demand capacity ratios at top levels which indicated the moment redistribution in columns at various levels [16]. Recent research have looked at the behaviour of structural members due to fire effects for instance, Gernay.T et.al. described the mechanisms noticed in a 2-dimensional structure when a column in the ground floor is affected by fire [17]. However, in prior investigations on concern of fire induced PC, the columns under study were either considered as per GSA guidelines or in some cases were randomly selected for the analysis. Here the focus is mainly on identifying the critical member in situations where the entire floor is subjected to fire and also to assess the variations in the internal forces of members that might probably be in the vicinity of this critical fire exposed column.

Building Configuration

Moment resisting rectangular steel frame structure 12-m tall having four storeys is considered for the present investigation. The typical structural floor plan layout and 3D view of the rectangular building are as shown in (Figure 1). Building size in plan of the structure is 32m x 16m. Bay size is taken as 4m in both directions. Typical floor height is 3m. The sections of beams and columns of the moment resisting frame are ISHB-450 @ 92.5 kg/m. Column bases are fixed and E250 grade steel is considered for all the sections.

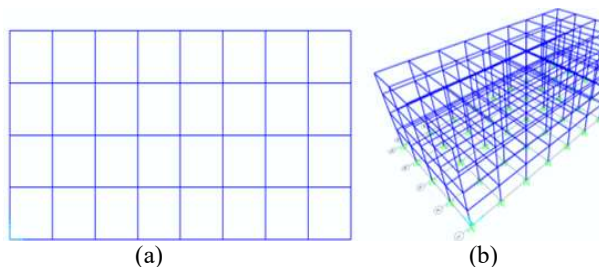


Figure 1: (a) Structural plan of the steel building; (b) 3D view of the structure

Analytical study

The analytical investigation of the progressive collapse of a steel building is carried out using a general purpose finite element software SAP2000. Linear static analysis (LSA) is carried out to know the behaviour of structures.

Loads and Properties

Gravity loads: Dead load - self-weight of members are considered in SAP2000 directly, floor live load of 2.0 kN/m² and roof live load of 1.5 kN/m² as per IS code are adopted and transferred to all beams. Wall load applied on beams is 10.2 kN/m. The sections are subjected to uniform temperature loads.

At ambient temperature, modulus of elasticity and yield strength are taken as 2×10^5 N/mm² and 250 MPa respectively. The properties of steel at elevated temperature are referred according to IS 800:2007.

Identification of critical member

Three dimensional modelling of the rectangular frame structure as per the description stated is modelled and analysis is performed initially with all the gravity loads applied. The stresses developed as well as the demand capacity ratios of all the members are found within acceptable limits (i.e., DCR for regular and 1.5 for irregular structures as mentioned by GSA) and structure is thus estimated safe. This structure is further subjected to uniform temperature loads throughout the entire floor. Temperatures starting from 70°C and increasing with 15°C interval are applied at all consecutive storeys sequentially. Analysis is performed and is observed that the stresses in columns increase with the increase in temperatures. The stress values for certain members of the system exceeds the material strength and hence failure occurs within the members. Due to uniform temperature distribution throughout and large overall thermal expansion in such cases, the frame deforms initiating the member failure for temperatures as low as 110°C.

Among the members that have exceeded the permissible limits the columns with the maximum bending moment, maximum stress and highest DCR's are identified as the most critical members and are further considered for the study related to the effect of elevated temperatures on the stress resultants of structural elements. In this model four corner columns C1, C9, C13 and C21 of ground floor (Figure.2a) are identified as the critical members. Due to symmetry in the model one column C1 out of the four corner columns is taken for further study. Similarly critical columns of all other storeys are also identified and are shown in Figure.2b

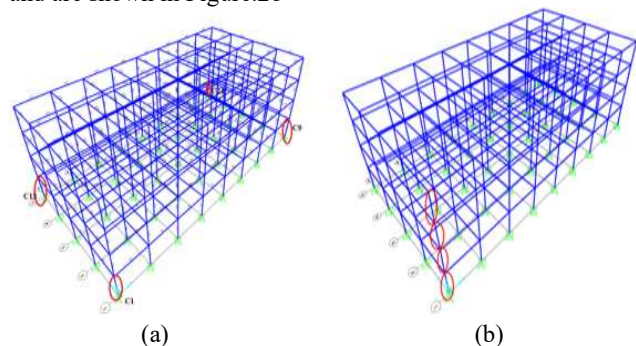


Figure 2: (a) Representation of critical columns of ground floor, similarly considered for remaining storeys; (b) Critical columns of all storeys considered for further analysis

Variation in internal forces when a column is subjected to elevated temperature

This section analyses the response of a multi-storey moment resisting frame subjected to localized fire attacking the most critical column at all storey levels. The objective is to note the load distributions and variation in internal forces of members of the structure.

Critical Temperature

For this study, the steel structure is first loaded with distributed loads only. Then the critical columns identified in section 2.3 at all storey levels are exposed to incremental temperature loads. The DCR values of the fire exposed column at different temperatures are recorded.

The temperature at which the DCR of the fire exposed column reaches the permissible acceptance limit specified by GSA is considered as the critical temperature at which the member will fail and probably may lead to progressive collapse of the structure.

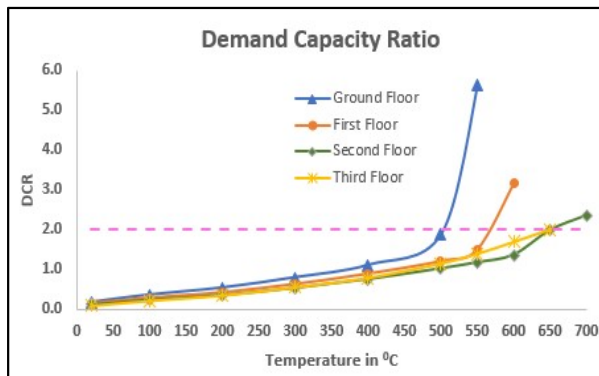


Figure 3:DCR of the fire exposed column at all storeys

(Figure 3) represents the graph of DCR versus temperature, it is noted that the fire exposed column exceeds the acceptance criteria of 2 at temperatures 504°C, 574°C, 652°C and 648°C for ground, first, second and third floor respectively and these temperatures are considered as the critical temperatures at which the member fails.

Effect of elevated temperatures on the stress resultants of adjoining members

This section discusses the effect of elevated temperature on the stress resultants of adjacent members when a component of the structure is exposed to fire. The identified critical columns at all storey levels are subjected to the critical temperature. Analysis is performed and results in terms of DCR, axial forces, bending moments and shear forces before and after the fire exposure are obtained. Figure 5 represents the members of a particular floor considered that might

probably be in the vicinity of the fire exposed column. For the sake of simplicity the nomenclature of beams and columns are kept the same for all the storeys.

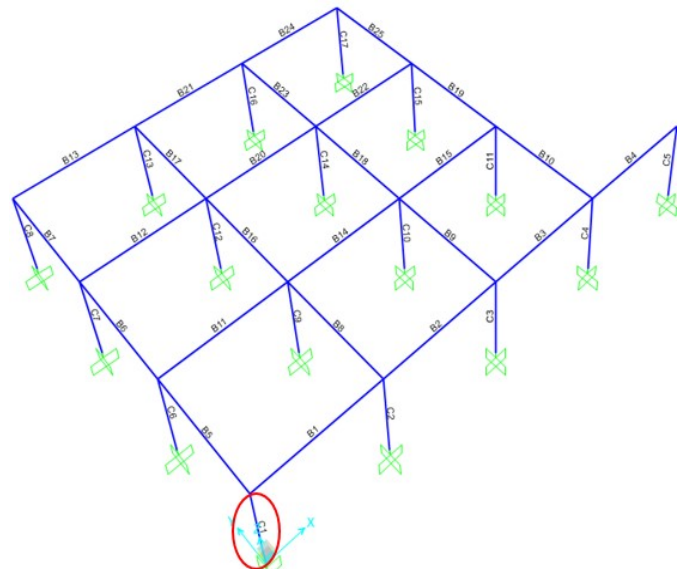


Figure 5: Beams and columns vulnerable to the fire exposed corner column C1

Demand Capacity Ratio (DCR)

Acceptance criteria of members will be assessed by Demand Capacity Ratio as in equation (1)

$$DCR = Q_{UD}/Q_{CE} \dots (1)$$

where, Q_{UD} = Acting force in component and Q_{CE} = Expected ultimate capacity of the component.

Allowable demand capacity ratio mentioned by General Service Administration for fully restrained moment connections are less than 2.0 for regular and less than 1.5 for irregular structures. Members exceeding the DCR allowable limits are considered to be severely damaged. DCR obtained from linear static analysis aids to define the potential for PC of the structure.

The results of the static study for critical columns at all storey levels are plotted in terms of DCR before and after fire exposure for the columns and beams displayed in (Figure 5).

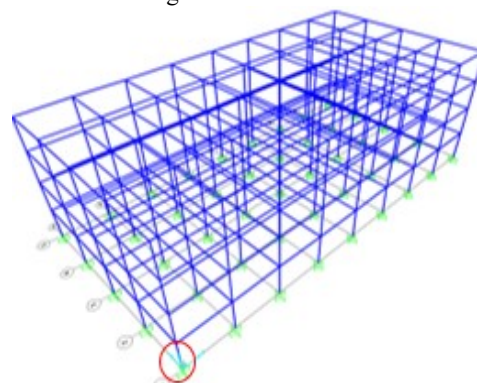


Figure 4: 3D view of the structure representing the critical column of ground floor

DCR of Columns:

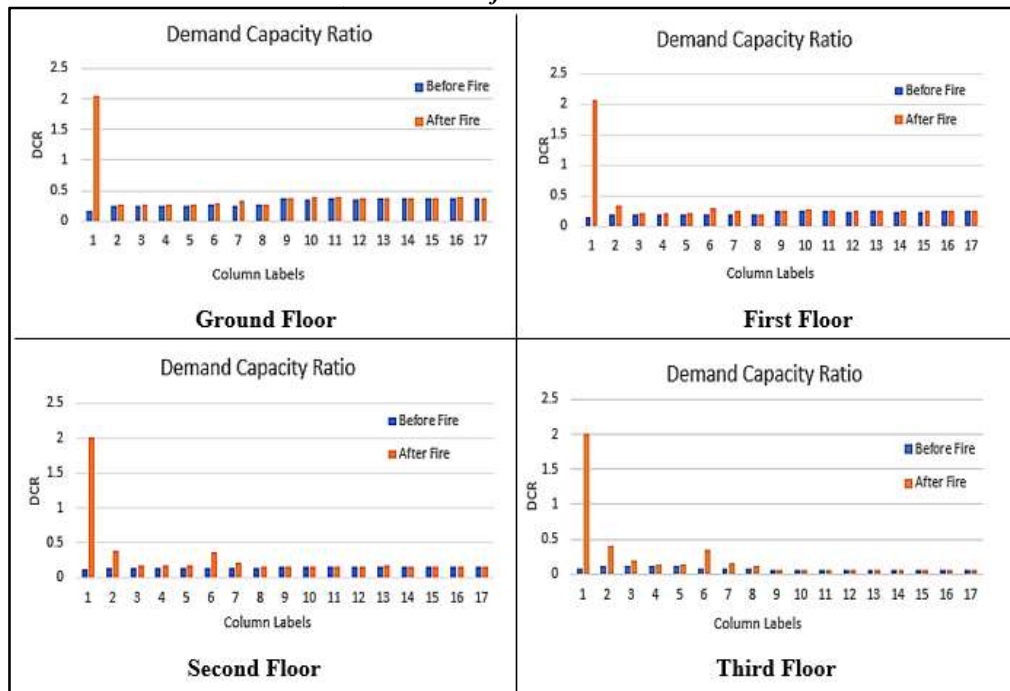


Figure 6: Demand capacity ratios of the fire exposed column and adjacent columns

DCR of beams:

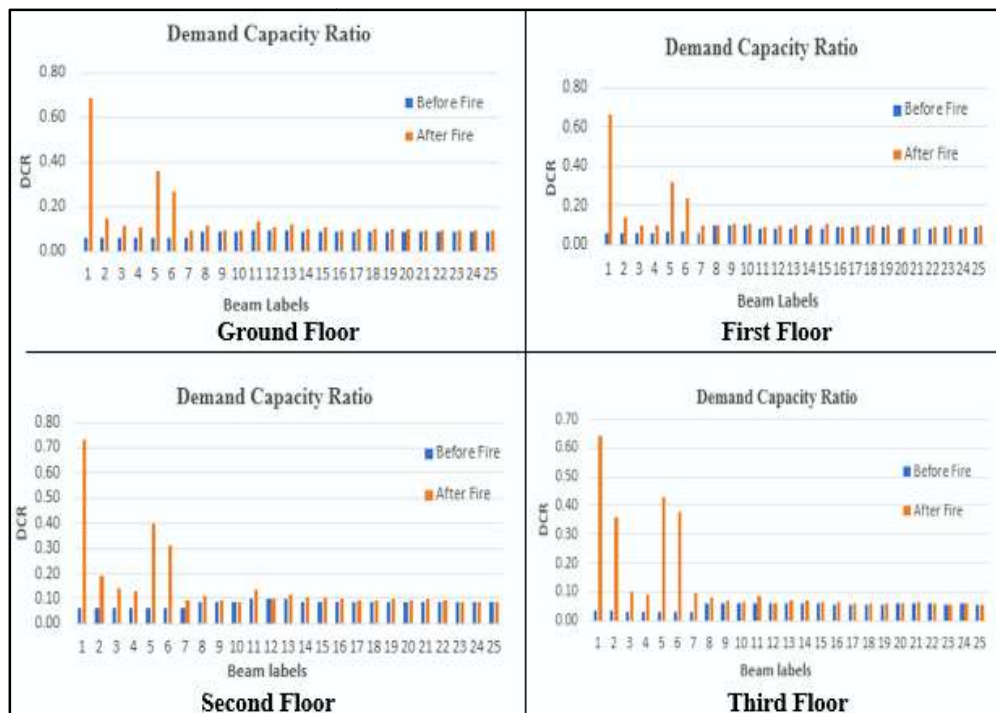


Figure 7: Demand capacity ratios of adjoining beams

From Figures 6 and 7, it is observed that at critical temperatures, the DCR values of the fire exposed column has reached the maximum permissible limit and

undergoes failure, but the DCR values of the adjacent members of that particular floor are well within the acceptance limits. Hence the damage of the fire exposed column of the structure may have an impact on the stability of the adjacent members of the structure, but

will not trigger a progressive collapse.

Ratio

The effect of temperature on the stress resultants of structural elements due to fire applied to the critical columns is understood by calculating the ratios. The internal forces-axial force, bending moment and shear force before and after fire exposure obtained through analysis are noted and the ratios are calculated by using equation (2).

$$\text{Ratio} = \frac{\text{Internal force in the member after fire}}{\text{Initial internal force in the member before fire}} \text{----- (2)}$$

Axial Forces

Axial forces obtained from the analysis before and after the critical temperature application to the identified critical columns of all storeys are tabulated and the ratios are calculated and plotted.

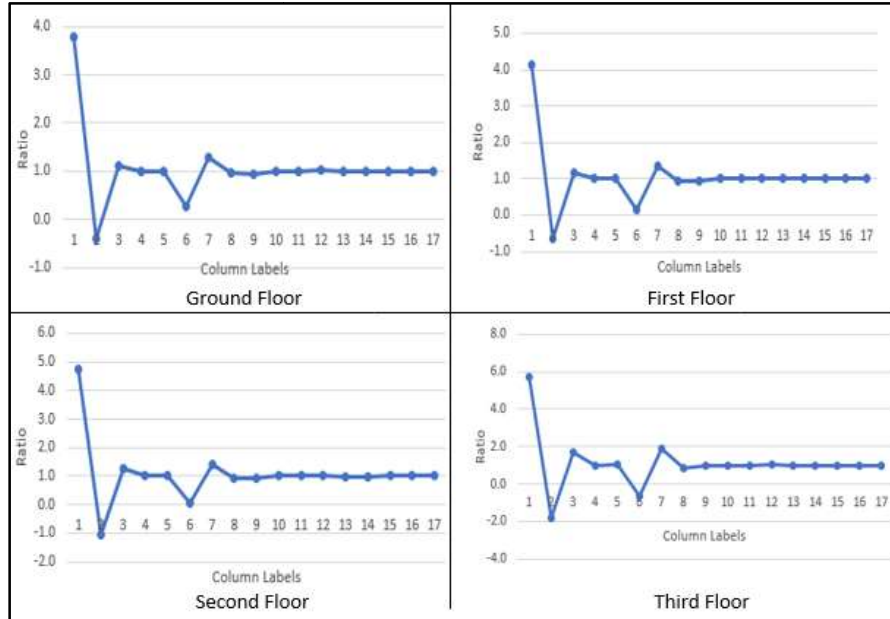


Figure 8: Ratio of axial force of columns before and after fire

Figure 8 shows the ratio of axial forces of the fire exposed column and the neighboring columns as displayed in Figure 5. Due to initial gravity loads all the columns are under compression. When the fire occurs, the initial compressive force of the heated column increases drastically while the adjacent column to the right C2 (Figure 5) changes the nature of force and shifts to tension.

Huge variation is observed in the axial forces of the fire exposed column and the immediate adjacent columns C2 and C6 (Figure 5), when compared to the other columns that are relatively away from the affected column in all floors. As the distance of the other members from the fire exposed column goes on increasing the thermal effect over other

members goes on reducing.

Change in nature of force in the adjacent column

Initially when the structure is loaded with only gravity loads the critical column C1 and also the adjacent column are under compression. Later the column C1 is exposed to fire. Heating of the critical column C1 during the initial stage of the fire, leads to thermal expansion of the column. However, the surrounding structure at ambient temperature restrains the elongation of column and a thermal induced compressive force builds up in column C1 adding up to initial compression force. In the meantime, the force in the adjacent column shifts from compression to tension as shown in Figure 9. As the temperature increases the column C1 loses its strength, stiffness and starts yielding.

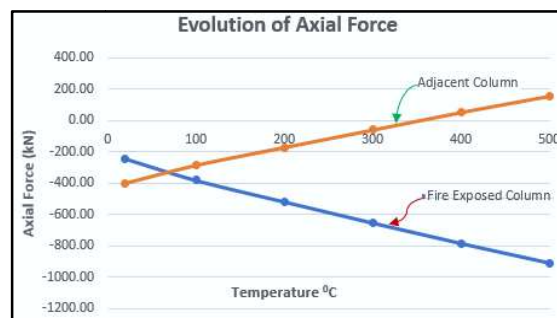


Figure 9: Evolution of axial force of the fire exposed column

Bending Moments in Columns

Bending moments obtained from the analysis before and

after the critical temperature application to the critical columns are tabulated and the ratios are plotted for all the storeys. Figure 10 shows the ratio of bending moment plotted for the column exposed to fire and other

neighboring columns displayed in Figure 5. Maximum ratio in bending moment is observed in the adjacent column C2 when compared to the other columns that are relatively away from the affected column.

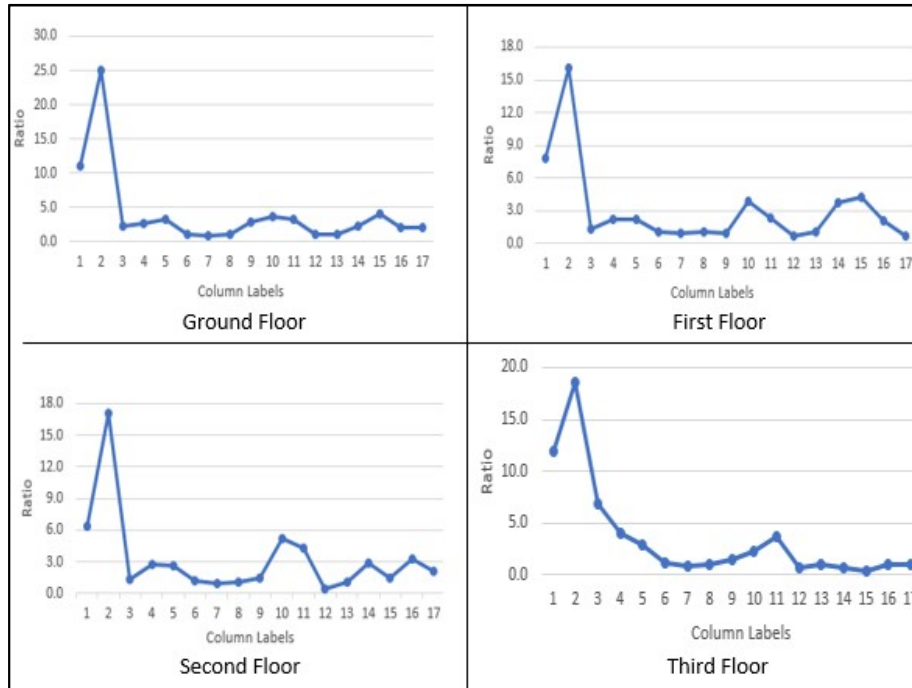


Figure 10: Ratio of bending moment of columns before and after fire

Bending Moments in beams

Figure 11 shows the ratio of bending moment plotted for the adjoining beams connected with the fire exposed column and also the other nearby beams as displayed in Figure 5. For all the storeys the beams B1 and B5 that are

directly connected with the fire exposed column shows maximum variation in bending moment when compared to the other beams that are far away from the damaged column.

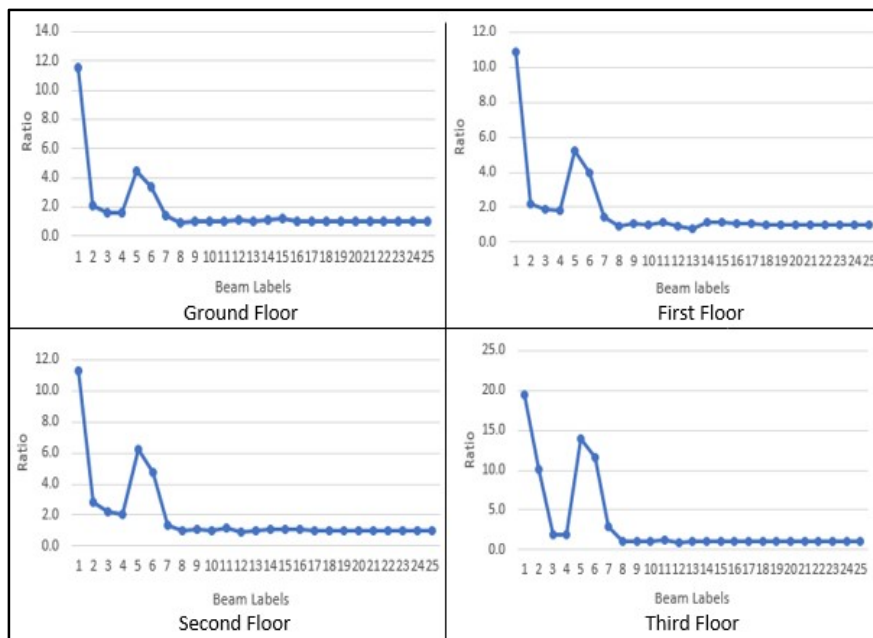


Figure 11: Ratio of bending moment of adjoining beams before and after fire

Shear Force in beams

Shear forces obtained from the analysis before and after the critical temperature application to the critical columns are tabulated and the ratios calculated are plotted for all the storeys. Figure 12 shows the graphs plotted for the ratio of shear forces calculated for the beams displayed in Figure 5 from the shear force values

obtained before and after the fire exposure. Huge variation is noted in the shear force of the adjoining beams B1 and B5 connected with the fire exposed column in comparison to the other beams that are at a distance away from the affected columns.

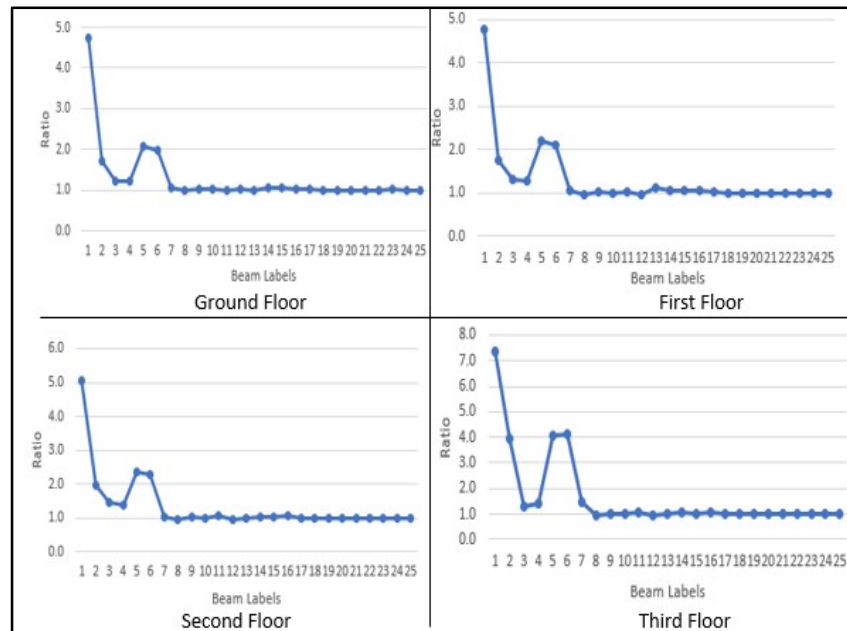


Figure 12: Ratio of shear force of adjoining beams before and after fire

CONCLUSIONS

This paper investigated the structural response of a 3D moment resisting steel-frame building exposed to standard fire.

1. The results indicate that when fire spreads throughout the floor, high stresses develop in members particularly in corner columns signifying it to be the most critical member. In addition to the high stresses developed, maximum bending moment and DCR also justifies the corner column to be the most critical column.
2. Owing to uniform temperature distribution throughout the floor and huge overall thermal expansion stresses in the members exceed the material stress and the frame deforms initiating the member failure for temperatures as low as 110°C.
3. Demand capacity ratio of the fire exposed column exceeded the permissible limit, but the DCR of the adjacent members were observed to be within the acceptance criteria at all storey levels and hence may not undergo progressive collapse.
4. The variations observed in axial forces are maximum in the fire exposed column and the immediate adjacent column when compared to other members that are away from the affected column.
5. The load distributions due to fire effect indicated the change in the nature of axial force initially from compression to tension developing in

adjacent column and simultaneously overloading the fire exposed column in compression.

6. Maximum changes in bending moment and shear forces are observed in the beam that is directly connected with the fire exposed column when compared to the other beams that are at a distance away from the damaged column.

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A PROCESS OF DEVELOPING A MOBILE CYBER PHYSICAL SYSTEM UTILIZING BLOCKCHAIN

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ABSTRACT

This paper focuses to encourage the users of mobile by its quality and experience in the system of cyber mobile. It has ultimate goal to make the users to close to the content of cache coding. This network connection promises the mobile users to decrease the delay in delivering the message and also it alleviates the intermediate connection between the important network and network which is considered as backbone in telecommunications. The challenges faced by the mobile users are having finite capacity of cache of side joints, framing the essential side using the scheme of cache and faith towards administration. Simultaneously, the mobile cyber physical system also faces problems in safety process like hacking, malicious software, improper joints, payment refusing for the service of cache and so on. To resolve these challenges, we committed into a work called a scheme of caching depend on blockchain for users of mobile in mobile cyber physical system. At first, we want to restrict the blockchain to analyse its transmission between the joints and frequent users through the service of cache. This service cannot adapt and avoid the information. In addition, this paper also introduces a faithful administration process for the users to communicate the worthy service of cache from the various joints. The users node was assessed and modernized depend on the worthy of service of cache. To occupy the overall benefits regarding sources of cache, We framed a minimum-maximum depend on the location of resource algorithm and also the correct connection of joint in cache service also depend on users demands. And the result was shown like this scheme encourages the advantage of joints and also improves the quality of experience of users.

KEYWORDS: system of mobile oriented crime, hacking, quality of experience, coding, cache service, block chain.

I. INTRODUCTION

A system of mobile cyber was developed to offer users of mobile with different service and apps from the space of cyber to the world.[1-10] Here an mobile cyber physical system executed a smart and flawless connection towards the material world, space of cyber and finally increases the level of research in high from the field of business and learning. Nowadays its growth was high in level. These things made users to think that mobile cyber physical system was one of the best networking prototype in the upcoming years.[11-14]

The users feel that the servers of content in remote area were always late in giving the information. To encourage the quality of experiences, the content of cache is the only essential solution for the service of mobile in mobile cyber physical system to the users. By using the cache content the users easily able to receive the information in an earlier manner. This content makes users to have trustworthy in the application of cache. Here the cache of side or edge is considered as the trustful solution because it distributes the joints in side in a larger place. Mobile cyber physical systems have many basic problems. They are,

1) The quantity or capacity of cache in the joints is bounded because it is not possible to content all the caches on the joints in edge.

2) Because of the various socio-economic bonding, users create different groups or community to interchange and divide their contents or messages.

3) The joints are distributed by doubted one to the users. Here some joints can be hostile and gives some treats to the safety of network. For example, erasing and adapting the content of cache, giving some malicious software to users, hacking and so on.

4) The association of cache between the users of mobile and joints in the network will not controlled by any mischievous criminals, hackers who intentionally suppressed to give money for the services of cache of joints.

The scheme where cache exists [16,26,27] in an ancient devices will not essential to solve the above problems in mobile cyber physical system. Consequently, it is an important problem to frame the effective scheme of cache for mobile cyber physical system. Therefore, the capacity of cache is defined as the interaction in society among the users of mobile and the attacks regarding security. Here both the users and joints connection could be confiscated as the content of cache for users.

This research focussed on the process of cache content in latest design [16]. It also depend on the blockchain scheme of cache for users of mobile in mobile cyber physical system. It is considered as a trust worthy project or research. Especially, the content of cache are encoded into various segments by the process of coding segments. Such process also known as scalable video coding.[17] This type of coding are used to reduce the time while receiving the message and also increases the speed of network. The users of mobile are executed the group of socio-

economic to organize a cache sources to near joints. These types of execution reduce the efficiency of cache cost and solve many problems faced by traditional cache. A management of trust [18,19] for users of mobile is to choose the faithful joints which do both high quality cache and also protect the information from hackers. The degree of trust was evaluated by both joints and users of mobile depend on the factual associations. And it also has the power to restrict the protected data to interplay between the users and joints. And the value of cache and its allocate price for cache sources are able to execute a frame work in minimum-maximum depend on effective cache service for users of mobile.

II. SIMILAR WORKS:

This segment highlights many works especially mobile cyber physical system, block chain optimization, content caching in the wireless network.

A. MCPS

Nowadays, the researchers encouraged themselves to study more about the mobile cyber physical system. Xu and others [11] highlights the scheme of provocation to talk more matter about the users of mobile. They used a latest network method called MOBILE SOCIAL NETWORKS. This process of joints is proceed depend on the bargain method to check the broadcasting joints which obtained to provide good service. Wang and others [15] focus on the cloud depend matter scheme because to deliver the joints and had contact with the reachable joints. Niyato and others[20] also highlights the important work art in mobile social networks. This matter is used to form affiliations to share a wireless network to low the cost of bandwidth. The cost and connection of bandwidth was depend upon the operator of network. Li and others [21] highlights a information infrastructure to distribute the manageable depend

computer oriented hacking through information technology system.

B. Network for cache matter:

The cache matter in the WSN is gradually increased. To resolve a problem of packsack was only by a choice of various contents. Poularakis and others [26] highlights a log of cache where the various generator to cooperative the audio or video matter of cache to reject or low the delay. Li and others[27] focus on a cache of video log where each and every joint broadcast the famous matter in a simple period to show the importance of cache service in a way of finance and thee system of small way. The operators of web plans to show the matter of caching regarding the price. Xu and others [29] highlights the place to store the information and to low the enhancement of energy during processing. Only two types of time are framed in the information cache to replace the other four cache.

C. Enhancement of block chain:

The crypto currency emerges to attract and highlight the field of learning and administration. Sharma and others[30] learns the deployed and good frame of latest cloud design. The prototype of block chain executes to find the code for framework of web and concurrence. After investigate the prototype, it surely increases the function of the main block chain with late of web, price of hard block, shapes of things, time for circulation, capacity and so on. The hardened block compares to a processed block and not compared to the PC. The capacity is compared to the overall proceedings that are taken by the block chain in each sec. The hardened block price will gone through framework of the safety shape division and that is depend on Processes of Decision Markov to attack the much time and cunning smart breakage. The structure of block chain gives result against breakage and ease to construct the safety.

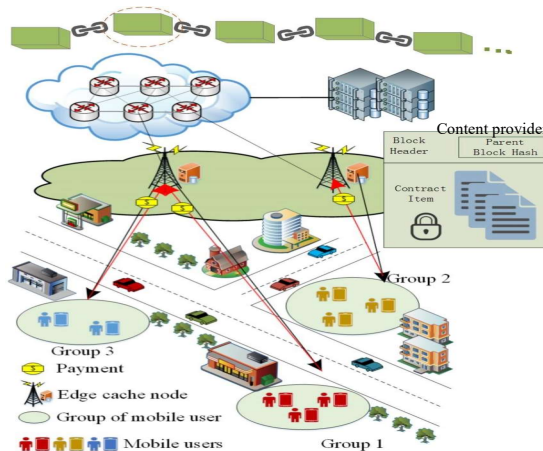


Figure 1. An example of Mobile Cyber Physical System which deploys to require the safety with low enhancement of energy.

Liu and others[31] publish the idea of information currency and power currency depend on the blockchain with a deployed concurrence, where a safety occurs to protect the information from network of cloud and

systematic joints which is processed. He and others[32] talks about the faithful infrastructure for deploy apps which proceeds a bitcoin and gives a successful users while giving rewards during the

delivery period. The experts also proposed a high rated rules to merge and protect valid process to the method of incentive.

3. FRAMEWORK OF SYSTEM:

In this segment we present the model of network at first. The next we introduce and follow the model of content by the blockchain, the second one we talk about the block chain procedure using proof of stake and work and finally see the attack. They are shown in the table 1.

A. BLOCK CHAIN CONTENT:

The joint of block chain I , within the group of matters appealed by user of mobile which is defined by $m_i = [m_i, 3, li, 7, \dots, m_j, \dots, jmlMli(d)]$, here $M_i(j)$ denote the no. of community groups which is connected to joint I in the slot of time t . n_{ij} describes the block chain content which is appealed by the community group I

$$f_{i,j} = \frac{1}{(\tau(m_{i,j}))^\gamma} \cdot \frac{1}{\sum_{j=1}^{N_i(t)} \left(\frac{1}{j}\right)^\gamma}, \forall i \in \mathcal{I}, m_{i,j} \in \mathcal{M}_i, \quad (3)$$

herexis the value of positive to control the statics process in a correct design. γ is high to occupy the famous matter and also the maximum request of content. This popularity regarding content shows the possibility of the matter that is request by users of mobile.

B. Block-chain

A Block chain is considered as the deployed giver during transmission method. It is able to store the information from the users and also through the joints, To confirm its requited faith, the block chain depend on the deployment of block chain performance. This function of concurrence has 42% lack of protection that spoiled by culprits who threats to operate the overall block chain. Processing of time depend on block chain. When a one or two workers exploits the energy work for more than 54% then the overall energy of the all block chain was organized 58% threats. Therefore the energy of work focus only in a smart pool and finally it lead the result in a situation of inadvertent.

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This method of design has three components which is analysed in this research. They are

Concurrence: Here the joints and client as workers attained the concurrence and also the latest block

from the joint j . here the svc process is used to connect the system of powe to transmit the voltage in block chain. The block chain content n_{ij} is encrypted into different layers. The size of block chain content n_{ij} was appealed by M_{ij} ,

$$S_{i,j} = \sum_{k=1}^{K_{i,j}} s_{i,j,k}, \forall i \in \mathcal{I}, \forall j \in \mathcal{J}, \quad (2)$$

here M_{ij} denotes the no. of segments for block chain content K_{ij} . Each and every parts of the content was send from server of content to users of joints.

No generality loss, the research provided the block chain content to popular mode follows by some deployment [28]. It is in the form of descending to assess the content m_{ij} is

which is mined during together transmission. It also highlights by the trustworthy joints or agents that is added to the blockchain.

Unaltered: By using this method all organisation in the web server may organise the things on the blockchain. The concurrence is accomplished after the block is tapped. No alteration should imposed the block of the network.

Obvious: In this method, third parties like community group or joints that connected in the network may install and approach the blockchain to figure out the data of the cache transmission.

This research paper also focuses on the proof of work concurrence log is to utilize and attain the concurrence in the block of tapped. This block chain also needs the function or performance of workers to work with the hard task with massive systematic work like searching a joints that is grounded to find the finite value.

This intelligent agreement is framed in the model of systematic function to find the output. It is also used to process the data while gathering, collecting, sending, receiving the information. Here each and each intelligent agreement is allocated with different internet protocol address. It also trigger the events for sending the information through transmission. These are triggered and stored the information on the blockchain through the procedure that is stored in the smart agreement. This contract allows to utilize the certain condition, funds during time, event and transaction. This contract is used to exploit the implementation and economic trade principles without any other parties like government and bank.

C. ATTACK:

The attacks takes place using the community group and joints. They are

- I. At first, the joints of hostile nodes extracts the content of cache to decreases the cost while processing and enhance the sources of cache.
- II. The second one understands the attack taken by hackers, malicious software and spyware

which request to occupy the energy of system.

- III. The third one takes place to deny the service of cache from joints and decline to send the amount by hostile community groups. Here proof of work is used to give warranty for the safety to blockchain which also exists blockchain depend apps. By using this application we cannot gather the 80% of the energy which is processed through the network/.

Algorithm 1: Log 1 to execute the smart contract log

Algorithm 1 Smart Contract Execution Algorithm

- 1: **Init:**
 - 2: Input: $ID_{i,j}, ID_i, S_{i,j}$, and p_i
 - 3: $\{(pk_{i,j}, sk_{i,j}), (pk_i, sk_i), dTime, tStamp, ctime\}$.
 - 4: $sign(ID_{i,j})$ and $sign(ID_i)$ on the smart contract.
 - 5: **Create:**
 - 6: Input: $deposit_{i,j}$, $deposit_i$.
 - 7: Verify($deposit_{i,j} \geq p_i$).
 - 8: Verify($deposit_i$).
 - 9: **Transaction:**
 - 10: Input: ()
 - 11: Verify ($t > dTime$)
 - 12: Social group sends content to edge node.
 - 13: Edge node broadcasts caching transaction.
 - 14: Verify ($t > cTime$)
 - 15: $Penalty() \rightarrow (Penalty_{i,j}, Penalty_i)$
 - 16: Send($ID_{i,j}$, $deposit_{i,j} - p_i + Penalty_{i,j}$).
 - 17: Send(ID_i , $deposit_i + p_i + Penalty_i$).
-

4. BLOCK-CHAIN FRAMEWORK AND DEVELOPMENT REGARDING STRUCTURE AND ITS MEASURES:

This segment highlights the design and development of block chain. It also analysis the safety measures of block chain.

A. Blockchain development:

The mechanics of block chain was established by showing its administration survey. Block chain was appealed to different categories like currency of crypto to present intelligent agreement. There are many researches about the personal and safety problems of block chain but all these research have absence of computing test regarding safety of block chain technology. But this research talks about learning of computing devices especially problems of block chain safety and prospects of incursion while investigate the famous gadgets of block chain. This paper also criticizes about the consumption of safety for block chain that is proceed in the growth of different block chain and also execute the way to find various things about this topic. The process of block chain was

broadcasted with concurrence to allow the people who are using this block chain to finish their information transmission without using any other process. Ether is considered as one of the most useful network for block chain because it supports many users in a smart way. This process has around 3 lakhs smart agreement and also 80K transmission for each day. Financial Technology considered block chain as important product for user because this product is more concern about safety and privacy. The compulsion of safety and threat had already announced.

B. Analysis of safety:

And the system of block chain contains two important thing they are Ether and Crypto Currency which is used for the process of proof of work. Here Ether assimilates with proof of authority performance which is known as the examination chain of KP. And the bit coin also used for the process of proof of stake which examines with cash of shadow, coin of peer etc. Proof of work

process is used to solve the mystery and give result as the information credits. This problem is always systematic tough but can easily described as proved problem. Furthermore, a joint described a new block which is resolved a proof of work problem that it will be published to another joints to success in the mean of concurrence. Various types of block chain described in detailed manner in this topic. Here in crypto currency, each and every block accommodate with nonce of rehash and Transfer protocol. Here the rehash was considers as the value of hash which is lastly operated and TX defines the transmission that is adopted in the block. The estimate price of nonce is retrieved by finding answer to the proof of work question. And the solved nonce was attained to give the value of hash which is proved in equation 1 where the value of target is decreased to adjust the proof of work question.

The performance of proof of stake utilizes the proof of partnership of bitcoin to verify the credits of the information. In Proof of Stake depend on block chain when the function is taken to describe the block or transmission where the users are needed to have a some value of bitcoin. When the validity of block or amount transaction was proved, the value of bitcoin will gone into the normal joint as a present to user or it will be regard as penalty. In the process of proof of work, it acquires a more time to calculate the value and it also smashed the energy of system. But just opposite to proof of work, proof of stake process was decrease the value of system, time and also useful to increase the value of block chain.

5. Evaluating its function:

This segment focuses to organise the falsification pervasive method to assess the function of the current scheme of cache. At first we begin with the falsification setup and finally analyse the result of falsification.

A. Setup for falsification:

This network was distributed in beginning with five groups of society or community and ten side joints. The total number of users of mobile in every group of

community is chosen arbitrarily. [4,7] The demand of desire cache for every community is chosen arbitrarily from [2,9] megabyte. The quantity of each and every joints are randomly chosen within [4,9]. The average proportion of low, high quality, hostile joints are 4,0,2,0,4,4. The condition of service of cache from the quality high joints is 9,0,7 and the quality of low joints is 0,3,2. And finally the quality of hostile joint is 0. This is one of the methods to calculate the quality of low, high and hostile cache service. This calculation is used to rate the simulation setup in the service of cache. The joints in band width is 34,20 megabyte per second. The pixel size of information of per content is 20,30 megabyte. Similarly 45,56 are the another parameters which are shown in the table 2.

B. The value of falsification.

The figure two describes about the rate of cache of joints and the time of simulation with the sign T. In this process, the time of simulation $T=200$ which is clearly shown in the figure 2. At first the prices of quality high joints increases for certain period and at last it reduces to the constant level and again the price of low and hostile joints are increased for the certain period and at last it also reduces its cache price. Because of this decreased level price in low quality, high quality cache services and also low hostile caching services can be able to choose its execution services of cache and persuade the high level price of cache. During administration, the quality of low joints in cache service and hostile cache service are differentiated after their instructiveness, whereas the users of mobile slowly turn to quality of high level joints for servicing the cache. It is important to note that, when the cache price of all joints are constant in value then the quality of high level joints are increased while comparing to other cache services. This happens because the quality of high level node attracted the many users of mobile by their cache service. This made the high quality joints to increase their profit by selling it in high rate.

The figure three highlights the minimum price of cache which is in the quality of high level joints and the capacity of cache. In this figure, the capacity of cache increases from 45 to 90. The joints select the number 20,10,40,60. This number executed the price of cache increases when compared to the capacity of the joints.

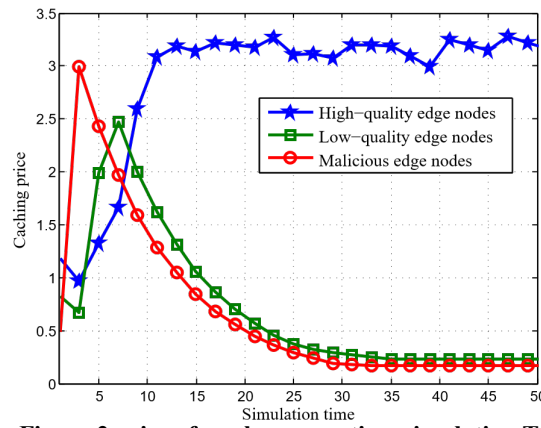
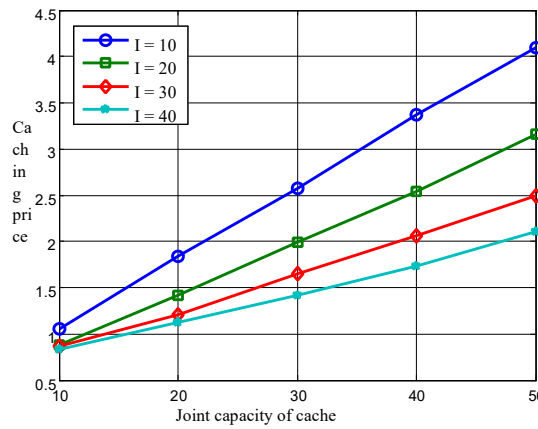


Figure 2 price of cache versus time simulation T

Figure 3. Minimum price of cache versus capacity of Cache C



The figure four highlights the minimum value of joints vs time simulation T. here the time of simulation was set in 100. It is noted that the minimum degree of quality high joints which increases for certain time and finally it is in constant value. But by contrast the minimum degree of low and malicious joints quality decreases for that time. These things are clearly explained in the figure. And the next side, the quality of high joints gives a quality in high level cache

services. At that time the degree of quality provided by users of mobile was increased. It only comes to constant time when the users of mobile finished their overall actions with the quality of high joints. Because of quality low cache services from quality low and hostile joints, the average value of quality low and hostile joints of cache services decreases for certain time.

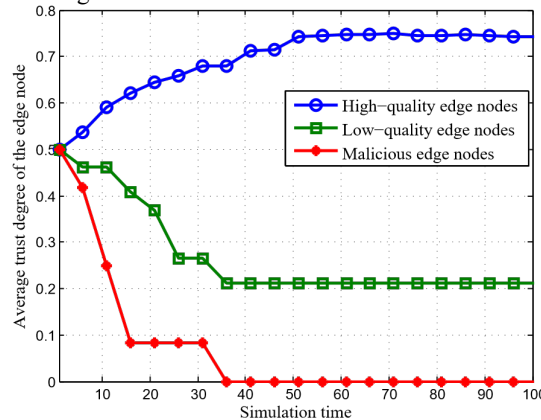


Figure 4 minimum degree of joint and time simulation

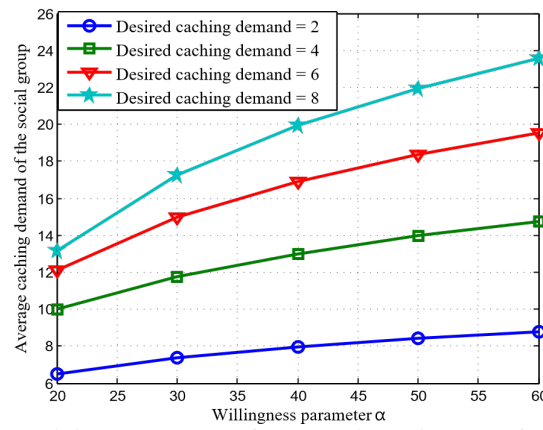
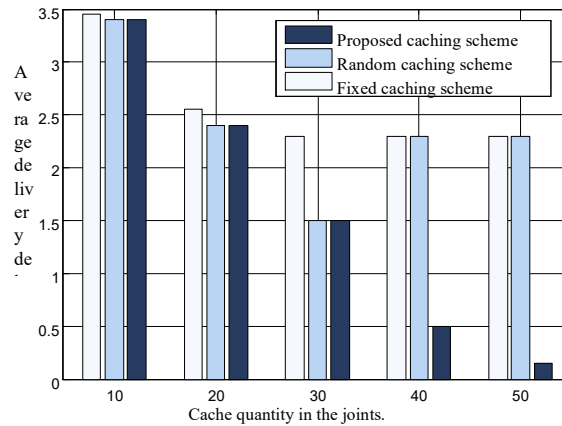


Figure 5. Minimum demand of community vs involved framework

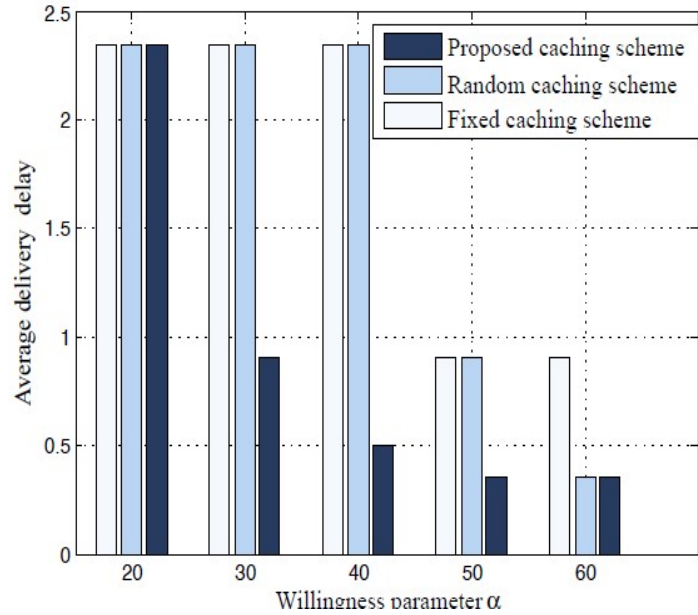
The figure 5 highlights the minimum demand of cache in community group vs involved framework α where the involved framework increases from 70 to 90. And the five cache demands are assessed to highlight the results of falsification i.e 3,6,9,12 simultaneously.

It is important to note that the minimum value of cache demand is high positive when it is connected with the cache demand. These all happens because of users of mobile who have more desire in cache demand trust to assess a larger amount of cache sources from the joints.



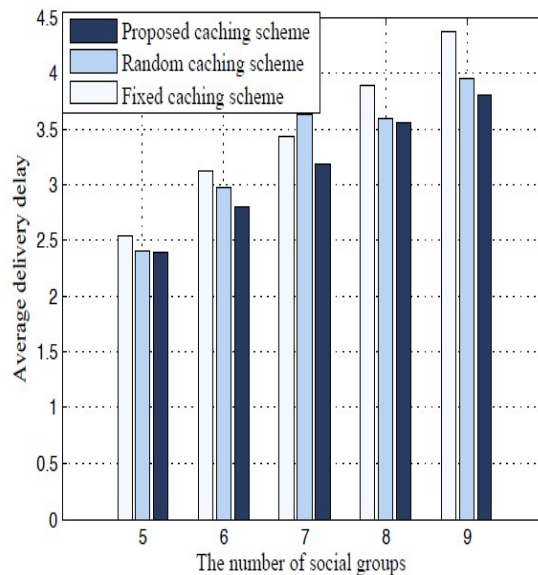
The figure six highlights the minimum delay in delivery using three important schemes. This figure shows the quantity of the joint from the value 20 to 30 to examine the minimum value of delay in each and every community group. It also focus the assessed scheme of cache with correct value where the quantity of the joints increases from 30 megabyte to 40

megabyte. The manual chosen cache scheme plays an important role in the rate, community group which also decreases to avoid some things in cache demand. The components of community groups and joints are determined to have a proper value in the sources of cache. Here the rate is high and fixed.



The figure eight focus about the connection between the scheme of proposed work and other two important schemes used in the minimum delay in delivery. Here the number of joints varies from 40 to 80. This figure clearly explains about the proposed scheme of cache with the standard scheme of cache on the minimum delay during delivery. This experiment also notes the capacity of cache in each and every joint with the value

of 30 megabyte. And the involved framework of each and every users of mobile is 50. This figure setting is not changed because it is always in the fixed mode. This scheme of cache have fixed price depend on the users demand and sources of cache which is located with the minimum and maximum log, whereas the users of mobile can assessed the correct cache space to joints.



The figure nine highlights the impact of community group while comparing. Here the overall value of joints is 40. Here also the settings are fixed. It compared the proposed scheme of cache with the important value scheme to the minimum delivery late and the community group from 6 to 9.

6. CONCLUSION

This paper focuses to encourage the users of mobile by its quality and experience in the system of cyber mobile. It has ultimate goal to make the users to close to the content of cache coding. This network connection promises the mobile users to decrease the delay in delivering the message and also it alleviates

the intermediate connection between the important network and network which is considered as backbone in telecommunications. This research focussed on the process of cache content in latest design. It also depends on the blockchain scheme of cache for users of mobile in mobile cyber physical system. It is considered as a trust worthy project or research. Especially, the content of cache are encoded into various segments by the process of coding segments. Such process also known as scalable video coding. This type of coding are used to reduce the time while receiving the message and also increases the speed of network. The users of mobile are executed the group of socio-economic to organize a cache sources to near joints. This service cannot adapt and avoid the information. In addition, this paper also introduces a faithful administration process for the users to communicate the worthy service of cache from the various joints. The users node was assessed and modernized depend on the worthy of service of cache. To occupy the overall benefits regarding sources of cache, We framed a minimum-maximum depend on the location of resource algorithm and also the correct connection of joint in cache service also depend on users demands. And the result was shown like this scheme encourages the advantage of joints and also improves the quality of experience of users.

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IMPACT OF TVCs IN ATTITUDE FORMATION OF CHILDREN AND THEIR INFLUENCE ON FAMILY PURCHASE DECISION MAKING: AN EXTENSIVE LITERATURE REVIEW

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ABSTRACT

Admittedly, advertising plays a major role in creating awareness about product or service among the people at large. Infact, all of us are exposed to advertising through various mass media because of its persuasive and penetration potential. With their increased spending capacity, children now qualify as a big business for advertisers. In order to attract children's attention towards the product / service, ads should include certain features that are compatible with their level of maturity, attitude and enthusiasm for that specific product / service. The present day children are no longer a band of easy, obedient children who are willing to obey their parents and live within the socio-cultural mores of Indian society. Infact, they decisively influence their family purchase decision making process. Against such a backdrop, an attempt has been made to explore the role of TVCs in attitude formation of children vis-à-vis their impact on family decision making through review of literature.

Keywords: Television Commercials, Children, Materialism, Pester Power.

INTRODUCTION

The present day Business world is characterized by liberalization, privatization and globalization. As a result, each business tries to be a pioneer in the market and is largely dependent on market positioning through advertising. An advertisement provides vital information about the company, the quality of its products and the place of accessibility that helps consumers to make the right purchase decisions (Mathew & Awasthy, 2014). In order to attract children to the product / service, ads should include certain features that are compatible with their level of maturity, attitude and enthusiasm for that specific product / service. It provides youngsters with an insight and awareness about the issues of goods and services to make good thoughts and beliefs. When youngsters perceive a particular product/service advertisement beneficial to them, they influence their parents to buy that product/service. There is a cozy connection among advertising and children's behavior (Khan & Syed, 2014).

Advertising

Advertising plays a major role in increasing awareness about the product or service among the people. As a matter of fact, all of us are prone to advertisements disseminated through various mass media because of its persuasive and penetration potential. Advertisement is a non-personal message that often contains paid and reliable data from recognizable sponsors in the various media about goods, services or thoughts (Datta, 2008).

Advertising is one of the main tools used by companies for communicating and convincing their target

customers. It is effective when targeted prospects receive the advertising message, process it and accept it. In this demanding business environment, the company must advertise its products in such a way that the targeted consumers will be enticed to purchase such advertised products. Advertising also plays a major role in children's lives and makes them conscious of the products. It also assists them to learn product usage (Peter and Olson, 1994).

Advertisers expect their advertisements to change the purchasing behaviour of targeted consumers and persuade them to buy their products. Some experts argue that children don't comprehend the convincing agenda underneath the ad and thus become market persuasion targets (Wilcox, 2004). Such children perceive advertisement claims with precise information as true (Kunkel, 2004).

Television Advertising

Today, companies are spending a great deal of money on advertising their products/services through various mass media such as internet, TV, radio, newspaper, magazines, etc. Among all, TV undoubtedly is one of the most popular media. Television is the world's most dominant and persuasive communication medium. Because of its powerful effect, most advertisers prefer television medium for advertising their products targeted at children who can easily be persuaded to buy advertised product.

The effect of TV is imperative because of its enormous potential as an audio - visual communicator. Reactions to TV ads tend to be greater than reactions to print advertising. A major chunk of Youth in India is a regular TV viewer. They spend most of their free time viewing TV shows and channels of their choice.

Marketers who use the pasture power of young people to influence family decisions prefer advertisements in general and TV advertisement in particular to target both children and their parents. Brand executives are of the opinion that such young customers should be captured as early as possible in order to make them loyal to their products. Adolescents have turned into a strong influential group and can impact family purchase decisions from cakes to vehicles. The impact of television advertising on adolescents is more effective than print media or radio advertising.

Factors Affecting attitude formation towards TV Advertisement

- TV appeals to both literates and illiterates, and this unique feature of TV differentiates it from other media.
- The increasing purchasing power of children is related to TV advertising. At an early age, children learn about value for money and the meaning of being a consumer. Children have spending power, partly because of pocket money given to them by their parents.
- The presence of children in ads highly influences children's perception towards such advertisements and as a consequence they insist on buying the products advertised through children
- The impact of advertisement on children depends on their brand awareness and the way advertisement message is delivered to them.
- Television advertising combines catchy and enjoyable songs, lyrics, jingles, humour and recurring messages. Television makes it possible for the creative person to communicate to large and widely dispersed audiences by mixing motion, sound, colour, character and stage settings to convey and demonstrate thoughts.
- Embedding a promoted brand into entertaining content produces a positive attitude towards that brand without the consumer even being aware of it.

Advertising targeted at kids is one of the controversial topics that advertisers need to introspect. A whole generation of TV kids is slowly coming of age in India. Children are watching TV more than ever before. TV indeed, has become a new member of the family. In order to attract children towards the product / service, ads should include certain features that are compatible with their level of maturity, attitude and enthusiasm for that specific product / service. As a matter of fact, when children like any product/service commercial, they compel their parents to buy the product. Such a ploy creates a gap between children, because not all parents can afford the things they demand. There is a close connection between advertising and purchasing behavior of children, and there has been effort to investigate the impact of marketing on children. Admittedly advertising is embedded with human life,

keeping this in view an attempt has been made to study the impact of TV advertisement on children.

Positive Impact of Television Advertising

- Television Commercials function as a source of information for latest products or services available in the market. Rural parents see television advertisement as a significant element of Children's learning processes of consumer socialization as children are aware of products available in the market and of related variables like its usage, pricing, a source of information about different brands and products and feel that television advertisements educate children about products/services to be purchased by them from the market.
- Research indicates that television advertisements have been largely accountable for children's social maturity and that urban children also possess sound knowledge and favourable perception of advertising. This could be due to education, family upbringing, as well as the modern lifestyle that the city has to offer.
- Awareness of products available in the markets and the healthy food products they are supposed to eat also have positive impacts on Children.

Negative Impact of Television Advertising

- Critics argue that children are especially vulnerable to advertising because they lack the knowledge and experience needed to understand the hidden objective of persuasive advertising and they are not also able to critically evaluate it. Children younger than ten years of age are incapable of understanding broadcast marketing messages objectively and are likely to recognize commercial claims and appeals as credible and real.
- The advertising also promotes materialism as it aims to raise the desire for the product that otherwise would not be the most important (Abideen and Salaria, 2009). Advertising spurs the idea that wealth is necessary and that only materialistic goods can attain the desirable characteristics, such as appearance, accomplishment and happiness. Television advertising is viewed as a reason for kids to develop materialistic values, increase consumption of junk foods, force parents to purchase products that lead to family conflict.
- Product advertising emphasizes possession and desire for a particular lifestyle.
- TVCs undermine social and religious values, causing societal moral fibre to deteriorate. It perpetuates and impairs the ideologies that are in conflict with Indian traditions and norms. They not only demonstrate a lack of respect

for cultural integrity but also promote unwelcome schemes of value such as materialism, consumerism, independent decisions, etc. (Singh, 2011)

- Parents in India believe that when children watch television, their behaviour changes. Parents have concern about the effects of television commercials on their children.
- The fundamental concern about TV advertising is that it exploits sentiments of innocent children and thus referred to as "seducers". The argument is that advertising persuades children to buy goods and spend money on them excessively. Advertising in this way is viewed negatively. (Young, 1990).
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Research Methodology

The present study is descriptive in nature which reviews some of the studies undertaken in the context of *Perception of children towards Advertisements* with reference to its impact on family Buying decisions. These secondary data are used for the present study.

Objectives of the study

Following are the objectives of the present study

1. To examine the factors affecting children's attitude towards TV commercials (TVCs).
2. To study the effect of television advertisements on children's buying behaviour.
3. To explore the influence of kids being influenced by television commercials on their family purchase decision-making.

DISCUSSION

In India, most of the children spend free time on TV, viewing various television programmes of their choice (Dubey & Patel, 2004). With their increased spending power, children are considered as potential customers by the advertisers. The Just Kid Inc.'s Global Kids Study reveals that kids aged 7-12 years spent \$8.9 billion on purchasing products, out of which share of snacks and soft drinks alone stands at 26% or \$2.3 billion (Pollack 1999). Because of this immense spending power of children, advertisers spend about \$700 million a year ensuring that their channels touch large numbers of children (American Academy of Pediatrics, 1999). Firms such as Kellogg, McDonalds, Mattel etc. consider children as a major market segment for developing advertising.

Young *et al* (2003) for their study titled "Attitude of Parents Towards Advertising to Children in United Kingdom, Sweden, and New Zealand" constructed a questionnaire consisting of 34 statements of attitude about advertising to kids. The results revealed that parents disapprove of such advertising, and most of them are of the opinion that advertising targeted at children creates stress on their families

Although a number of studies have indicated that advertisements influence the perception of children it should also be examined what other factors influence their perception. Parida, (2013), in his study titled "Presence of Children in Advertisements and its impact on Consumers' Purchase Behaviour" reflected on the impact of children when children are included in the advertisements. The respondents of the study indicated that presence of children significantly influences children's perception of advertisements and they insist on buying the advertising products. Further, Goldberg and Gorn (1978) observed that attractive ads with music which is fast and has tempo or use of humour or jingles influence children's perception. Chan & McNeal, (2002), in their research have pointed out that older children were more sceptical about the quality and credibility of the product and are not solely dependent on advertisements. Rossiter (1977), discussed about the likeability of advertisement is dependent on animated characters used in the study which leads them to remember and recall the advertisement.

Gulla & Purohit, (2013) conducted a study titled "Children's Attitude Towards Television Advertisements and Influence on the Buying Behavior of Parents" to understand the mindset of children towards TV advertising and how it effects their parents' buying behaviour. For this study they conducted a survey among 400 parents in Delhi and NCR having children 8-14 years of age. The study was conducted to evaluate attitudes of youngsters towards TV advertisements. The findings revealed that TV advertisements have critical effect on the attitude of teenagers towards advertisements. Further, it also revealed that the positive attitude of youngsters towards TV promotions prompts to pester power which significantly affects the purchasing behaviour of parents.

Narasimhamurthy N. (2014) in his study titled "Television Advertisement and its Impact on Attitudes, Behaviours of Children-A study" has examined the impact of TV advertising on children and its effect on product consumption. It is revealed that TV indeed has a significant impact on the lives of children. Their watching habits already have changed the pattern of family life and social interactions in metropolitan cities, and that this is likely to improve over a period of time, as television reaches out to more people and provides more viewing options. The age of kids is

an important factor in understanding television advertising and drawing attention to children. In many ways, behaviour of children is influenced by television advertising. The advertisements not only influence children's product choice, but also their lifestyles, participation in the family buying decisions, interaction with parents, and so on.

Sibińska & Łódzki, (2013), in their study titled "*TV Advertising and its Influence on Children's Brand Perception: Results of Qualitative Study*" conducted a qualitative analysis of perception of 30 children towards TV commercials of various brands with age as a critical factor. The results indicate that advertisements create images of products and logos in the minds of children. Further, it revealed that the older kids were able to develop their own perceptions and make decisions, whereas the younger ones were found to be dependent on somebody else's perception.

Khan and Syed, (2014) in their study titled "*Impact of TV Advertisement on Children's Attitude in Karachi*" examined the effect of TV advertisements on children's purchasing behaviour. The study concluded that TV advertising indeed has an effect on the buying behaviour of young people. Therefore, the marketers should understand the psychic of children before launching any advertisement. As a matter of fact, advertisers should not ignore the importance of children because they are the integral part of their advertisement

Khan, Zafar, & Ahmed., (2016) conducted a study titled "*The impact of TV Advertisements on Children's Buying Behavior: A Study of Moderating Role of Parental Influence*" to assess the effect of television commercials on children's buying behavior and examine the impact of moderating role of parents. Regression analysis was used to analyze the responses elicited from a sample of 200 youngsters in schools and shopping centers of Islamabad and Rawalpindi using convenience sampling. The results of the study reveal that T. V ads lack credibility and do not have significant impact on children's buying behaviour. On the other hand, parents indeed exert significant influence on the purchasing behaviour of their children.

Khanna, P., (2016) conducted a study titled "*Parents Perception of Influence of Television Advertising on Children*" to re-examine the materialism, parental conflict and unhappiness involved in television advertising. Further it also explored the parent's perception of television advertisements and their perceived impact on their child's behaviour. The findings of the study indicated parents residing in rural areas consider television advertisements as an important element of Children's learning process of consumer socialization as children are aware of availability of various products in the market and its related variables such as price, brand, after sales

services etc. In short rural parents feel that television advertising indeed educates their children about the features and usage of the products available in the market. Their perception is also adversely affected by the fact that children develop materialistic beliefs, use more junk foods, exert pressure on parents to buy items that contribute to family conflicts and lack of credible advertisement claims. They also opined that television ads are not healthy. Urban parents have negative views towards television ads and they strongly believe that Television Ads are the causes of family conflicts. Most of the parents have a negative attitude towards ads related to food items.

Sathya, R., (2016) has undertaken a study titled "*Impact of Television Advertisement on Children*" in order to find out how kids are affected by TV ads. The advertisement has both good and bad impact. In this study an attempt has been made to understand the awareness of the children about advertised products and their impact on their behaviour. The media adversely affect different aspects of healthy development, such as weight gain, violent emotions, consumerism and social isolation for children. Media also can have positive effects on children's health. There is therefore a need to find methods of optimizing the role of the media in our culture, taking advantage of their beneficial characteristics and minimizing their adverse ones. The ultimate goal is to deliver positive message to the youth. It promises to be an effective tool in shaping the behaviour of children and adolescents by embracing the media rather than trying to counteract it.

Parents should make their children more conscious of the environment so that they can take the right and logical choice. Parents should be conscious that their kids are more influenced by advertising than they believe. Here too intervention of the government is important. It can introduce appropriate food laws and integrate different laws into a single unified law.

Shabbir, M. S., (2016) conducted the study titled "*The Impact of Advertisement on Buying Behaviour of the Children*" to examine how children feel ads can be used accurately enough as a tool to pester their parents. Pakistani children believe TV ads are quite significant, and at the same time on the basis of the quality of product, they perceive a product as excellent or poor. Marketers should therefore be consistent with the product they display and sell to consumers.

Sarkar, S., (2013) in his study titled "*Understanding the Perception of Television Advertisements among Children in Mumbai*" has examined perception of children of Mumbai of television advertising. Findings of the study revealed that TV commercials have significantly contributed to the social maturity of kids and that children also demonstrate sound understanding and positive perception of advertising. This could be due to the level of education of children, their family upbringing as well as the modern style of

life offered in an urban city like Mumbai. The results show that children start to understand what is advertising and are aware of the convincing intention of TV advertising and the benefits of TV advertising in their modern way of life. Under the Piaget classification system, children aged 9-10 years start entering the formal stage of operations, in which they are able to think in an abstract way. The results have public policy consequences, which mean that younger children need better protection against persuasive marketing communication.

Nabi, M.K, and Raut, K.C., (2012) conducted the study titled *“Neo-consumers on the Block: Consequence of Television Advertising on Children”* to examine the impact of commercial ads on kids and explore how and why advertisements are influencing children. The study revealed that kids are a susceptible audience with limited capacity to process data that prevents their early understanding of the nature and intent of television advertising. In India, blatant and obvious consumerism has begun to spin its web and contribute to a consumer-orientated way of life, and teens are focused via TV commercials as being the most prone segments of the population, with the intended impact of buying or real purchases. Research shows that children-driven TVCs achieve their intended objective of promoting the products very effectively. Research studies indicate links between advertising and obesity among children, violence and aggression, promoting the use of tobacco and alcohol, conflicts among parents and Kids and fragile self-esteem. Culturally, TV advertising gives the great majority of Indian children a picture of life completely alien to it. Modern children are no longer a group of easy, docile children ever prepared to obey their parents and live in accordance with the Indian society's socio-cultural values. An endless exposure to TVCs produced a neo-consumer group with a materialist and consumerist mind-set. Too often the negative influence is understood as a way of life for young people and sensitive minds.

Ziyu Liu. (2009) has undertaken a study to find out how celebrity endorsed print advertisements affect University students' purchase behaviour. The empirical results revealed that both male and female students' attention and interest was generated by the use of celebrity endorsers, and that advertisements were made more memorable. It was also observed that for enticing children it is essential to use pictures, colours and appropriate wording in the advertisements.

Sandra L. Calvert, (2008) in his study titled *“Children As Consumers: Advertising and Marketing”* has observed that two latest developments have enhanced interest in children as consumers by advertisers. Firstly, the children's discretionary income as well as their ability to influence family buying decisions has increased. Secondly, the massive rise in the number of TV channels has led to fewer viewers

per channel, digital interactive methodologies has opened new paths simultaneously, thereby creating increased media space for children and products for children. Though TV is still the favoured means of reaching children and young people, advertisers are investigating how to reach this age group digitally through cell phones, gaming platforms, iPods and other digital devices. They are also exploring how parents view their children's advertising exposure, how kids respond to advertised products and how advertising affects attitude of kids.

Youth shape the buying patterns of their families. They exert enormous power over the family pocket, from holiday choices, to car purchases or meal selections. Influencing youth is thus influencing the purchasing choices of the whole family. In three respects parents can be engaged in the television viewing of their children: in *‘Co viewing’*, they watch advertisements without debating along with kids, in *‘Active mediation’* parents talk to their children about the programme, tell them which advertisements are allowed to watch (also called instructive guidance), and through *‘Restrictive mediation’* they stop children from watching advertisements. Given to a child a choice for an attractive object, all types of parental mediation seem powerless, but logically, an active mediation style can influence the choice of a moderately attractive product. Restrictive mediation in which parents impose restrictions on television viewing may also lessen the demand for products from children.

Danish (2012) has undertaken a study titled *“Impact of Advertising on Children Especially in Pakistan”* to understand the process of intellectual changes in children due to advertising, the role of family, peer and family influences as well as their own attitude towards advertising. External conditions and other natural variables of their lives are considered as variables affecting their attitude to advertising and media message. The research shows that the family's socio-economic background plays an important part in children's comprehension of advertising attempts. The majority of children think there is always some exaggeration in the ads. This disbelief may have originated from one's own product / service quality experience, or may have been stimulated by other people's influence and experiences. Family, other social groups and friends also play an important role in influencing children's advertising attitudes and making them attentive. Children of higher socio-economic background could better comprehend the purpose of advertising than kids of lower socio-economic background, which means in this regard the exposure and surroundings play a significant role. The child's age is a significant variable affecting the ability to decode an advertising message. With regard to parental influence, it has been observed that parents in most of the cases act as gatekeepers for children's media exposure and prioritize their activities. Thus, for all interaction concerning goods, services and activities of children, parents constitute significant audience.

Elements such as model/celebrity, jingles, slogans and the brand itself are most commonly debated topics among kids.

Swati Bisht, (2013) in her study titled "*Impact of TV Advertisement on Youth Purchase Decision-Literature Review*" concluded that consumers buy products through emotional reaction instead of environmental reaction. TV advertising has significant impact on the purchasing behavior of teenagers belonging to different geographical background (e.g., rural and urban) and gender (male and female) groups. Further, television advertising has also an impact on customers' product usage behaviour.

Mittal, Daga, Chhabra & Lilani, (2010) in their study titled "*Parental Perception of the Impact of Television Advertisements on Children's Buying Behaviour*" observed that parents think television advertising is changing children's buying patterns and behaviour. Kids demand and compel their parents to buy the advertised products which have negative impact on their children. The parents also think that kids are playing decisive role in the family purchase decision, and television advertising significantly influences kid's demand for a product from parents. They feel that TV advertisements contribute to their children's economic socialization by providing them relevant brand and product knowledge, but they also change their food habits, entice them to demand the advertised products more frequently and turn them into naggers to meet their demands.

CONCLUSION

Television Commercials influence not only the present, but also children's future purchasing habits. Admittedly, television plays a significant role in each of us daily lives, and kids are not exception to it. In the case of kids, television is the most effective medium. Consequently, television advertising to children has become a powerful instrument for companies to boost revenues. Thus significance of children as potential prospects is a forgone conclusion. On the basis of review of literature, following observations have come to the fore:

1. A large number of advertisements are targeted at children as they are the most potential group in a society. "Traditionally, females were seen as the family's purchasing agents. However, growing female involvement in the workforce has contributed to this position being modified as children have become the "buyers" for the whole family. Even in families where women are not working, children and their mothers share the buyers' role. Children are seen not just as an enticing market group but also as a significant market, since they affect the purchasing patterns of family members. Children initially experience issues with the decryption of TV

programmes. But as fast learners, under the supervision of parents, they can take rational buying decisions. It is therefore recommended for young children's parents to monitor their children's television viewing habits. Parents should let their children realize that they do not need the unnecessary products and also reduce media exposure to them. In addition, a rapid increase in television channels and internet use has resulted in advertisers appealing directly to kids and youth. Since Kids and youth are over exposed to media and prefer to adopt latest technologies, they are prone to advertising campaigns early in their life. Children purchase on their own at a much early age and have an increasing influence on their families' buying decision making process. They are irrational buyers, and before making a purchase decision they don't think much. The children's decision-making ability as well as the money to buy the goods could be another justification for advertisers to target children. The value of money and what it means to be a customer is now being learnt by children at a tender age particularly because of pocket money given to them by their parents has increased.

2. A number of studies have indicated that advertisements influence the perception of children. However, while forming an attitude towards TV advertisements children are also influenced by many other factors like opinions, recommendations of trusted people around, status symbol, cognitive impression about a brand and persuasive power of advertisements, presence of children in advertisement, celebrity, age of the child etc. People prefer to look at advertisements featuring children regardless whether they like or dislike the products or services; they find such advertisements cute and entertaining. When it comes to the purchasing of products, TVCs often lead to the first purchase, but the subsequent purchase is only a result of product quality. Children with creative methods of consumption convince both children and adults to follow them. The likeability of advertising depends on use of pictures, colors and wording featured in the advertisements, animated characters, fun and enjoyment that lead them to remember and recall the advertisement. Celebrities are very useful in building the brand image and making advertisements more memorable which is more likely to create purchase intention in the minds of the customers. The study reveals that the family's socio-economic background plays a major role in children's understanding of advertising intents making them attentive about the hidden objectives of

commercials. Most of the children take it for granted some exaggeration in advertisement either because of their own experience with the product quality or their perception might have been influenced by experience of others. The child's age is another important factor affecting the ability to decode an advertisement message.

3. As advertising plays an increasing role in people's lives, attention is now being given to the different positive and negative effects of advertising. On the positive side advertising is a major element of children learning consumer socialization process, which gives them knowledge of diverse products, market, brands, prices, develop strategies for purchase requests and negotiation and consumer skills necessary for market functioning. Research reveals that television advertisements have been responsible for children's social maturity to a substantial extent and also urban children show sound understanding and positive perception towards advertisements. The impact of advertising on children depends on their brand knowledge, family upbringing and supervision, the modern lifestyle that an urban city offers and the way in which advertising is delivered. Parents have shown negative attitudes towards TV ads, as they see it as a reason for developing materialistic values among children, involvement in family purchase decisions, foster tobacco and alcohol use, a brittle self-esteem based on possessions, increasing use of junk food, being pressured to purchase things that lead to family conflicts, and there is a low credibility in terms of advertising claims. Product advertisements place an emphasis on possession and on aspiration to a consumption-oriented lifestyle. Critics argue that children are vulnerable audience with limited information processing ability that constrains their early understanding of the nature and purpose of television advertising. Children under the age of ten are not able to critically understand televised advertising messages and are prone to accept commercial claims and appeals as genuine and truthful. TVCs undermine social and religious values, causing the moral fibre of society to deteriorate. The media has the potential to adversely affect many aspects of children's healthy development, including weight gain, sexual initiation, aggressive emotions and beliefs, consumerism and social isolation. Their impact on the kids is universal. The severity of the impact of television differs from kid to kid. Grown up children are able to create their own perceptions, more sceptical

about the quality and credibility of the product and are not solely dependent on advertisements while making product choices, whereas younger ones rely mostly on someone else's perception. The children of modern society are no longer a group of simple, docile children who are ever willing to obey their parents and live within the means in accordance with the Indian society's socio-cultural mores. In addition, parents assume an extremely important role in shaping their children's buying behaviour.

4. Influencing young people is influencing the purchase decisions of the whole family. Youth shape their family's buying patterns. They exert tremendous power over the family's decision making from holiday choices to car purchases to meal selections. They also evaluate a brand as excellent or worthless by using and assessing its value for pestering their parents. Advertising targeted at children often puts pressure on parents to buy junk for their children. The more advertising children watch, the more advertised goods they want and advertising encourages children to buy products they don't really need. Teenagers are well versed with the latest technology because of the internet and social media. They also pass it on by persuading their parents to use I Phone and Tablets. Children's involvement in family purchase decision making is increasing, and it may be due to enhanced exposure that adolescents gain understanding through advertising about the products and services available in the market.

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3D MODELLING AND ENERGY ASSESSMENT OF AG+3 RESIDENTIAL BUILDING IN MODERATE CLIMATIC ZONE(INDIA) USING BIM TOOLS

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ABSTRACT

Unique Energy examination is turning into a significant factor to be considered in the AEC business nowadays as a result of the deteriorating Earth-wide temperature boost and energy emergency. The energy examination should be amalgamated into the plan period of the structure regarding the expanded guidelines required everywhere in the world. Estimating the energy use of the structure and utilizing a reasonable energy moderating measure and plan for development is a need of great importance. The paper depends on the Autodesk BIM capacities to play out an Energy investigation of a G+3 Residential structure. The paper looks to discover and help coordinate the utilization of BIM energy examination brings about the anticipating the energy utilization of the building. This will additionally help in following along and study the energy utilization of the structure in future support. Any significant varieties, steps to saving the energy expenses or keeping away from wastage of energy should be possible with the assistance of these outcomes. For this reason the Autodesk Revit Software and BIM programming, for example,Revit Insight, which is a cloud-based energy investigation program are utilized.

Keywords: Building Information Modelling (BIM), Autodesk Revit, Autodesk Insight, Energy examination.

INTRODUCTION

The building sector in our country contributes to a third of the overall energy consumption of our country. A building's energy performance assessment provides the respective information required to analyse and determine potential ways to reduce environmental footprint and overall operational energy consumption while taking into account the national regulations and mandatory building by-laws. To assess energy consumption, we need to create a 3-Dimensional model of the building by using BIM tools. These tools allow an easy simulation and a consistent selection of different solutions of the envelope and thermal mass, taking into account the building. The life cycle expenses of a structure are influenced when early choices are taken in the venture. Various materials were surveyed utilizing BIM tools and alternative envelope materials were recognized for reducing the operational energy utilization in the structure.

Building Information Modeling

Building Information Modelling or BIM is an establishment for an advanced change in the field of architecture, engineering, and construction (AEC)

industry. It is the way of making and overseeing data for constructed resources. It is a computerized portrayal of the physical and functional information of a given structure. This system utilizes 3D models containing all the data about geometry, spatial relations, productive cycles, amounts, and material properties. Hence, the models that are made utilizing BIM tools are approximately similar to the real structure. In this way, high-performing structures can be made when the models created are nearer to reality. In contrast to the performing manual structural energy use, the energy execution appraisal through BIM can be a practical option, the explanation being the accuracy and speed of assessing which includes the most complicated models. Here, Autodesk's Revit programming is utilized to develop a more precise and greater model plan.

Energy Assessment

Every building requires a certain amount of energy to operate and maintain user comfort and proper functioning. We need to have an energy balance to estimate the needed energy demand. Because of the misfortunes brought about by transmission and ventilation losses from the structure's envelope, an energy assessment is needed. The utilization of natural

energy, however much as could reasonably be expected will prompt less measure of fuel utilization of the structure. An additional measure of the energy input is needed for basic amendments like the lighting and ventilation, and the activity of building frameworks. The general energy interest of the structure is decided at the point when the gains are accomplished and are deducted from the energy misfortunes of the structure. Appropriate comprehension of the energy examination will assist in making a proper energy model by which we can diminish the overall operational energy consumption.

Need for Energy Assessment

- Early-stage energy modeling will assist in the design, construction, and maintenance phase.
- To develop an energy-efficient building design and reduce the overall energy consumption.
- To utilize natural lighting and improve the ventilation of the building.
- To analyze the values of peak cooling and heating loads acting on the structure and improve them to obtain energy-efficient structures.

Autodesk Revit

Revit is utilized all through the 3D displaying interaction and it is a full-included structure data demonstrating stage.

Revit has the inbuilt tools for the MEP plan along with the design layout separated from the Architectural model. This is nothing but the display end to the Energy stimulation work process. Consequently, it is outstandingly well known in the AEC business for configuration purposes.



Figure 1:Autodesk's Revit Software

Autodesk RevitInsight

It empowers architects and engineers to plan more energy-effective designs with building performance information coordinated into Revit. We can calculate peak heating and cooling loads for a better energy assessment.

Terminology in REVIT

Worksharing: A planning technique that permits numerous members to work on a specific task model simultaneously.

Central Model:The central model is the vital component that empowers work-sharing in Revit. This model should be allotted at a typical location that is open to all colleagues, regardless of whether it is in an organized area or Autodesk's BIM tools cloud storage.

Worksets:Worksets are an approach to grant consent to objects in Revit. Numerous methodologies are rotating around how worksets are to be utilized, yet their most normal uses are for community work-sharing and improving execution.

Shared parameters:Shared parameters can be considered for information that should be made available and adaptable among numerous resources and ventures. Shared boundaries are needed to make plans in Revit.

View Range:The view range is the setting that permits clients to control the permeability of the items along the z-axis.

View Filters:View filters are made to abrogate the visibility and designs in a model which has similar properties. View channels depend on model classes and characterize the arrangement of rules to control the permeability and designs of a particular arrangement of components.

Object Styles:Item styles are utilized to indicate different objects in categories and subcategories of a project. These settings permit clients to determine shadings and examples just as the materials for a model, comment, and imported items in an undertaking.

OBJECTIVES

- To visually present the project in 3D Model using a BIM tool – Autodesk Revit ® 2018.
- To analyze the energy stimulation study at different climatic zones.
- To calculate the peak cooling load in a building envelope using red brick and concrete blocks at the moderate climatic zone in India.

METHODOLOGY

- In this study, a 3D model of a three-storiedRCC structure is created using Autodesk's Revit software to carry out energy analysis using a plug-in tool called Revit Insight.
- To obtain a building envelope material with higher energy efficiency, a comparative energy analysis between red bricks and solid concrete blocks has been carried out.

- An actual Residential building (G+3) project at Vidyanarayanapura, Bengaluru (13°4'55" N 77°33'16" E), Karnataka, India was used for the case study.
- Energy consumption can be reduced and building efficiency can be improved with the help of Envelope systems.
- Thermal comfort can be improved through quantitative analysis of the exterior building envelope.
- This work is carried out using a 3D Building model created in Revit to carry out energy analysis with Revit's plug-in tool Insight.

Steps to carry out energy stimulation are:

- Collection of the information and the drawings of the building to be reviewed.
- To analyse the drawings and to create a 3D model using the Autodesk Revit software.
- Export it to the gbXML format for further analysis in Revit's plug-in tool Insight.
- Input energy details in energy settings and run results in Revit Insight.
- Designing an energy-efficient building model.

Using the Autodesk Revit software, a 3D model is made. Later, labels are given which are created using Revit "Room" Tool. It is imperative to make "Rooms" that will help in sending out records to gbXML design. When sending out to gbXML, choose the type of building it is, area of the undertaking, in Building Element- select "Rooms" or Spaces.

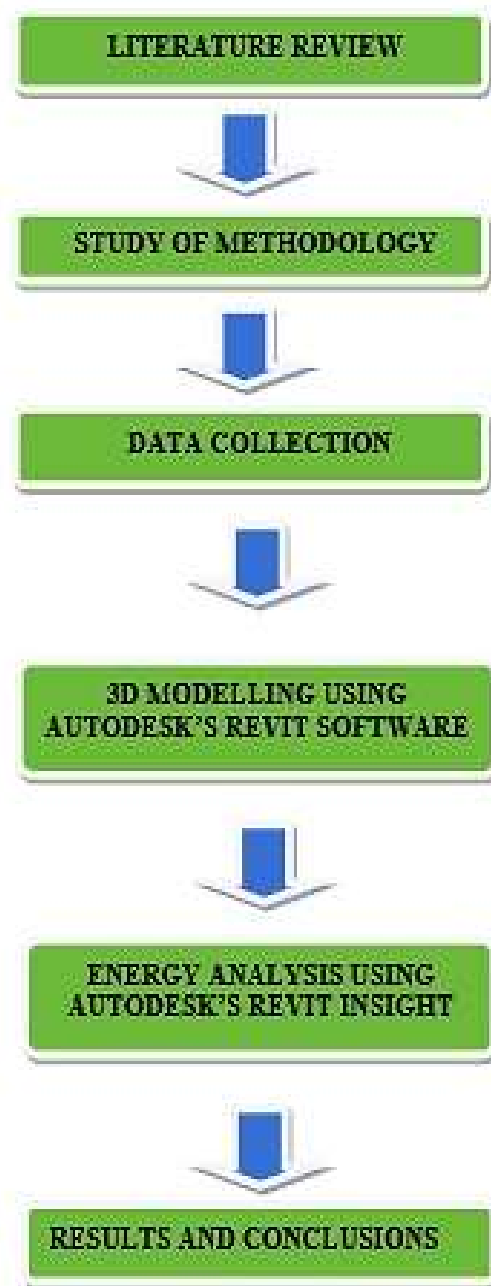


Figure 1: Work Methodology Flow Chart

DATA COLLECTION

To carry out the energy analysis, important data such as the exact location, weather condition, and details of the structure are required. A comparison between red brick and solid concrete block is carried out to know which among them are more energy efficient. It is always better to use good energy-efficient material for the building's envelope. The data of the building taken for analysis is mentioned below:

❖ Name of the project	Elite Home
❖ Type of Building	Residential Building
❖ No of storeys	G+3
❖ Location	Vidyanarayanapura, Bengaluru.
❖ Approximate budget	90,17,600 (Approx. 90.2 lakhs)
❖ Site Area	1200Sqft (30'x40')
❖ Total Built-up Area	3150Sqft
❖ Expected Construction period	11Months
❖ Project start date	Nov 2020
❖ Expected completion of project date	Oct 2021

Table1:Data Collection of the Building used for the study

Building Modelling and Energy Analysis

Model preparation, climatic context, building envelope material, sun path diagram and the energy analysis are all done by taking the residential building mentioned above.

Model Preparation

The building plan is collected and is analyzed to a 3D Revit model of the G+3 storey building to carry out an energy assessment. The plan of the building is shown in fig 2.



Figure 2:Building Plan

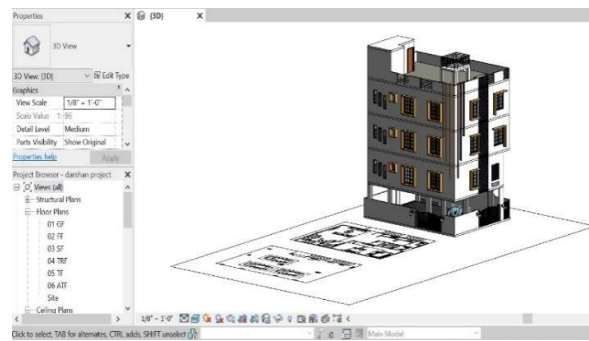


Figure 3: 3D Stimulation of the Residential Building in Autodesk Revit software

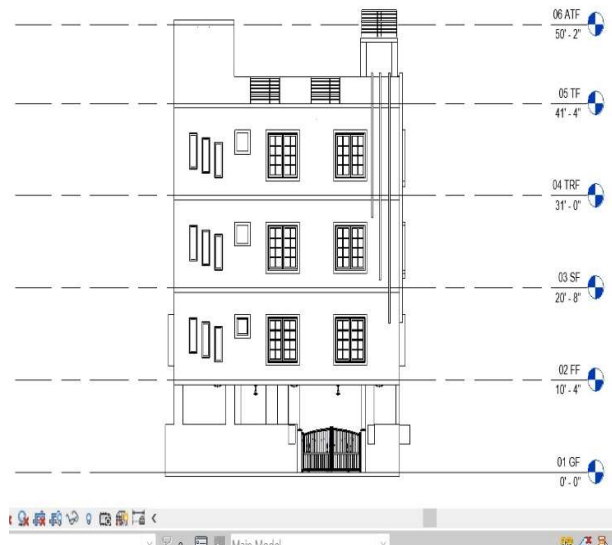


Figure 4:BuildingLayers allocation model



Figure 5: 3D model of Residential Building developed using the Autodesk Revit software

Tropical Climate Context:

The regions surrounding the Earth's Equator are called as "TROPICS". Extreme temperature and high moistness, along with extreme radiation of the sun are the ordinary highlights of tropical weather. The variety in the environment, as far as temperature and relative moistness leads to changing levels of comfort and thereby, energy consumption. India is separated into 6 different climatic zones which is shown in figure 6.

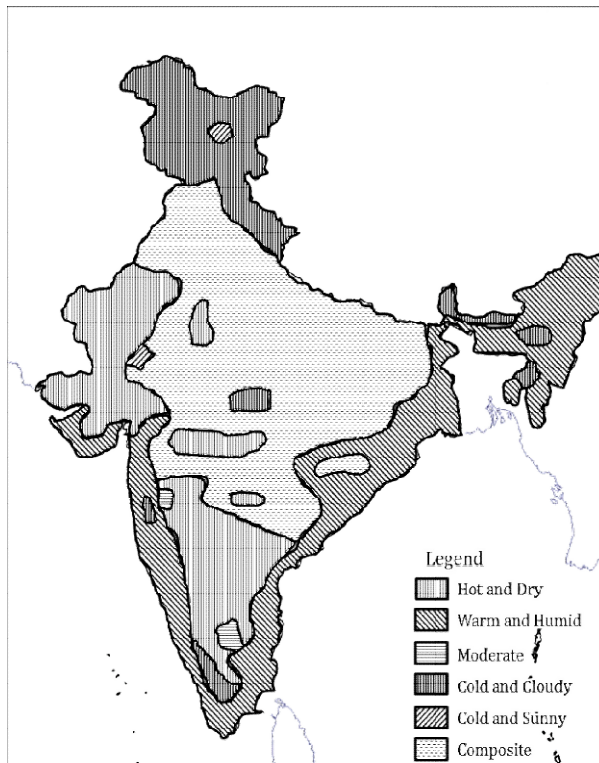


Figure 6: Map showing different climatic zones of India

The six climatic zones are classified below,

1. Cold and Cloudy – Example: Leh, India (34.15° N, 77.57°E)
2. Cold and Sunny – Example: Shimla, India (31.1033° N, 77.1722° E)
3. Composite – Example: Punjab, India (30.7900° N, 76.7800° E)
4. Hot and Dry – Example: Jaipur, India (26.9260° N, 75.8235° E)
5. Moderate – Example: Bengaluru, India (12.9667° N, 77.5667° E)
6. Warm and Humid – Example: Chennai, India (13.0839° N, 80.2700° E)

In this study, the residential building chosen is located in Bengaluru which falls under the moderate zone

Bengaluru and Pune are the two major cities representing Moderate climatic zone in India.

Building Envelope

While going further in this topic, when we try to understand what building envelope means, it is nothing but a bifurcation between the internal and external portion of a structure. Its main task is to control temperature inside a building which refers to the cooling and heating of that structure. It also keeps interior free from many issues like dampness, noise, or light. roofs, walls, doors, and windows are some examples of building envelopes.

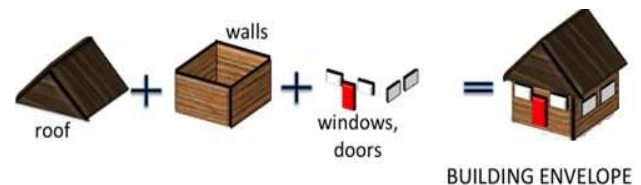


Figure 7: Building Envelope components

Transfer of Heat through an Envelope material

When it comes to what are the core concepts that affect the heat exchange rate, few things that affect are radiation increase; building interior and exterior temperature; envelope material's thermophysical properties; and surface area. For example, during daytime; when the solar radiation hits exterior wall surface, it is absorbed and transmitted via the material. The internal surface of wall then transfers heat with the room air and also other surfaces. Apart from this, the wall orientation also influences heat gain and loss and it has to be considered for energy-saving envelope design.

Sun Path Diagram

Sun path diagrams provide information about the solar position which can be established for any hour on any day, to provide a valuable tool for designers and planners. The Sun path diagram is very essential to determine the position of sun shading that will take place at a specific location.

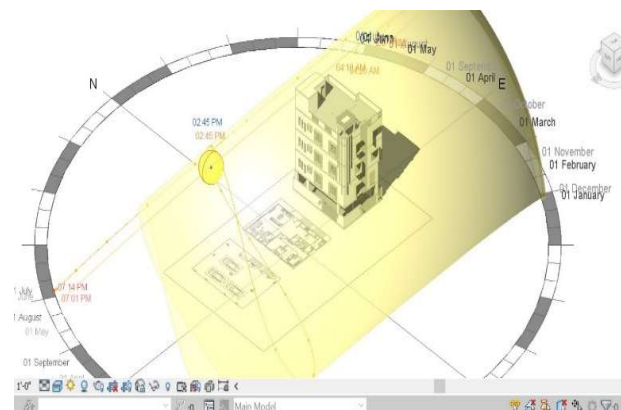


Figure 8: Sun Path Diagram for Moderate Zone – Bengaluru

Building Assessment

The Revit model has to be exported to gbXML format to calculate the energy parameters of the model.

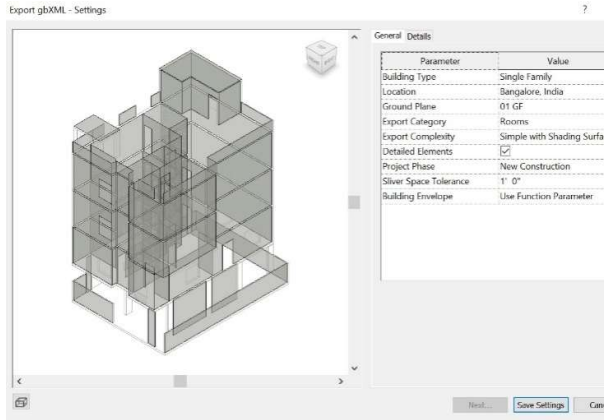


Figure 9: Exporting file to gbXML format in Revit

Building Performance Factors

The factors that are responsible for energy performance in the building.

The performance factors of the building are listed in Table 3.2

Location	Vidyanarayanapura, Bengaluru, Karnataka.
Site Location coordinates	13°4'55" N 77°33'16" E
Outdoor temperature	Max: 36°C/Min: 16°C
Floor area	292.644m ²
Average lighting power	4.86W/m ²
People	8 people
Electrical cost	Rs. 3.40/kWh
Fuel cost	Rs. 9.54/therm

Table 2: Building performance factor

Basecase parameters of Simulation

Component	Section	U-Value (W/m ² k)
External wall	15mm Plaster + 230mm redbrick block + 10mm Plaster	2.11
Roof	10mm cement plaster + 150mm RCC roof slab + 10mm internal ceiling plaster	2.96
Glass	Single Glazing	5.7

Table 3: Base parameters for energy stimulation

Energy Setting Inputs

The information required by Revit to select envelope materials like walls, doors, roofs; and windows and to perform energy simulation is used by energy models.

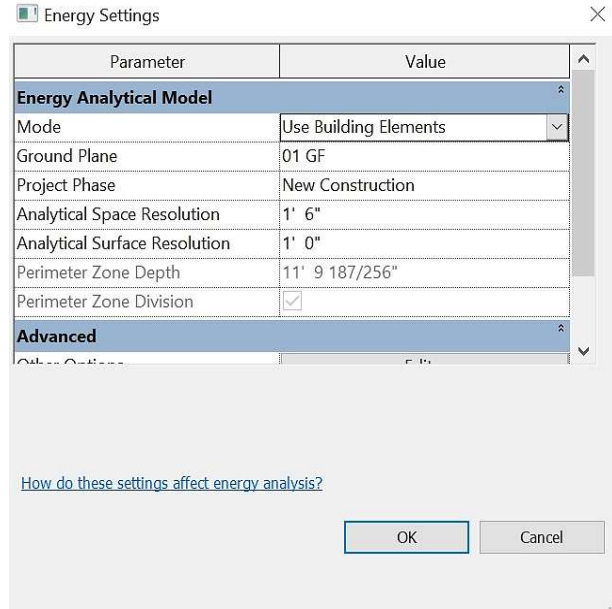


Figure 10: Energy settings in Revit

Advanced Energy Settings

We need to provide values about the building type, thermal properties of envelope materials; to further create an energy model.

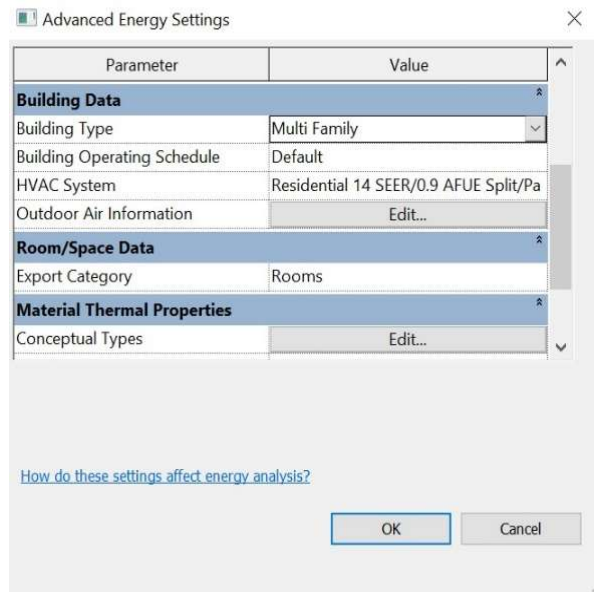


Figure 11: Advanced Energy settings in Revit

Conceptual Type Inputs

Mass Model	Constructions
Mass Exterior Wall	Lightweight Construction – High Insulation
Mass Interior Wall	Lightweight Construction – No Insulation
Mass Exterior Wall - Underground	High Mass Construction – Typical Mild Climate Insulation
Mass Roof	Typical Insulation - Cool Roof
Mass Floor	Lightweight Construction – No Insulation
Mass Slab	High Mass Construction – No Insulation
Mass Glazing	Double Pane Clear – No Coating
Mass Skylight	Double Pane Clear – No Coating
Mass Shade	Basic Shade
Mass Opening	Air

Figure 12: Assigning of conceptual parameters

Energy Model

The energy model of the building will be generated using the base color codes for different segments to be analyzed using the available resources in Revit; like the area; climate information; and thermal properties using Insight.

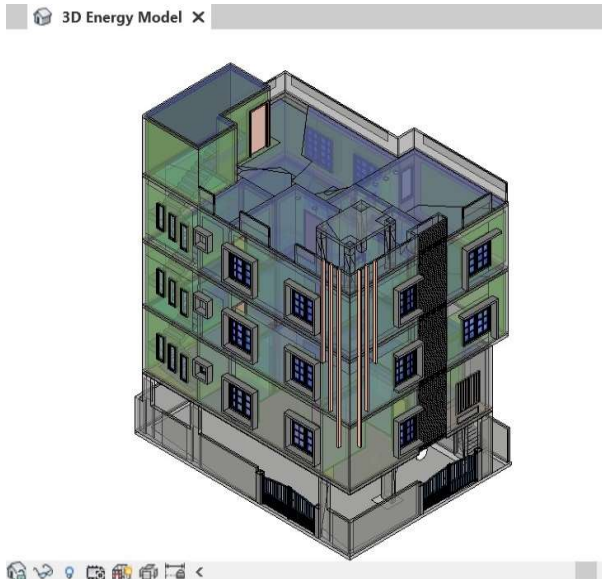


Figure 13: 3D Energy Model generated in Revit Software

Envelope wall material comparison

Red bricks and Solid concrete blocks are the two envelope wall materials chosen for comparison in this study.



Figure 14: Red Bricks Figure 15: Solid Concrete Blocks

Parameter Difference between Red bricks and Solid Concrete Blocks

Thermal Conductivity

The thermal conductivity of red bricks is in the range of 0.5 to 0.9W/mK
 The thermal conductivity of Solid concrete blocks ranges from 0.75 to 1.20W/mK

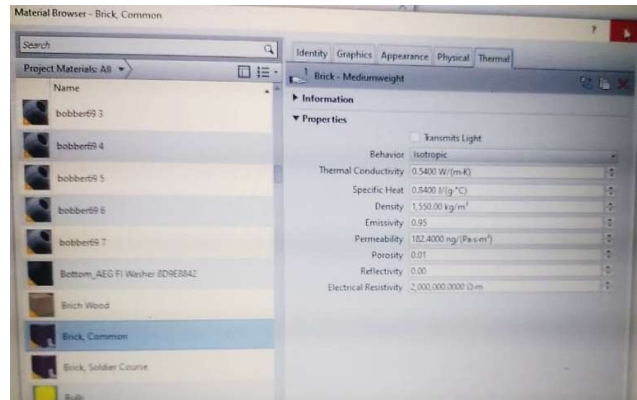


Figure 16: Data entry of red brick parameters

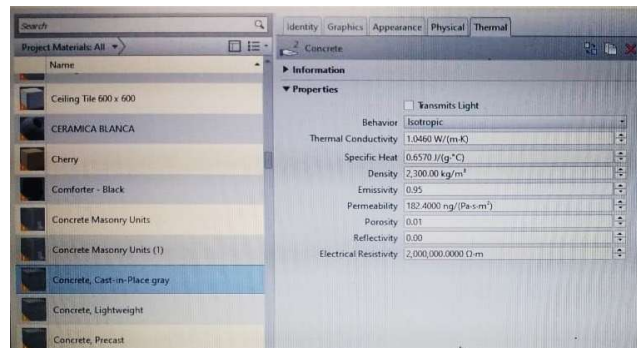


Figure 17: Data entry of Solid concrete block parameters

RESULTS AND DISCUSSIONS

In this study, we compare different wall envelope materials to analyze which among them have higher energy efficiency and greater peak cooling loads. The comparison is shown through graphical representation.

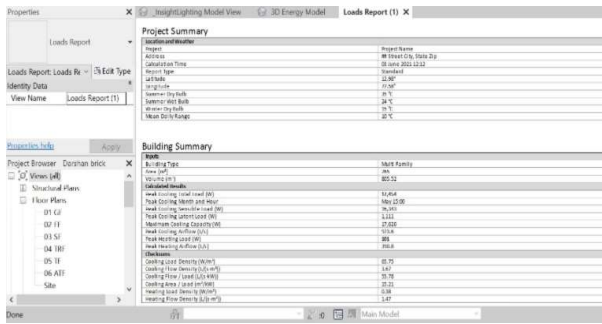


Figure 18: Project and Building summary

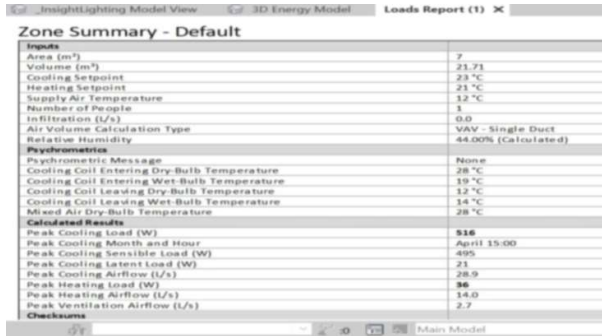


Figure 19: Model zone summary

Peak Cooling load analysis

It is the process to calculate the complete sum of heat that requires to be removed from the building to have a balanced room temperature. Envelope materials play a great role in transferring the excess heat load.

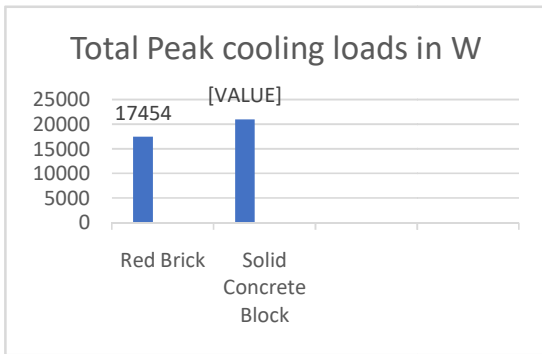


Figure 20: Graph of the total peak cooling load

Results obtained are:

- The total Peak cooling load of Red Brick is 17454 W
- The total Peak cooling load of the Solid concrete block is 20945 W

Higher peak cooling loads suggest that energy consumption in the building is less. Since the solid concrete block is exhibiting a higher peak cooling load, it proves that it is a better energy-efficient envelope wall material. Even though the initial investment cost for

solid concrete blocks is slightly more when compared to red brick.

Efficiency factor achieved through window-wall ratio

These graphs are obtained along with the energy analysis report. The window-wall opening percentage helps in building design modification during the initial stage itself by which we can reduce energy consumption in the building. The graphs show the energy use intensity in incremental aspect and yearly aspect. Window to wall ratio interacts with window properties to impact daylighting, heating loads, and cooling loads. The total energy consumption increases with an increase in the window-wall ratio.

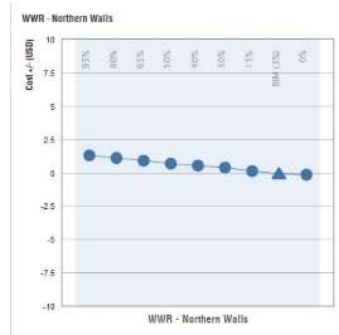


Figure 21: wall-window ratio for NW

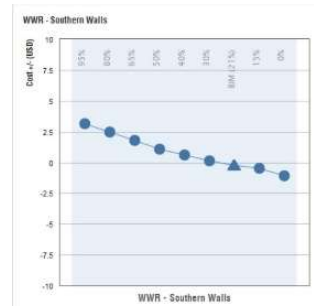


Figure 22: wall-window ratio for SW

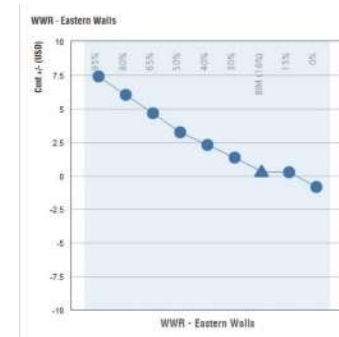


Figure 23: wall-window ratio for EW

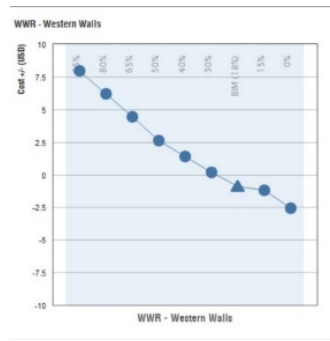


Figure 24:wall-window ratio for WW

Here, the x-axis indicates window-wall ratio and the y-axis indicates the total energy consumption.

CONCLUSION

Implementation of BIM-based tools such as Revit and Insight helps to minimize the overall energy utilized in buildings and make them energy efficient right from the planning stage itself. In this study, a 3D model of a G+3 Residential building has been created using Autodesk's Revit software. In a further Energy evaluation one can observe that, by utilizing diverse envelope divider materials, energy effectiveness of the construction can be achieved. By observing the results, it is clear that solid concrete blocks are more energy efficient when compared to red bricks.

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BATTLE PICTURE IN VIETNAM'S *DAM SAN* EPIC AND GREECE'S *ILLIAD* EPIC: A COMPARATIVE STUDY

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ABSTRACT

The epic is a massive folk narrative genre, born at the dawn of human, reflecting big events in ancient community life and depicting enormous changes of the times when the society transforms from a primitive commune society to a higher organizational form. This mankind's advance was formed through wars to unify tribes and form state. Therefore, the epic often reflects the fierce wars that take place for a long time. In addition to the common similarities of the genre, Vietnam's Dam San epic and Greece's Iliad epic also have differences in expressing the theme of war because they come from different eras, ethnic groups and cultures. This article focuses on studying the similarities and differences in the causes of wars, the scale of battles and the degree of divine intervention in wars in the epic Dam San of Vietnam and the epic Iliad of Greece in order to see unique characteristics in the cultural picture of each nation and educational lessons about value for life through the meaning of battles in epic works.

Keywords: Battle picture, Dam San epic, Iliad epic, Vietnam, Greece.

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INTRODUCTION

The epic is a massive folk narrative genre, born at the dawn of human, reflecting big events in ancient community life and depicting enormous events of the times when the society transforms from primitive communist society to a higher organizational form, "epic as a special form of folk creation was born earlier than nation formation." (Propp, 2004, p.485-488) This mankind's advance was formed through wars to unify tribes and form the state. Therefore, the epic often reflects the fierce wars that take place for a long time. The Vietnam's *Dam San* epic has been born before the state was appeared, and wars are depicted in the epic with the aim of merging villages into tribal alliances. The Greece's *Iliad* epic was born when the primitive commune made its final drastic changes into a new era, reflecting national and great problems. In epic, the heroic character is the central element of the epic art world, representing the spirit, talent, courage and wisdom of the community. This article focuses on the similarities and differences in the cause of the war, the scale of the battle and the extent of divine intervention in the wars in the Vietnam's *Dam San* epic and Greece's *Iliad* epic.

The epic was born at the dawn of human, depicting the big events of the era when society transformed from a primitive communal regime to a higher organizational form. Vietnam's *Dam San* epic appeared after the Greece's *Iliad* epic, but the environment from which it was produced was still completely primitive society, not affected by historical changes. This article uses

text analysis method This article uses text analysis method, (Nguyen, 2006) comparative method "as thought manipulation, culture comparison as study method", (Nguyen, 2011, p.60) type method "studying the commonalities between phenomena to prove the similarities between the literatures of the ethnic group" (Nguyen, 2011, p.112) to recognize the similarities in the battle picture, reflecting newly awakened national consciousness in Vietnam's *Dam San* epic and Greece's *Iliad* epic. At the same time, the article also highlights the difference in the causes of wars, the scale of battles and the degree of divine intervention in wars in the epic *Dam San* of Vietnam and the epic *Iliad* of Greece in order to see unique characteristics in the cultural picture of each nation and educational lessons about the value of life through the meaning of battles in epic works.

Research Results

The epic usually mentions the war because the epic age is the period when tribes annexed each other to form a united state, or a lesser extent, the clans fought with each other for the purpose of unifying a clan (tribe) alliance. "In general, it can be said that the most relevant situation for epical poetry is the conflicts of state of war. Indeed, during the war the entire nation moves. It is provoked to act because it has to protect all of itself." (Hegel, 1999, p.594) In other respects, the war in ancient times has the meaning of solving the conflicts of the era, creating a driving force for the development of society. In human history, the war has repeatedly played a role as a

tool to eliminate outdated and reactionary forces to bring novelty and progress to the first position. In the heroic era, the war contributes to ending the fragmentation, causing the stagnation and degradation of the community and creating enduring unity and peace, taking the development of society one further step.

Similar characteristics of the battle picture

Similarities in cause and purpose of war

First of all, the cause and purpose of the war in the Vietnam's *Dam San* epic and the Greece's *Iliad* epic have a connection with the fighting for women. This is a familiar topic in the epics, where "a hero fights for self-defense, avengers his father or brotherhood for a distant fiancé or cultural interests..." (Ma, 1982, p.433) In the *Dam San* epic, the hero goes through six encounters with neighboring tribal chiefs to free his wives, Ho Nhi, Ho Bhi. In the matriarchy, the women play an important role in each family and the entire clans, especially when she acts as the tribal chief of each village. Every time Ho Nhi and Ho Bhi were kidnapped, Dam San very urgently organized a rescue force with a hundred of people going first, a thousand walking behind. (Vietnam Academy of Social Sciences, 2006) He bravely fought and did not hesitate to sacrifice his life through six battles with the evil and tricky tribal chiefs named Mtao Gru and Mtao Mxay. This originates from a strong attachment to the two wives of Dam San, but it is also the hero's responsibility to protect the female tribal chief - the soul of the village and to protect the village. In the *Iliad* epic, it is told about the attack of the Greek army to regain the beautiful Helen, charmed by Paris Prince. In the *Iliad* epic, the characters also try to explain the cause of war in their own way. The generals of Troia considered Helen's beauty as the source of unhappiness: "May you not stay for more troublesome", (Homer, 1997, p.108) Priam does not blame Helen but blame the gods: "For me, you are not blameworthy. Just the gods launched against me, a regrettable war." (Homer, 1997, p.108) Hector and many others consider Paris to be the source of disaster: "It is you, who caused the moans and smoke of war." (Homer, 1997, p.193) Asin argued that the origin of war was due to two conflicts between the world of the gods and between the world of human. Trojan war was a part of Zeus mind, but just the Zeus condemned Ares, the god of courage and war: "Among the Olympians, you disgust me the most because you only like disharmony, war and killing." (Homer, 1997, p.175) The Trojans consider the war against invading forces, defending their homeland as a true thing: "Just one point is only good luck. Defend the fatherland." (Homer, 1997, p.361) This war is also explained by the ethical point of view of the primitive communal regime. The Greek tribes invaded the city of Troy to reclaim Helen and the possessions to restore and protect the honor of the Greeks, "preserving moral traditions of self-respect and self-esteem, honesty and mutual trust in social relations that are the rules of life and

ethical standards of the clan commune." (Nguyen, 2002, p.144)

The deep cause and purpose of the war in the *Dam San* epic and the *Iliad* epic is to advance to a more progressive level of social organization. In the *Dam San* epic, the hero's profound goal also representing the will of the community is to expand the land, gather more manpower, wealth, create a high reputation for the community and proceed to form tribal alliances, creating conditions for the appearance of higher social organization. Right after gathering forces to participate in the war, the hero Dam San has clearly affirmed the purpose of the war: Call here all to fight the enemy, crush the land of the rich tribal chief,... (Vietnam Academy of Social Sciences, 2006, p.35) The villagers and slaves all shared a determination with the hero Dam San to subjugate other tribal leaders to expand the strength and influence of the village. On the way to creating a higher social form, manpower is an indispensable factor. The wars among these communities were not aimed at occupying land but mainly gathering the people to increase the labor and wealth of the military chief, contributing to reflect a big conflict in the development of the Central Highlands society, in which the land is large and the population is sparse, and human resources are very limited. "It is a reflection of the social movement of the Central Highlands ethnic groups with separate and small communities, through the war the residents, wealth and forces are collected to promote social development to a higher level." (Ngo, 2007, p.411) The war in the *Iliad* epic was in the trend of unifying tribes and their alliances into a primitive nation. From the socio-political point of view, the Greek attack on the city of Troy was aimed at expanding the territory, plundering manpower and wealth, and enhancing the sphere of influence. That is the process of invading powerful city-states over the other city-states on the path of national unification. This inevitable evolution of history brought people to a new page. "To enter the era of civilization, the mankind must pay the price of bloody wars. In order to have a more progressive, organized spiritual and material life, founding of nation and state, and the appearance and development of science and art, humanity must lose its rustic and simple life, a life of equality and equal rights in the poverty, narrow and dark conditions of the clan regime." (Nguyen, 2002, p.139)

The similarities of Gods' participation in war

Epic is a bedside literary genre with mythology, so the gods are present in many epic works, "epic carries the breath of gods", "life between mortal people and the gods make no distinction at all. All are interlaced in a universe in the state of chaos." (Do, 1996, p.155) In the primitive commune era, people had a deep belief in the gods. Therefore, in the *Dam San* epic and *Iliad* epic, gods have a very important role when participating directly or indirectly in the war. Before joining the war, the heroes in the *Dam*

San epic and the *Iliad* epic both prayed to the gods for their support to win. When the Troy army was weak, Hecto returned to the city and told his mother to go to the temple to pray to the Atena. The hero Dam San, every time at a standstill, he prayed that the God would help him.

In the *Dam San* epic, there is only one god that indirectly interferes in the battle. That is the deity with the highest position in the E De deity system, the Creator. The Creator did not participate in the battle, nor did he give military support to the hero, he only intervened indirectly. The Creator is always on the side of the hero Dam San - the person representing the justice and future of the community. All of Dam San's enemies did not receive any divine assistance. The Creator appeared when needed and showed Dam San how to destroy the enemy. During his fight with Mtao Mxay, after unsuccessful attempts to destroy the enemy, Dam San pleaded with the Creator for help: Oh, well! I have no idea! I stabbed into the amor without puncturing. God told him: You should take a pestle and throw it in his ear. (Vietnam Academy of Social Sciences, 2006, p.54) The hero Dam San followed the Creator's instructions that made Mtao Mxay's armor to fall down and he quickly put an end to the enemy. In the *Dam San* epic, there is a far distance between gods and humans. The God does not step down to the earth, but only appears when Dam San falls into a dreamy state through dreaming. This God separates from normal life and intervenes in the battle exactly like a person who reigns from the above. In the war with Mtao Tuor, Dam San fought for a long time, the force suffered heavy losses but could not win, the Creator gave him a way: Oh, dear, you only win this cruel rich man if your hands hold a spear and knife firmly. Take a hoeblade at your hip, a hoe on your shoulder to beat, call a large number of young men and women, those with knives dig small holes, those with hoes dig big holes, dig deep holes everywhere. Then with short and long steps, you should jump well and timely, drag your loincloth to make dust like a dark cloud, dear! (Vietnam Academy of Social Sciences, 2006, p.93) With this tactics, Dam San lured the enemy into a hole dug by him and killed the enemy with a short pestle. In addition, the God also helped revive died Dam San's fighting force: So everyone who died, captured by a devils was now alive. (Vietnam Academy of Social Sciences, 2006, p.95) It can be said that the gods in the *Dam San* epic indirectly intervening in battle mainly minimize casualties and damage. The indirect support of the gods helped the war quickly end and limit the loss of the hero's strength.

Greek epics especially bold the imprint of the gods. The gods played an important role in both the cause, development and result of the *Iliad* war. The root cause of the war originates from the gods. When the war began, the gods divided into two factions that were both indirectly and directly involved in the war. The above generals were sponsored by various gods. Although Zeus repeatedly

forbided the gods to interfere in the war, the gods' tacit attempts to help forces between the factions were unstoppable. The gods wanted to remain the war and they tried to prevent possible agreements. The gods also directly intervened in each battle to give cover to the generals they protected and find a way for them to win. During the confrontation between Paris and Menelat, the Aphrodite had saved Prince of Troy just in time before Menelat rushed to kill him. The Aphrodite and Apolong intervened to help Ene from the death at the hands of the Greek hero Diomet: She spread her white arms widely to protect her darling children and took her lap as a veil in front of him. (Homer, 1997, p.155) Every time Diomet tried to destroy Ene, but failed to win the Apolong: Three times his glittering shield stumbles over Apolong. (Homer, 1997, p.159) Finally, Ene was taken out of the smoke by the Apolong and healed by the Laton and Actemit. While fighting with Asin, Ene was once again saved by the gods. The Poseidon, god of the sea, spread a thick layer of mist over Asin's eyes and pulled Ene out of danger. The gods in the *Iliad* epic not only intervened in each battle in the form of support for the hero but also directly participated in the battle, sometimes the gods also held the position of army commander in the form of a human. Aret and the venerable goddess Enyo are those guiding the Troy army. (Homer, 1997, p.165) The gods not only participated in the fighting but also had single combat with mortal people. In the seventh chant, Gen. Diomet wounded both the Aphrodite and the Aret, the god of courage and war. Since the Zeus allowed the gods to freely join the war, the war became many times more intense and the evil gods rushed to attack each other: They leaped on the enemy, causing noisy commotion. The immense ground resounded with the sound of fire and sword. (Homer, 1997, p.267) Divine involvement in every aspect of the *Iliad* war created an spectacle, magical, extraordinary and fierce battle space.

Different characteristics in battle picture

The difference in the cause and purpose of the war

In the *Dam San* epic, the wars are mainly generated from the human world to regain the wife who was robbed and expand the land, gather more manpower, wealth, build the great reputation of the community, and the profound purpose is to unify the gens to form the larger alliances. In the *Iliad* epic, the cause of war is rooted in gods (the aspiration of Mother - Earth Goddess and the story "golden apple for the most beautiful person") and the profound purpose is towards the establishment of the State. The war in the *Iliad* epic "took place in the name of a human and historic demand made by one nation over another,... The *Iliad* epic shows us the Greeks take the field against the Asiatics and thereby fight the first epic battles in the tremendous opposition that led to the wars which constitute in Greek history a turning-point in world-history." (Hegel, 1999, p.597)

The difference in divine intervention in battle

The divine world in the *Dam San* epic is not rich, diverse and does not directly dominate, or interfere with the hero's affairs in mortal life. The gods in the *Iliad* epic are large, diverse and have a rich and lively character like the human world. The divine world in the *Iliad* epic is closely organized into a court system headed by the Zeus and dominates all activities of the mortal characters. "The divine world is complicated, what is that superficiality if it is not the image of a superstructure that has become quite complex and has an organic relationship with an already quite developed infrastructure like Greek ancient society,..." (Vo, 1981, p.18) Although the divine intervention in wars was strong, the intervention form and degree of intervention by gods in battles were completely different due to the nature of the each war.

The difference in the scale of the war

The scale of war in the *Iliad* epic is much larger than the war in the *Dam San* epic. The voluminous volume of nearly sixteen thousand verses of the *Iliad* epic only focuses on describing a very short period of the entire war that lasted for fifty days in the final year (the tenth year) with more than ten battles but was a very fierce period that partly showed the intensity of this war. The volume of the *Dam San* epic contains just over three thousand verses, in which depicts six head-to-head wars between the hero named Dam San and the other chiefs. The progress, results and scale of each battle have certain differences.

The war in the *Iliad* epic was of a large scale, depicting many battles, deaths and events on the battlefield that the two sides at times had to stop their fighting to pick up and burn the corpse: They took water to wash the blood and mud spattered and the tears poured when loading the corpse to the vehicle. (Homer, 1997, p.222) Besides the mighty heroes and soldiers participating in the war, there were also the presence of numerous gods. Their fighting spirit to the last breath is to create the glorious feats even though they have to sacrifice their lives. The wars always followed one after another, in which one event is the source of another event and the heroes with superhuman strength had mercilessly slaughtered the enemy army to the point of "being tired of constant killing." On the chaotic battlefield of human corpses, horse corpses and on the ground, the red blood streamed from dawn until St.'s Day. (Homer, 1997, p.230) The level of carnage and damage after each battle is extremely great. The image of a shared grave made for the dead Greek soldiers that is high and majestic in the wilderness makes the audience imagine the horrors of the war.

The war in the *Dam San* epic "mainly took place within the traditional commune", (Vo, 1981, p.18) in which the war scale was not large and there was no carnage to the point of destruction. Normally, in the wars, only the leader or active combatant of the defeated faction is killed while

the soldiers and the people had their lives preserved. In some cases, mass deaths of people were brought back to life by divine magic. The people in villages defeated easily accepted to follow the victors. The tremendous battles were confined to the chiefs only and the masses serving as the background. The war in the *Ede* epic is aimed at peace, in which the hero joins the battle for the purpose of peace and prosperity for the community. Rightly because the battle was resolved almost by individuals, there was no tragic end to the war and horrible, tragic images of destruction.

The battle in the *Iliad* epic that has a majestic space and a large-scale battle space, no ending of the war with the situation of blood and flesh fly spreading the rivers or the corpse loading at high and majestic degree,... has shown an excruciating, and terrible battle. In the *Dam San* epic, each battle only has a fight between the two leaders, the following force has the effect of creating prestige and threatening the opponent's spirit rather than directly participating in the battle, thus the cruelty fierce nature does not appear in this work. Even at the end of the war, there was a bright spirit, signaling a good future for the community with the image of people who eagerly brought much wealth like bees' moving flowers, or boys' and girls' carrying water at village well. Thus, the level of carnage and damage in the battle in the *Dam San* epic and *Iliad* epic differ greatly.

Cause of similarities and differences in battle picture

The content covered in the epic works is war and all human activities around that war. "In the epic the general situation of a particular people must not be the proper subject-matter of an epic in this tranquil universality of its individual character as a people or be described simply on its own account; on the contrary it can appear only as a foundation on the basis of which a continually developing event occurs, touches all sides of the people's actual life, and incorporates them. Such a happening should not be a purely external accident but must be something carried out by the will in accordance with a substantial spiritual purpose. But if the two sides, the people's universal situation and the individual action, are not to fall apart, the specific event must find its occasion in the very ground and soil on which it moves. (Hegel, 1999, p.593) History in the epic work is fanciful, but to a certain extent reflects the reality of life. Because in the war is just the entire people's motion, the similarities and differences of the war picture in the epic can be explained on the basis of the society that produced them. The ethnic groups' epics have different levels of development and forms, depending on the level of historical and social development of each ethnic group. (Propp, 2004, p.485)

Social basis for forming the Dam San epic

Until now, the *Dam San* epic of birth has not been determined exactly. When introducing the *Dam San* epic, Researcher Dao Tu Chi said that this work was born around

the seventeenth century. (Dao, 1959) Researcher Vo Quang Nhon based on the social transformation and the cultural relationship between the Cham and the Ede people shown in the *Dam San* epic said that this epic work was formed around the fourteenth century or maybe earlier in the twelfth century and thirteenth century. (Vo, 1983) "The forming period of the epic works of the Central Highlands of Vietnam can not exist simultaneously, but it is certain that the genesis epics (or mythical epics) that reflect the older social history perhaps were born earlier." (Ngo, 2007, p.409) Thus, it can be said that the *Dam San* epic was born when the society was in the primitive commune period and it reflects the tendency of small villages to move towards joining into larger alliances.

Basically, the society of the *Dam San* epic has not had a class division. The gap between the rich and poor exists but is not the result of exploitation. The elderly, the sick, the disabled, the orphans, etc. are often poorer than others due to their inability to work, but they are the subjects receiving much care and attention from the community. In society at this time there exists a relationship of friendship, democracy and solidarity. The society of the ancient epic did not have a public organization or its authoritarian forms. Cultivated land is a public property, members only have the right to use, not to own. "The occupation area of the communes also has a certain boundary, determined by the chiefs after their meeting." (Vo, 1981, p.8) In production, most of the ethnic groups in the Central Highlands of Vietnam practice their cultivation according to the shifting cultivation method. The long-term nomadic situation makes the agricultural life in this area unstable. (Vo, 1981, p.9)

In the structure of a democratic society, there is an equal distribution relationship with no dominance. The slave class are prisoners of war, the people with no support or the people who are the servants to clear the debts. Their familiar jobs are taking water, firewood, cooking rice, raising livestock and poultry,... They are not discriminated against and are not an important production force in society. The village's internal issues are resolved in accordance with the customary laws in a democratic and voluntary manner. The contradictory conflicts only take place between one community and another. Due to the high spirit of community cohesion, if one person in the village is offended or threatened, the whole community is ready to fight to protect. The wars happen constantly between the villages with the profound purpose is to increase the workforce, acquire more wealth and expand land.

To prepare for the war, the village was militarized with the core of the militia team with its regular training and the civilian leader, as well as military leader. The villages are well fenced with thick bamboos and added a defense system with traps, tackles, tunnels, pits,... The wars often began with skirmishes between leaders and ended with the victor taking his/her wealth and the entire villagers

of the loser. These villagers again became productive forces and warriors of the victorious village, making this village rich and strong and the reputation of the leaders that were increased further.

In terms of beliefs, the people here follow polytheistic beliefs and believe in the animism. Their religious beliefs are rustic and democratic. They believe that there are good gods, and bad gods, in which it is required to punish bad gods by humans.

The social relations of ethnic groups in the Central Highlands of Vietnam, which are clearly reflected in the epic, are the community and matriarchal society. "Community, firstly and only, is the village community, that is a clear characteristic of the social relations of ethnic groups in the Central Highlands of Vietnam. This community is based on a community of residence, ownership of land and resources, as well as a community of spiritual life and a community of culture. Community here is not in opposition to, or no separation from the heroic character in the epic, but only shows the concentration of the community's strength and aspiration to rise." (Ngo, 2007, p.411) In epic, the relations of matriarchal society are shown in a concentrated way, especially the custom named *Juê nuê* (race continued). "There seems to be a contrast between matriarchal society in which the exalted role of a woman exists, with the role of a man, especially the *Mtao*, who is the military chief, and a new class of men in society." (Ngo, 2007, p.411)

Thus, the social basis of the *Dam San* epic belongs to the primitive commune period, that is the time in which the role of the chief has a motivating effect in social organization. (Chu, 1960) A basic characteristic of the society in the Central Highlands of Vietnam in general and the Ede ethnic group in particular is that it has not undergone the process of a State formation. "The relatively complete organization of society is the *kon* (*kung*), *plây* (*plei*) (a village) with the village patriarch or the village leader. The social trend was to make an alliance with many villages called *Torung* but right when being undeveloped, then stopped by the invasion of French colonialist. Some people are called kings (King of Fire, King of Water) with *Hoa Xa*, *Thuy Xa*, who are not the kings of the country, but are just the great chiefs with alliances of many villages." (Phan, 1991, p.242) It is the pre-national society, as a basis of producing the ancient Central Highlands of Vietnam epics in general and the *Dam San* epic in particular.

Social basis for forming the Iliad epic

The ancient epics were born when having a social motion from primitive communes to primitive state forms. Wars happen as an inevitable phenomenon in order to meet the trend of unifying tribes, eradicate the situation of ruling as a feud, then result in the formation of a nation, and bring society stepping into its civilized period. The era that was reflected in the ancient Greek epics (Homer era) was the

intermediate era between gentile society and class society. This era is marked by military democracy. The social organization of a tribe included the Council of Notables, the People's Council, and the military leader. "The military commander, the council and the popular assembly formed the organs of the military democracy into which gentile society had developed. A military democracy — because war and organisation for war were now regular functions of the life of the people." (Engels, 1972, p.271-272) The principle of democracy and equality is still guaranteed because when all the male members of the tribe reaching their adulthood all are warriors, "there was as yet no public authority separated from the people that could have been set up. Primitive democracy was still in full bloom, ..." (Engels, 1972, p.170-171)

In terms of economy, the cultivated land in general still owned by the commune has a large part to become the private property of the heads. Agriculture has developed, handicrafts have just begun to specialize and commerce is still at a low level. Therefore, the source of the society's wealth accumulation is not generated from production or commerce, but wars of plunder. Wars was the economic form of this era and Homeric society was basically in the early days of using slave labor. "Mother right had given way to father right; thereby rising private wealth made the first breach in the gentile constitution." (Engels, 1972, p.160) The community is still a united bloc, but the leading individuals have begun to think about their own interests. In each family, the woman no longer has her role and position as before and the role and power of the husband prevail. The traces of the matriarchy remain only in mythology with a large number of goddesses in the system of gods.

Religion in Homeric society is mythological polytheism. The god in the ancient Greek religious beliefs was a symbol of nature and the social forms themselves artfully created by the folk imagination. In the Homeric era, there was no strict system of dogmas, and doctrines, as well as strict ecclesial organization. Each clan or tribe has its own guardian god and religion clearly that reflect the contemporary social relations. The gods are thought to have a blood relationship similar to that of a clan. The fate of each individual is completely determined by the gods, regardless of their own morality, personality or efforts. Society is reflected in the *Iliad* epic of "the upper stage of barbarism at its zenith..." (Engels, 1972, p.39) This was the time when the original communal organization peaked and was changing into form. more progressively, "the old gentile system full of vigour; but we also see the beginning of its decay: father right and the inheritance of property by the children, which favoured the accumulation of wealth in the family and gave the latter power as against the gens; differentiation in wealth affecting in turn the social constitution by creating first rudiments of a hereditary nobility and monarchy; slavery, first limited to prisoners of

war, but already paving the way to the enslavement of fellow members of the tribe and even of the gens; the degeneration of the old intertribal warfare to systematic raids, on land and sea, for the purpose of capturing cattle, slaves, and treasure as a regular means of gaining a livelihood. In short, wealth is praised and respected as the highest treasure, and the old gentile institutions are perverted in order to justify forcible robbery of wealth." (Engels, 1972, p.175-176)

Due to the sales of land, the division of labor between agriculture and handicrafts, between commerce and marine, a large part of the population moved and spawned in the lands of other clan and tribe. This makes the traditional management of the gens no longer suitable. A law on the tribal gens' customs has emerged in response to the new situation. Besides, the division of members of the opposing classes (aristocrats, farmers, craftsmen) has caused an upheaval for the communal organization. Assigning the duties of the gens to certain families is no longer a custom but becomes a necessity. Since then an aristocracy with special privileges has been formed. All of these are the causes that led to the state of birth.

Education about the value of life through the meaning of battles in epic works

Literary works always have a close relationship with social life. The era of epic is far from us in terms of time, history and culture, but the issues of human life, culture and morality always have common standards. As a literary genre, ancient epic has left a huge legacy in the history of human literature. Great epic works reach the exemplary level of the epic genre, symbolizing the creative capacity of man from the dawn of human history. Epic works highlight the life-value lessons about the ethical qualities, good traditions of each nation, the humanitarian spirit, etc. to people, providing a significant contribution to fostering good feelings, positive way of thinking, healthy lifestyle to people. In the epic era, each person was aware of being a member of the clan and tribe and had to fight and sacrifice for the clan and tribe. Everyone was always concerned about the community, put the community's interests above the individual's because in the war, there is no place for an individual person, but all people need to have the same purpose and direction. In a society full of complicated changes, people tried to strive to live with the era, keep up with the steps of the era. In literature, the authors have built the characters that truly reflect the life of that era. Literary characters also try to keep up with the steps of history, affirming the most beautiful ideals of their nation and era. Those are characters of historical stature - epic characters.

In the era of epic, there was always a connection between the individual and the community, between each member and everyone in the community. Right from the dawn of the formation of the genre, there were individuals with a sense of attachment to the community in epic works.

This is a two-way relationship between individuals who act not only for themselves but also for the responsibility and duty between individuals and the community. In addition, the purpose of tribal gathering and solidarity is to honor and create solid conditions for individuals to make victories for the community. Once a hero made a glorious victory, he would be considered the model of the era, representing the beauty of the nation and the strength of the community. The hero's extraordinary strength represents the strength of the community.

Characters in epic works are perfect people, admired and respected by the people. The personality of epic characters is immutable and completely "foreignized". Characters in epics are often portrayed very beautiful in terms of appearance, with extraordinary strength and cosmic stature. Epic characters are expressed mainly through actions, this is one of the characteristics of the first development stages of literature in general and of epic in particular. An epic man is a person of duty and responsibility. They are heroes with a lofty mission to always fight and sacrifice for the common good of the nation and the community. These are people wearing the face of the collective, representing the aspirations of the people in the society in which they live. An epic hero character is a special type of hero with a fit connection between personal interests and community interests and aspirations. A hero character brings the social ideal and the aesthetic ideal of the era that gave birth to him. The hero always puts himself in the harmony of social relationships. His individual interests must be associated with those of the community. The hero's fighting purpose is for the common interest and benefit of the community. The victory or failure of an individual does not only belong to that individual but also relates to the community. Through the battles in epic works, the reader sees a whole movement of contemporary society on the path of ever-higher development of each nation. This is the highlight in the epic art of applying the forms of comparison, exaggeration, expressive formulas with majestic style, rich in images and national colors. Folk authors borrowed depictions of wars to affirm people's aspirations and ideals for a harmonious and happy life. Besides, epic works also aim to educate people living in the community to obey the rules, regulations, and ethical standards set by the community. At the same time, everyone in the community must live and strive for the honor and well-being of the whole community.

CONCLUSIONS

Epic is a complete picture of people's life in the form of storytelling of a hero in the past. Over thousands of years of existence, Epic has always contained a strong attraction. The *Dam San* epic is the leading famous work of the oral literature of the long-lived tribes in the Central of Vietnam. When referring to the folklores in the pre-Indochina period, the title of the *Dam San* epic certainly

appears in our mind. (Geoges Condominas, 1997) The *Iliad* epic is one of the most famous classical epics, the pinnacle of the epic about the topic of war. The *Dam San* epic and *Iliad* epic are the products of two geographical regions, two cultures separated from each other with unequal development levels, thus in the battle picture of the two epic works there are both similarities and differences. In which, the cause of war was aimed at a higher social organization, but the battles in the *Dam San* epic were only aimed at unifying the clans and tribes into tribal alliances. And the *Iliad* epic is in the trend of tribal alliances taking over each other in the process of state formation. The scale of war in the *Dam San* epic is not epic, and does not bring a stature as the scale of war in the *Iliad* epic. Divine intervention in the war of the *Dam San* epic and the *Iliad* epic is quite profound because the people in the primitive commune were always dominated by beliefs in gods. Epic is the first literary product of a newly awakened national consciousness. Not all epics are all stories of war, but war is the most important, representative and relevant subject of Epic. Through the topic of war, Epic shows best the will of the community and the transformation of an entire nation.

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ARTIFICIAL INTELLIGENCE IN CONSTRUCTION INDUSTRY: BARRIERS IN THE IMPLEMENTATION

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ABSTRACT

Artificial intelligence implementation in the construction industry is limited and not being actually implemented in the construction industry of India. To overcome this problem, this study focuses on the fault tree analysis by identifying the factors that acts as the barriers in implementing artificial intelligence in the construction industry of India. One hundred and fifty responses were collected in total, fifty each from the three different types of construction industry (namely residential, commercial and industrial construction) by preparing three different questionnaire survey. After the Boolean algebra, the basic barrier causes were represented by the fault tree. After the Minimal cut set analysis of these basic barrier causes, the topmost dominant barriers causes were sorted out and again represented by the fault tree. These topmost dominant causes are the barriers in implementing artificial intelligence in the construction industry.

Keywords: Artificial intelligence (AI), Construction industry, Fault tree, Fault tree analysis, Boolean algebra, Minimal cut set analysis.

1 INTRODUCTION

Artificial intelligence is an intelligence that machines shows which is different from the humans and animals intelligence which has the emotionalism. The artificial intelligence term generally used to represent the machines that performs the work easily and in a short duration that can be done by human but with a lot of efforts and time. Computer Science Engineering defines artificial intelligence as the agents that are intelligent. Device which perceives its program and takes actions to increase the success probability and complete its goal.

1.1 Artificial Intelligence Types

Artificial intelligence technologies are categorized by their capability to mimic the human characteristics, the technology they use to try to this, their world applications and also the theory of mind. There are generally 3-types of AI and are mentioned below:

Narrow Artificial Intelligence: It is conjointly stated as weak artificial intelligence or narrow artificial intelligence, the solely style of computing we've got with success so far. It is orientated to carry out a particular task as per the program i.e. biometric identification, voice command assistant, automatic vehicles or searching in the web. As it is specific to perform a particular task the AI is having a narrow scope but it is the best in performing the assigned tasks.

General Artificial Intelligence: It conjointly stated as robust artificial intelligence or deep artificial intelligence, similar to the human behaviour and intelligence which can apply its own intelligence and take decisions according to the situation. In a given case it will act in a way that is slightly varying than the human with ease. The robust intelligence is not however attained. Psychological feature and talents are yet to be realised. With time it will become a robust intelligence and will handle complicated situations that humans find difficult.

Super Artificial Intelligence: A hypothetical artificial intelligence which can simply perceive the intelligence and behaviour of human and if the machines is conscious and surpass the human capability and talent. It subjugates the humanity and perceive more intelligence than human and can solve complicated problems. It is more superior to the narrow artificial intelligence and general artificial intelligence which are mentioned above.

1.2 Artificial Intelligence Technologies

Artificial intelligence involves a particular technique and technology in order to perform the specific task assigned to them and the pictorial representation of these technologies is shown in fig 1 below:

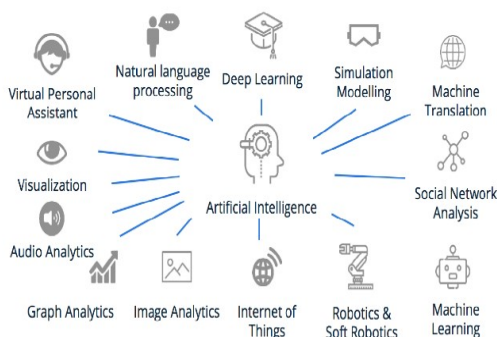


Fig. 1 Artificial intelligence technologies

1.3 Construction Industry

The term “Construction” in general is the art and science to form objects, systems, or organizations. In its most generally used context the development covers all the processes that are concerned in delivering buildings, infrastructure and industrial facilities and associated activities to the end of their life. It generally starts with planning, financing and design, and continues till the quality is constructed and prepared to be used construction conjointly covers repairs and maintenance work, any works to expand, extend and improve the quality and its eventual demolition, dismantlement or decommissioning.

1.4 Construction Industry of India

Indian Construction industry is vast and holds totally around 9% shares in the year 2011-2012 which contributed to the nations GDP an amount around 800 crores. The trade is vast and is branched nicely with some concerned corporates which are specialized in performing the construction works. There have been slightly over five hundred construction instrumentation producing corporations in India and around 50 million folks are employed in this sector. This sector provides a crucial role in the economy development leading to the great infrastructure of the nation with long life of these structures. Economic development is directly related to this sector. It witnessed the govt. taking part in a lively role for service development and grown rapidly since then and created the economy. The Indian construction industry contains hundreds of companies in this field. In those companies around 120000 registered contractors and sub-contractors are working privately and with numerous govt. organizations.

1.5 Construction Industry Types

There are generally four types of construction industry and are mentioned below:

Residential Construction: The first kind of construction is residential construction that involves building, repairing and remodelling of structures. It includes residences, town homes, condos, nursing homes, dormitories, conjointly garages and outbuildings like utility sheds.

Commercial Construction: The second kind of construction encompasses comes colleges, sports arenas, shopping centres, hospitals, stadiums, retail stores, and skyscrapers. Typically, a project sort of a place of business is sometimes commissioned by a corporation or personal owner. Alternative comes like stadiums, schools, and medical facilities are typically acquired and managed by each the native and national government.

Industrial Construction: The third kind of construction is industrial construction that entails building structures that need a high level of specialization as technical skills in coming up with construction and design. Typically this kind of construction is distributed by for-profit or industrial firms. As an example, an industry will build oil refineries, and power generation trade will build structures atomic energy plants and electricity power plants, that are samples of specialised industrial constructions.

Infrastructure Construction: The fourth kind is the infrastructure construction that comprises of upgrading of roadways, existing places and bridges, tunnels, pipelines and infrastructure works related to the construction. The government agencies and enormous personal firms take the responsibility to carry out these constructions in the interest of public.

1.6 AI in the Construction Industry

The construction industries are on the verge of digitalization that is disrupting ancient processes and conjointly holds several opportunities in the future. But the development trade has progressed quite bit in building the structures. Since years, techniques are been employed in the development providing jobs, additional economy to construction companies and the safer structures. Artificial Intelligence is one amongst the technologies creating nice impact because of its future potentialities within the whole construction method. Computing and the analysis of enormous sets of information within the construction sector, besides the development component, we have a tendency to conjointly generate a valuable info within the variety of knowledge that is never ever used. The creator Daniel D, the founding father of the corporate Another creator Studio, associate degree design studio that encourages the utilization of open supply styles, believes that the creator could be replaced by a machine exploitation computing in twenty years.

2 Literature Review: Important findings

Important findings from the literature review are:

Artificial intelligence is programming the machine in a similar way as of the human thinking ability so that the machine can mimic the action of human in order to reduce the human efforts, money and time. Various applications of artificial intelligence is known Majority of the work focuses on the implementation of the artificial intelligence in the construction industry and the literature review available on the barriers in the

implementation is very rare. The literature review indicates that there is limited knowledge and information about the factors acting as a barrier in artificial intelligence and how they can be a barrier in the implementation of artificial intelligence in the Indian construction industry is not available. So our present objective is to study the factors that acts as the barriers in the implementation of artificial intelligence in the construction industry of India.

2.1 Problem Identification

The construction industry demands effective construction techniques to compete in the globalization and technologically advanced world due to increased competition and the capital. The problems related to construction have opened the chance of additional revolutionary solutions among the industry. One prospective possibility is in the implementation of innovative technologies in construction industry like artificial intelligence that has the potential to enhance the construction industry in terms of quality, productivity and safety. But in the Indian construction industry scenario the implementation of the artificial intelligence in various construction industry fields is limited to the dissertation work purpose only and not being actually implemented in the construction industry of India. So it is a must to find out why it is not actually being used in the Indian construction industry. Through this project an attempt has been made to find out the factors that act as a barriers in the implementation of artificial intelligence in different types of construction industry of India only.

2.2 Objective of the study

- To identify the factors that act as a barriers in the implementation of artificial intelligence in different types of construction industry of India only.
- To carry out the Boolean representation of the responses collected which leads to a genuine fault tree construction and the Minimal Cut Set Analysis to accomplish the barrier factors associated with each construction industry type in a fault tree construction again to outline the topmost important barriers in implementing artificial intelligence in the three types of Indian construction industry only.

2.3 Scope of the study

- To collect the responses, fifty from each type of construction industry (namely residential, commercial, industrial constructions) by preparing the questionnaire survey and a fault tree analysis is made to represent the combinations of the factor acting as a barrier in implementing artificial intelligence in the Indian construction industry.
- To represent a genuine fault tree for the barrier factors which outline the topmost important barriers in implementing artificial

intelligence in the three types of Indian construction industry only.

3 Methodology

The following are the steps involved to carry out this study:

- Literature review
- Categorizing and classifying the barriers factors.
- Data collection and method of data collection.
- Data analysis and results.

A flowchart will represent the methodology in an easy way and is shown in fig 2 below:

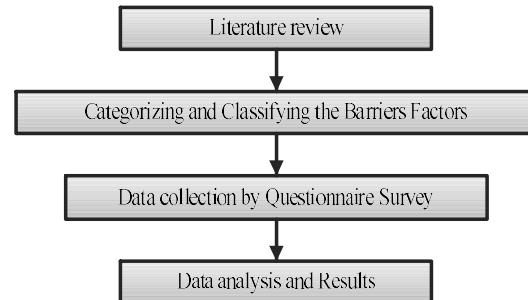


Fig. 2 Methodology flowchart

3.1 Categorizing and classifying the barriers factors

The identified factors were divided into three categories which are further classified in two to three causes for each identified factor:

Resource related:

- Limited resources available
- Resources are not easily available locally

Workers related:

- Resistance to change by the workers
- Training the workers having low technological literacy

Technology related:

- Technologies are complex
- Technologies are expensive
- Technologies are difficult to implement

3.2 Construction Industry types selected

- Residential Constructions
- Commercial Construction
- Industrial Construction

4 Data Collection

Data collection is outlined as the procedure of grouping, measuring and analyzing correct insights for research using customary valid techniques. It permits us to gather data and information that we would like to gather regarding our study from the respondents. The foremost crucial objective of data collection is that information-rich and reliable data is collected for analysis so data-driven selections are often created for analysis. The target population for this study are the people working in the companies of the different types

of the construction industry within India. The construction industry could be the leader in the artificial intelligence field. Given the characteristics of the target population, a questionnaire survey is a suitable approach to collect data. It is accessible, simple to complete, and fewer time intense for the respondent. The online survey began on December 24, 2020 and ended on March 31, 2021 for about three months which received 150 responses totally. As per therequirement only 50 responses were collected from each type of industry and after that the response acceptance from the respondents were stopped.

5 Data Analysis

The data that is collected has to be analysed and the useful information from the data has to be taken out and based upon these data the decisions could be made.

5.1 Questionnaire survey Analysis

The questionnaire survey is divided into three sections:

Personal Information: This section focused on collecting the personal details and information related to the respondents. It includes information such as the full name, designation or job titles, company or organization name, email id and the type of business the company or organization of the respondents does. The respondents were engineers, site engineers, design engineers, structural engineers, project managers, CEOs and interns. The respondents from all the three categories were represented in a single pie chart as shown in fig 3 below:

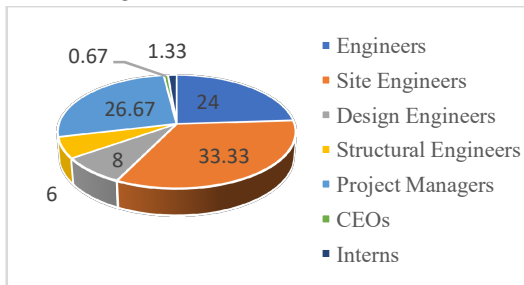


Fig. 3 Designation/ Job title

The type of business the company or the organization of the respondents were collected. The type of business was categorized into five types and are provided for the respondents to select the most suitable type for them. The five types of business provided for the respondents to select are Contractor, Consultant, Sub-Contractor, Professional Services and the developers is shown in fig 4 below:

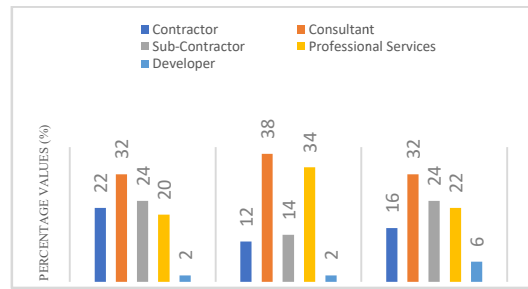


Fig. 4 Business Type

General Information: This section consists of the set of questions to check the knowledge and opinion of the respondents regarding the AI. The figures 5 to 9 shows the percentage values that the respondent have chosen for the questions and are as follows:

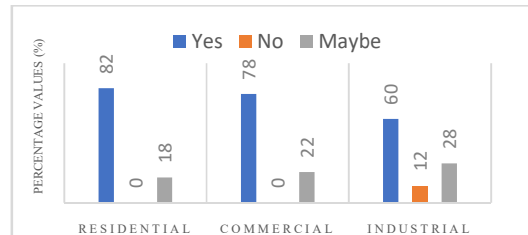


Fig. 5 Artificial Intelligence can be implemented in the construction industry?

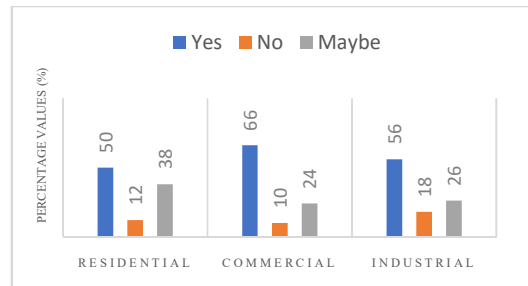


Fig. 6 Artificial Intelligence will impact construction industry?

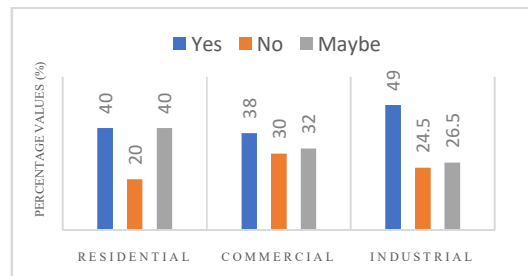


Fig. 7 Artificial Intelligence technologies are more likely suited to some projects compared to others projects?

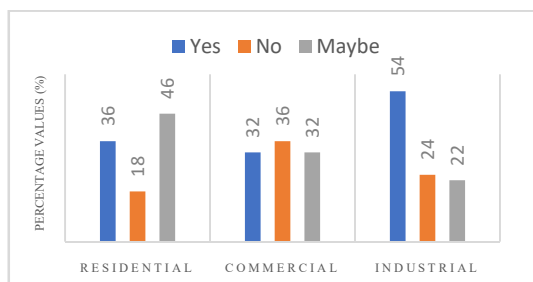


Fig. 8 Artificial Intelligence technologies in larger companies are more likely used compared to smaller companies?

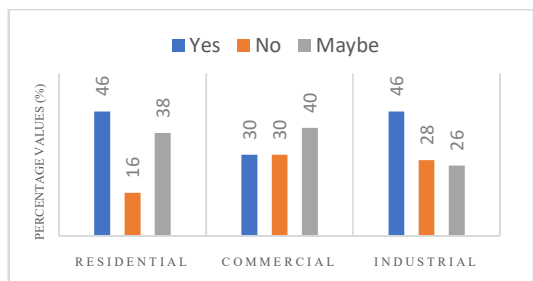


Fig. 9 Artificial Intelligence technologies are more likely to be used by the internationally operating companies compared to locally operating companies within their own countries?

Responses: The responses collected from the questionnaire survey, the combination-cause barriers in AI implementation for residential construction were tabulated in table 1 below:

Table 1: Combination-cause barriers in implementation

No.	Barriers in Implementation	Freq.
1	Limited resources available	1
2	Technologies are complex	4
3	Resistance to change by workers	7
4	Technologies updating are expensive	1
5	Technologies are difficult to implement	1
6	Technologies are not easily available locally	1
7	Training the workers having low technological literacy	4
8	Limited resources available Resistance to change by workers	2
9	Limited resources available Technologies are not easily available locally	1
10	Technologies are complex Technologies are not easily available locally	1
11	Limited resources available Technologies are complex	1
12	Resistance to change by workers Technologies updating are	4

	expensive	
13	Resistance to change by workers Training the workers having low technological literacy	6
14	Limited resources available Technologies updating are expensive	1
15	Limited resources available Technologies are not easily available locally	1
16	Limited resources available Technologies updating are expensive Technologies are difficult to implement	1
17	Technologies are complex Resistance to change by workers Technologies updating are expensive	1
18	Technologies are complex Resistance to change by workers Training the workers having low technological literacy	1
19	Limited resources available Technologies are complex Resistance to change by workers	1
20	Technologies are complex Technologies are difficult to implement Technologies are not easily available locally	2
21	Limited resources available Resistance to change by workers Training the workers having low technological literacy	3
22	Technologies updating are expensive Technologies are difficult to implement Technologies are not easily available locally	3
23	Technologies are difficult to implement Technologies are not easily available locally Training the workers having low technological literacy	1
24	Limited resources available Technologies are difficult to implement Technologies are not easily available locally	1

5.2 Boolean algebra Representation

The Boolean algebra abbreviations used in this study is given in the table 2 below:

Table 2 Abbreviations for the Boolean algebra representation

No.	Barriers	Abbreviations
1	Limited resources available	Limited
2	Technologies are complex	Complex
3	Resistance to change by workers	Resistance
4	Technologies updating are expensive	Expensive
5	Technologies are difficult to implement	Difficult
6	Technologies are not easily available locally	Locally
7	Training the workers	Training

The barrier causes combination related to the residential type of construction industry tabulated in the table 5.1 were represented in the Boolean algebra before the MCS analysis and is given by equation (A) as below:

$$\begin{aligned}
 &1\text{Limited} + 4\text{Complex} + 7\text{Resistance} + 1\text{Expensive} + \\
 &1\text{Difficult} + 1\text{Locally} + 4\text{Training} + \\
 &2(\text{Limited}*\text{Resistance}) + 1(\text{Limited}*\text{Locally}) + \\
 &1(\text{Complex}*\text{Locally}) + 1(\text{Limited}*\text{Complex}) + \\
 &4(\text{Resistance}*\text{Expensive}) + 6(\text{Resistance}*\text{Training}) + \\
 &1(\text{Limited}*\text{Expensive}) + 1(\text{Limited}*\text{Locally}) + \\
 &1(\text{Limited}*\text{Expensive}*\text{Difficult}) + \\
 &1(\text{Complex}*\text{Resistance}*\text{Expensive}) + \\
 &1(\text{Complex}*\text{Resistance}*\text{Training}) + \\
 &1(\text{Limited}*\text{Complex}*\text{Resistance}) + \\
 &2(\text{Complex}*\text{Difficult}*\text{Locally}) + \\
 &3(\text{Limited}*\text{Resistance}*\text{Training}) + \\
 &3(\text{Expensive}*\text{Difficult}*\text{Locally}) + \\
 &1(\text{Difficult}*\text{Locally}*\text{Training}) + \\
 &1(\text{Limited}*\text{Difficult}*\text{Locally})-(A)
 \end{aligned}$$

Fault tree illustration commonly begins with the highest event and continues with the highest down manner. The AND-and OR gates are accustomed and factors are logically connected with each other. For residential construction, we've got the 24 distinctive combination causes related to the 50 cases. In these 50 cases, 19 cases were due to the 7 single causes in which resistance to change by workers (7 cases) is the majority recurring single cause. 17 cases were due to the 2-combination cause in which resistance to change by workers and training the workers having low technological literacy(6 cases)is the majority recurring double cause. And at the last 14 cases were due to the 3-combination cause in which limited resources available, resistance to change by workers and training the workers having low technological literacy (3 cases) and technologies updating are expensive, technologies are difficult to implement, technologies are not easily available locally (3 cases) and a fault tree is created as shown in fig 10 below:

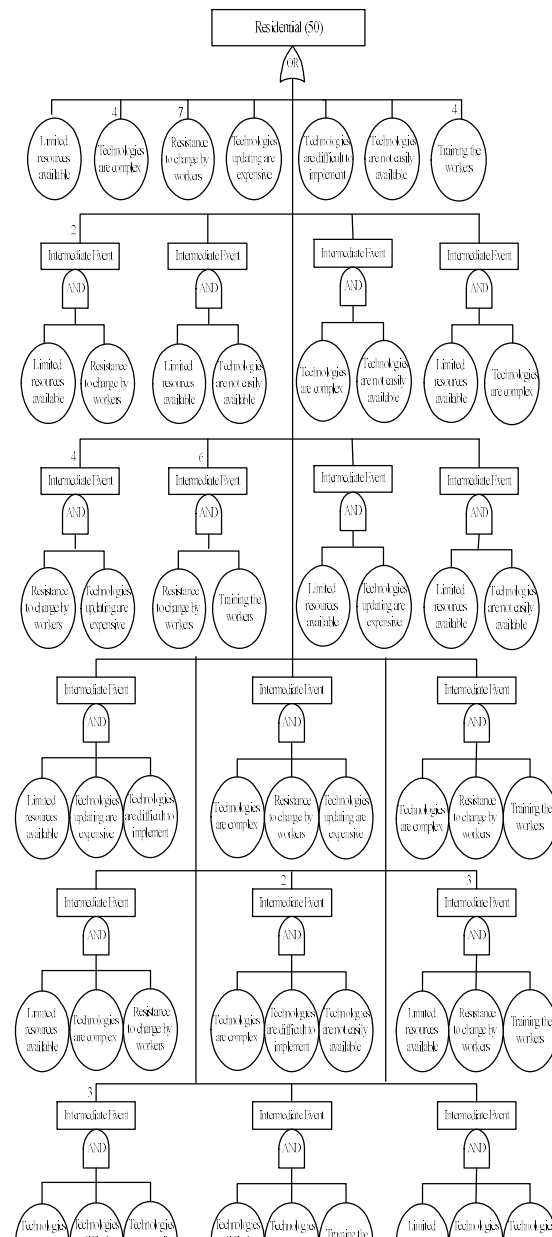


Fig. 10 Fault tree before MCS analysis

5.3 MCS analysis

The Minimal Cut Set Analysis was carried out by applying the absorption rule in order to bring down the barrier combination causes. The primary causes in the MCS Analysis consumes the secondary causes. The primary causes were selected in such a way that they can alone be the main barrier and does not depend on other causes. For the residential construction, 2 cases were due to the combination of limited resources available and resistance to change by the workers. As both of these factors are the primary cause and can singly act as a barrier in the implementation, the current study assumed that limited resources available and resistance to change by the workers each absorbs 1 cases out of the 2 two-combination cause barriers. For example 6 cases were due to the combination of resistance to change by the workers and training the

workers having low technological literacy. But resistance to change by the workers can itself be a primary barrier and there is no need to train the workers and it acts as a secondary barrier and becomes the only cause barrier in the fault tree after the MCS analysis. The MCS Analysis absorption rule will not stand valid for the cases where the multiple combination cause involves the secondary barrier cause only and results in neglecting the multiple combination cause. Another probability chance in the three combination cause will be such that there are two primary cause and one secondary cause. In such case the two primary causes equivalently consumes the cases related to the secondary causes. For example 3 cases were due to the three-cause combination of limited resources available, resistance to change by workers, training the workers having low technological literacy in which training the workers having low technological literacy is a secondary cause and these remaining two primary causes equivalently consumes the secondary cause and provides 1.5 cases each to limited resources available and resistance to change by workers. Last probable case is where all the three cause combination are primary cause only. For example 1 case was due to the combination of limited resources available, technologies are complex, resistance to change by workers in which all the causes are primary causes and would be equivalently consumed by all the three primary causes and provide 0.33 cases to each. By applying the MCS analysis the 24 distinctive combination causes associated with the 50 cases before the MCS analysis were reduced to 7 distinctive combination causes associated with the probable 49.16 cases. In these 49.16 cases, 39.16 cases were due to the 3 single causes in which resistance to change by the workers (20.83 cases) is the majority recurring single cause. 9 cases were due to the two combination cause in which limited resources available and resistance to change by workers (5 cases) is the majority recurring single cause. And at the last only 1 case was caused by the three combination cause with limited resources available, technologies are complex and resistance to change by workers. The Boolean algebra representation after the MCS analysis as in equation (B) as below:

$$20.83\text{Resistance} + 9.5\text{Limited} + 8.83\text{Complex} + 5(\text{Limited}*\text{Resistance}) + 2(\text{Resistance}*\text{Complex}) + 2(\text{Limited}*\text{Complex}) + 1(\text{Limited}*\text{Complex}*\text{Resistance})-(\text{B})$$

Fault tree is shown in fig 11 below:

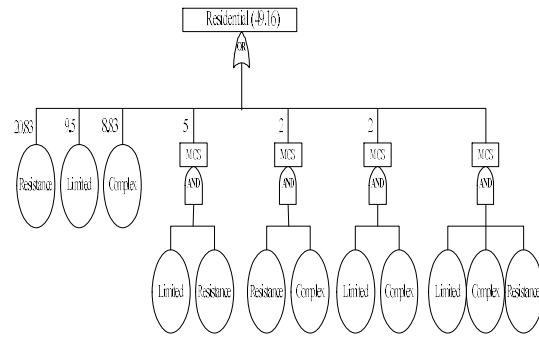


Fig. 11 Fault tree after MCS analysis

Similarly the MCS analysis can be applied to the remaining two types of the construction industry. All of these MCS are the topmost important barrier causes which cannot be neglected and are shown in fig 12 below:

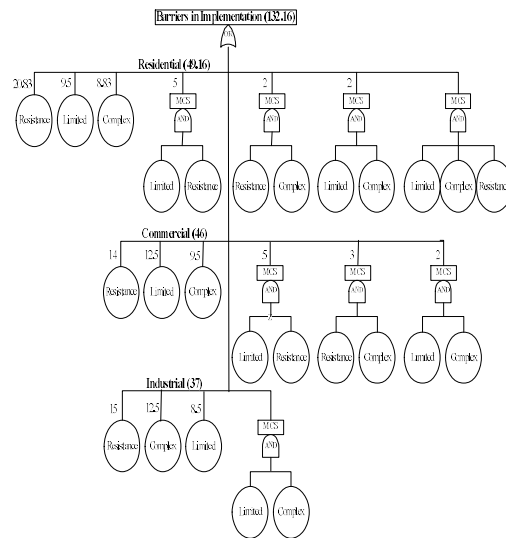


Fig. 12 Fault tree for all the three construction industry types after MCS analysis

The Boolean representation before and after the MCS analysis for all the three different construction industry types are shown in the table 3 and 4 below:

Table 3 Boolean representation before the MCS analysis

Barrier causes before MCS analysis
RESIDENTIAL CONSTRUCTION
1Limited + 4Complex + 7Resistance + 1Expensive +
1Difficult + 1Locally + 4Training +
2(Limited*Resistance) + 1(Limited*Locally) +
1(Complex*Locally) + 1(Limited*Complex) +
4(Resistance*Expensive) + 6(Resistance*Training)
+ 1(Limited*Expensive) + 1(Limited*Locally) +
1(Limited*Expensive*Difficult) +
1(Complex*Resistance*Expensive)
+1(Complex*Resistance*Training) +
1(Limited*Complex*Resistance) +
2(Complex*Difficult*Locally) +
3(Limited*Resistance*Training) +

$3(\text{Expensive} * \text{Difficult} * \text{Locally}) +$ $1(\text{Difficult} * \text{Locally} * \text{Training}) +$ $1(\text{Limited} * \text{Difficult} * \text{Locally})$
<p>COMMERCIAL CONSTRUCTION</p> $8\text{Limited} + 9\text{Complex} + 5\text{Resistance} + 2\text{Expensive}$ $+ 1\text{Difficult} + 1\text{Locally} + 1\text{Training} +$ $5(\text{Limited} * \text{Resistance}) + 4(\text{Complex} * \text{Resistance}) +$ $1(\text{Complex} * \text{Expensive}) + 4(\text{Resistance} * \text{Training}) +$ $3(\text{Expensive} * \text{Difficult}) +$ $2(\text{Limited} * \text{Complex} * \text{Locally}) +$ $1(\text{Limited} * \text{Difficult} * \text{Locally}) +$ $1(\text{Complex} * \text{Expensive} * \text{Difficult}) +$ $1(\text{Complex} * \text{Locally} * \text{Training}) +$ $1(\text{Resistance} * \text{Expensive} * \text{Training})$
<p>INDUSTRIAL CONSTRUCTION</p> $1\text{Limited} + 2\text{Complex} + 5\text{Resistance} + 2\text{Expensive}$ $+ 4\text{Difficult} + 2\text{Locally} + 2\text{Training} +$ $1(\text{Limited} * \text{Expensive}) + 3(\text{Limited} * \text{Locally}) +$ $1(\text{limited} * \text{Training}) + 6(\text{Complex} * \text{Expensive}) +$ $1(\text{Complex} * \text{Training}) + 1(\text{Resistance} * \text{Difficult}) +$ $7(\text{Resistance} * \text{Training}) + 2(\text{Expensive} * \text{Difficult}) +$ $1(\text{Limited} * \text{Complex} * \text{Difficult}) +$ $1(\text{Limited} * \text{Expensive} * \text{Locally}) +$ $1(\text{Limited} * \text{Expensive} * \text{Training}) +$ $2(\text{Complex} * \text{Expensive} * \text{Difficult}) +$ $1(\text{Complex} * \text{Locally} * \text{Training}) +$ $1(\text{Resistance} * \text{Expensive} * \text{Difficult}) +$ $1(\text{Resistance} * \text{Difficult} * \text{Training}) +$ $2(\text{Difficult} * \text{Locally} * \text{Training})$

Table 4 Boolean representation after the MCS analysis

<p>Barrier causes After MCS analysis</p> <p>RESIDENTIAL CONSTRUCTION</p> $20.83\text{Resistance} + 9.5\text{Limited} + 8.83\text{Complex} +$ $5(\text{Limited} * \text{Resistance}) +$ $2(\text{Resistance} * \text{Complex}) + 2(\text{Limited} * \text{Complex})$ $+ 1(\text{Limited} * \text{Complex} * \text{Resistance})$
<p>COMMERCIAL CONSTRUCTION</p> $14\text{Resistance} + 12.5\text{Limited} + 9.5\text{Complex} +$ $5(\text{Limited} * \text{Resistance}) +$ $3(\text{Resistance} * \text{Complex}) + 2(\text{Limited} * \text{Complex})$
<p>INDUSTRIAL CONSTRUCTION</p> $15\text{Resistance} + 12.5\text{Limited} + 8.5\text{Complex} +$ $1(\text{Limited} * \text{Complex})$

6 RESULTS AND DISCUSSION

Total 150 cases were initially selected, 50 cases each from all the three types of construction before the MCS analysis. After the MCS analysis these cases were brought down to 132.16 probable cases, in which 49.16

cases were from residential, 46 cases were from commercial and 37 cases were from industrial. It is found that for all the three types of construction the leading topmost barrier was the resistance to change by the workers with 20.83 cases from residential, 14 cases from commercial and 15 cases from industrial. The second topmost barrier was the limited resources available with 9.5 cases from residential and 12.5 cases from commercial and 8.5 cases from industrial. The third topmost barrier was the technologies are complex with 8.83 cases from residential, 9.5 cases from commercial and 12.5 cases from industrial. All the three types of construction industry after the MCS analysis is represented in a single fault tree as shown in fig 12. The study focuses on only three different types of construction industry of India. The response accuracy of the respondents to the survey depends upon the respondent truthfulness, understanding and experience with AI. Further the fault tree analysis can be done two types of approach. One is the quantitative and the other one is the qualitative analysis. This study focuses on the qualitative analysis which determines the MCSs which are the topmost important barriers in the implementation of AI in the construction industry. A different study could be made for the quantitative analysis which constitute the topmost prospective barriers in the Minimal Cut Set phrase.

7 CONCLUSION

The study was undertaken with the objective to identify the causes that acts as the barriers in the implementation of artificial intelligence in the construction industry of India. From the literature review seven barrier factors were selected as Limited resources available, Technologies are complex, Resistance to change by workers, Technologies updating are expensive, Technologies are difficult to implement, Technologies are not easily available locally and Training the workers having low technological literacy. Fifty responses from each type of construction industry (namely residential, commercial and industrial constructions) were collected by preparing the questionnaire survey by providing the basic information about the AI. The respondents were asked to select up to a maximum of three combination causes and were tabulated accordingly followed by the Boolean representation of these responses which leads to a genuine fault tree construction and the Minimal Cut Set Analysis accomplishes the barrier factors associated with each construction industry type in a fault tree construction again to outline the topmost important barriers in implementing artificial intelligence in the Indian construction industry only. The study concludes that for the residential constructions the initial 24 barrier combination causes were brought down to a 7 barrier combination causes, for the commercial constructions the initial 17 barrier combination causes were brought down to a 6 barrier combination causes and for the industrial constructions the initial 23 barrier

combination causes were brought down to a 4 barrier combination causes after the MCS analysis.

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CHILD ABUSE: TERROR SUBSISTING IN THE ESSENCE OF MANKIND IN INDIA**Kritika Gupta¹ and Dr. Meenu Gupta²**¹Ph.D. Scholar, Amity Law School, Noida²Professor, Amity Law School, Noida**ABSTRACT**

During the past 50 years, there have been reported cases of increased child abuse and harassment across the globe. Irrespective of the economic status, almost all the countries globally have faced heinous incidents on child abuse and sexual assaults that have disgraced the worldwide phenomenon of gender equality. Child abuse and sexual assaults on children being global issues have considerably plagued the global culture and integrity to a significant extent. The traumatized cases of child abuse have been so devastating that it destroys the psychological growth of the child mind-set. It even pushes the child towards conducting outrageous acts of self-destruction and suicidal indulgences.

For a longer period of time and greater social eventualities, the aspect of child protection have been a notion of importance and initiates a locus of discussion to deal with the child abuse incidents. The legal structures of the nations across the globe including the developing nations like India have placed special focus on the phenomenon. The introduction of the POCSO act in 2012 within the Indian Judicial System has been specially designed and to cater to the child abuse and sexual assault cases at large. This act forwards itself as a discipline to mend the barriers of child protection and safety in order to bridge the gaps of national security standards.

This article is based on the derivate that have been inducted from a range of studies conducted on the basis of a myriad of sources that decode the implications and limitations of child abuse cases in India. With special focus on the POCSO, Child Labour Act, Child Marriage Act and other such pertinent legal acts hedging the issue of child protection are being explicitly discussed through the literature review. Considering the experience of child abuse as early as at the age of 11 months, the article offers a strong artefact of evidentiary renditions and the significant constraints that need to be resolved.

Keywords: Child Abuse.

INTRODUCTION**Child Abuse in Indian Context**

Child abuse has become one of the major social stigmas that affect the social balance and ruin human relationships within a social structure. Child abuses in India can you witnessed in the form of physical or mental injury, forced sexual stimulation, forced sexual activity, scaring, blaming, and negligent treatment outcomes. It is reported that 53% of the total population of Indian children witness different forms of child abuses¹. Surprisingly, the numbers of deaths by child rape and other physical or mental torture have increased rapidly in India in last few years.

Forms of Child Abuses Identified by UNICEF

UNICEF defined that the child abuse can be both mental and physical and it is meant to be addressed as major violence against the children. Any activity related to child abuse may occur in schools, homes, orphanages, speech, residential care facilities and even in prisons. Such violence not only affect the psychological setup of a child but it also negatively influences the emotional arrangements within any community or larger area².

Physical Abuse

Physical abuses in this context refer to the occurrence of the physical injury on a child, which includes hitting, shaking, punching, kicking, beating, burning and other ways to harm a child. In many instances, the caregiver

¹ Gelles, R.J., 2017. What to learn from cross-cultural and historical research on child abuse and neglect: An overview. *Child Abuse and Neglect: Biosocial Dimensions-Foundations of Human Behavior*. Oxon: Routledge.

² Shahidullah, S.M., 2017. Criminalization of Child Abuse and Violence against Children in South Asia: Law and Legal Advances in India, Pakistan, and Bangladesh. In *Crime, Criminal Justice, and the Evolving Science of Criminology in South Asia* (pp. 109-144). Palgrave Macmillan, London.

or even the parent both intentionally or unintentionally hurt the child for the purpose of scolding, scaring, or taking passive revenge on the children³.

Sexual Abuse

Sexual abuse indicates an inappropriate behaviour towards a child, which may encompass the activities including fondling of child genitals, comparing a child to fondle genitals of any elderly people, incest, intercourse, sodomy, exhibitionism, rape, for any other sexual exploitation. All these activities are considered as child abuse or child maltreatment. These activities are mostly conducted by the people responsible for the children care, including the day-care provider, babysitter or even the parent⁴.

Emotional Abuse

Emotional abuse in the context of child abuse is also known as verbal abuse, which is also followed by psychological and mental maltreatment to a child. In the most common instances, it includes the acts of fallacies by the parents, babysitter or other caretakers. They are often found imposing effective parts in emotional abuses through cognitive, serious behavioural, mental and psychological trauma. This usually takes place when they apply weird forms of punishment, such as confinement in a dark room or inside a closet, tying up with bed or chair on anything fixed furniture for the long term and terrorizing a child for threatening in different ways⁵.

Neglect

Neglect is described in the context of child abuse when a child is denied to get the basic requirements. It also encompasses varied forms including educational, emotional and physical. In most of the cases, neglect related to

education refers to the fallacy of the parents of the caretaker to provide appropriate educational needs and schooling. Furthermore, the emotional or psychological neglect includes the deficiency of emotional or psychological support from the families or the teachers or the siblings.

Legal Perspective for Child Protection

As per the legal perspective in India, children of this country are meant to enjoy the right to be protected from any sort of vulnerable situations and exploitations in any form. However, it needs people to be aware and spread awareness about the preventive measures for child abuses. For this, it is necessary to detect the real problems along with the risks associated with the bringing up of the children so that we can prevent them from becoming the victims or future criminals. Both the elderly men and women are liable to understand the remedies for each issue and form of child abuses in light of the legal perspective in order to abide by them and convince others not to violate them risking the future of a child⁶. By the term of a legal perspective, people should know the policies and laws that protect the children from being abused within and externally from the family.

Constitutional Interference

The protection and welfare of the children in India are safeguarded by the Indian Constitution that contains numerous provisions to prevent child abuse. Indian Constitution in this context has been amended several times and has shaped up into the present form with the empowered Legislature including distinguished policies, special laws and safeguarding measures of children rights. In this context, Indian Penal Code and the articles of 14, 15, 15(3), 19(1) (a), 21, 21(A), 23, 24, 39(e) and 39(f) that ensure the safety and protection of the children within any territory of the country⁷. All these articles of Indian penal code are empowered for the purpose of

³ Kumar, A., Bhagyalakshmi, K.C. and Foster, J.M., 2018. Child Sexual Abuse: Evaluating the School-Based Prevention Programs in India. In *Social, Psychological, and Forensic Perspectives on Sexual Abuse* (pp. 166-178). IGI Global.

⁴ Dayal, R., Kalokhe, A.S., Choudhry, V., Pillai, D., Beier, K. and Patel, V., 2018. Ethical and definitional considerations in research on child sexual violence in India. *BMC public health*, 18(1), p.1144.

⁵ Behere, P.B., 2018. Child Sexual Abuse Indian Scenario: Existence in India. *Journal of Indian Association for Child & Adolescent Mental Health*, 14(1).

⁶ Jain, R., 2017. Sexual Predation: Protecting Children In The Era Of Internet-The Indian Perspective. *Fiat Iustitia*, (1), pp.141-152.

⁷ Peterson, V., 2016. Speeding up Sexual Assault Trials: A Constructive Critique of India's Fast-Track Courts. *Yale Hum. Rts. & Dev. LJ*, 18, p.59.

ensuring the provisions for safety, protection, security, and wellbeing of the children along with the people who are accused but yet to be proved.

The Indian Penal Code, 1860

The protection of children and ensuring their safety from any sort of child abuse or maltreatment had been initiated in Colonial India when the British government used to rule this country. According to the Indian penal code, 1860 was further updated in 1994 with the Amendment Bill highlighting the issue of validity in the present post-colonial India. This bill was amended and passed in the name of Regulations and Preventions of Misuse Act 1994 comprising with more advanced Diagnostic techniques for the victims and the accused abusers⁸. This amendment has been proven more dynamic to ensure the interests of the victims of child abuse and neglect along with the interests of the accused before being proved with his or her crime. Foeticide and infanticide had been described as two major criminal offenses, which are punishable by the court. Any act of foeticide under the section of 315 and 316 was described as a punishable act done by any person even from the family. This punishable act has been accompanied by another punishable act of infanticide under the section of 315, which regulates punishments to the person who violated this act under the Indian Penal Code. This act also had emphasised on the abatement of suicide under the section of 305 to protect the minors from committing suicide due to any form of child abuses and neglect.

The Regulation and Prevention of Misuse Act 1994 also encompasses exposure and abandonment under the section of 317 that prevents any sort of crime from the parents or others outside the family against the children to leave or expose with loneliness with or without the intention of abandonment. On the other hand, starting from section 362 section 369 under the Regulation and Prevention of Misuse Act 1994 protects the children from being kidnapped or abducted. This act also focuses

⁸ Sharma, A., 2016. Fines as a punishment in Indian Penal Code, 1860: A jurisprudential failure or commodification of an offense?. *Journal of Contemporary Criminal Justice*, 32(3), pp.243-263.

on the procurement of minor girls by force or inducement to seduce are having illicit intercourse under the section of 366-A. In India, child trafficking is another major issue that needs distinct attention from the Supreme Court. For this reason, this act also emphasizes section 372 in order to prevent any arrangement or intention to sell girl child for prostitution. With the private attention on the pre-natal Diagnostic techniques, this act also enables section 373 to prevent the counterpart of 372 by protecting the girl children from being bought for prostitution⁹. Section 376 also encompasses the safety of the girl children from being raped as well as the elderly woman who is a victim under the same section... the prenatal Diagnostic technique under this act is enabled to prioritise the prevention measures of any misuses of the determinants under any section of this act.

The Juvenile Justice (Care and Protection of Children) Act, 2000

The Juvenile Justice (Care and Protection of Children) Act 2000 ensures extensive care provisions for the children along with enabling treatment and protection for the children. As per this act, the children are meant to be taken care of, protected and treated in any conflict situation associated with care and development needs. The objective of this act has been enabled on the pride foundation of the assurance for child-friendly approaches within the disposition and adjudication of matters associated with the best interest of the children. Furthermore, it also empowers the child care facilities with the ultimate rehabilitation arrangement with the help of various institutions of government established under section 23 to 26 of this act¹⁰. These sections of this act are also liable to deal with any situations related to child abuse and the confirmation of their rehabilitation as soon as possible.

Child Labour (Prohibition and Regulation) Act, 1986

⁹ Sarmah, M. and Mahanta, S., 2017. Crime against women in India with reference to the Indian Penal Code. *Clarion: International Multidisciplinary Journal*, 6(2).

¹⁰ Agarwal, S. and Kumar, N., 2016. Juvenile Justice (Care and Protection of Children) Act 2015: A Review. *Space and Culture, India*, 3(3), pp.5-9.

Child labour issue is one of the dreadful phenomena in India that not only prevents the children from having proper education but also ruins their natural growth dynamically. It is very shameful for any constitution that this issue still remains even with increasing rate. Thus, the Supreme Court of India has enabled Child Labour (Prohibition and Regulation) Act 1986 for this issue to be resolved or prevented properly. This act enables the provision for child labor to be eliminated from any social structure and allow the children to get their right to education. This act also encompasses the provision for punishments and penalties for the people employing children under the age of 14 years¹¹.

The Immoral Traffic (Prevention) Act, 1956

Women trafficking and child trafficking are two extremely dreadful issues in India that the government has been witnessing for many years. The Government of India, a few years after the Independence, had brought this issue in the light. In 1956, the Indian Constitution has been amended with The Immoral Traffic (Prevention) Act in order to deal with this issue and the related offenses of sexual exploitation with the children especially for the purpose of commercial benefits by individual or syndicates¹². Furthermore, it also had enabled this act to ensure the provision for punishment and penalties for the people or individual involved with any sort of child trafficking under this act.

The Commissions for the Protection of Child Rights Act, 2005

The childhood rights had been found with the needs of further amendments in order to ensure their requirements related to their protection to be delivered properly. The Commissions for the Protection of Child Rights Act was passed in the year of 2005 in order to maintain the provision what the constitution of both the state and national commissions to protect the child

rights in every federal state within the Union Territory of India¹³.

The Prohibition of Child Marriage Act, 2006

Child marriage, especially among the girl children, is another frightful issue for the Indian society, which is no less harmful than the child labour issues in this country. This is the reason why the Child Marriage Act had to be amended in 2006 with the name of The Prohibition of Child Marriage Act, 2006. The objective of this act is to enact with people for the purpose of bringing an end to the practice of both physically and psychologically misleading practices of child marriages in India. It enables the awareness for the people to not to engage any girl child in marriage before the age of 18 years, which was validated for the boy child until he gets the age level of 21 years¹⁴. It also indicates that every child marriage practice is meant to be voidable at the option of contracting party who used to be a child under the age of 18 years while getting married.

Protection of Children against Sexual Offences Act, 2012

The explicit child abuses incidents are mostly found associated with diverse sexual offenses and in India, the rates are increasing since the last decade. In the year 2012, the child protection activities related to the sexual offenses has been amended in the parliament with Protection of Children against Sexual Offences Act 2012¹⁵. The objective of this act is to strengthen the legal options for the victims of childhood rape and other sexual assaults. It also protects both the boy and girl children from being sexually abused or exploited within or outside their family. This act also empowers the notion that no child can intentionally or unintentionally be involved in any sexual arrangements until the age of 18. This act

¹¹ Deb, S., Sun, J., Gireesan, A., Kumar, A. and Majumdar, A., 2016. Child rights as perceived by the community members in India. *International Law Research*, 5(1), pp.1-15.

¹² Shukla, R., 2018. 1.1 Suppression of Immoral Traffic (Prevention) Act, 1956. *International Journal of Applied Psychoanalytic Studies*, 15(1), pp.61-63.

¹³ Bhattacharyya, R., 2017. Sociologies of India's missing children. *Asian Social Work and Policy Review*, 11(1), pp.90-101.

¹⁴ Pandya, Y.P. and Bhandari, D.J., 2015. An epidemiological study of child marriages in a rural community of Gujarat. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, 40(4), p.246.

¹⁵ Belur, J. and Singh, B.B., 2015. Child sexual abuse and the law in India: a commentary. *Crime Science*, 4(1), p.26.

encompasses various areas related to childhood sexual offenses related to sexual harassment, sexual assault or casting in pornography. Rigorous imprisonment in accordance with the gravity of the offense is meant to be provided to the accused if the incidents are proved in the court. In addition to it, this act also enables the court to take fine from the concrete alongside the rigorous imprisonment. Section 3 of this act was the penetrative sexual assault that imposes not less than 7 years of imprisonment and up to life imprisonment with fine under Section 4. Section 5 of this act prevents aggravated penetrative sexual assault by imposing 10 years of imprisonment at least and it can be extended up to a lifetime with fine if the time is proven under section 6. Section 7 refers to the normal sexual assault, which does not allow the criminal to be released before at least three years of imprisonment or extended up to 5 years according to the gravity of the crime¹⁶. Under section 11 and 12, sexual harassment on child issues are treated strictly with no less than 3 years of rigorous imprisonment with fine. Section 13 and section 14 of this act prevents the children from being used and tough state in pornographic purposes. 5 years minimum to 7 years of imprisonment is meant to be imposed for the offended if the event is proved in the court.

The Protection of Children from Sexual Offences (POCSO) Act

A requirement of the robust legislative framework has been observed by the Indian Parliament as well as the government for the purpose of protecting the child rights and preventing child abuses from the country. In the year 2012, the Indian Parliament and passed the bill for the Protection of Children from Sexual Offences Act or popularly known as POCSO. It enables the protection measures for children from any sort of offenses regarding sexual assault, pornography, and sexual harassment. This act also safeguards the interests of the children from the various states

¹⁶ Moirangthem, S., Kumar, N.C. and Math, S.B., 2015. Child sexual abuse: Issues & concerns. *The Indian journal of medical research*, 142(1), p.1.

of the Indian judicial process¹⁷. the fundamental framing of this act intends to put every child first by making things easier for him or hard by using the inclusion of children-friendly reporting mechanism followed by evidence recording, an investigation with full pace and rapid trial arrangement with the help of the designated Special Courts. .

Contention around implementation of POCSO

With the growth in criminal incidents over the last decade across the nation, the cases of child abuse and mental torture remain in the obscure. There have been public outrages over the cases of adolescent and child rape that aghast the integrity of the nation at large¹⁸. According to Lodha and De Sousa (2017), there have been instances of ignorance about the **Protection of Children from Sexual Offences Act**, who may be in dire need of it. Thus, the distressed and bereaved family members of the affected children consider themselves as helpless and confused and are not able to make up with the debacle situation¹⁹.

Despite of the implementation of the **Protection of Children from Sexual Offences Act** on November, 2012, this special customized law remains in the darkness and lacks a strong enforcement and enactment. According to the demographic ration, 40% of the Indian population are under the age range of 18 years and out of the 40%, 53% of the children have been victims of the some kind of sexual abuse or the other²⁰. With the specific terms and clauses in the law, POCSO is especially tailored to safeguard the interests and of the children and adolescent under the

¹⁷ Seshadri, S. and Ramaswamy, S., 2019. Clinical practice guidelines for child sexual abuse. *Indian Journal of Psychiatry*, 61(8), p.317.

¹⁸ Seth, R. and Srivastava, R.N., 2017. Child Sexual Abuse: Management and prevention, and protection of children from Sexual Offences (POCSO) Act. *Indian pediatrics*, 54(11), pp.949-953.

¹⁹ Pathak, M.K., Jha, S.S. and Rai, S., 2018. A Case Reported Under POCSO Act and Murder. *Journal of Punjab Academy of Forensic Medicine & Toxicology*, 18(2).

²⁰ Kumar, A., Bhagyalakshmi, K.C. and Foster, J.M., 2018. Child Sexual Abuse: Evaluating the School-Based Prevention Programs in India. In *Social, Psychological, and Forensic Perspectives on Sexual Abuse* (pp. 166-178). IGI Global.

age of 18 years and any kind of illegal offences like, physical assault, sexual abuse of pornography are stringently punishable under the law²¹.

Weaker Implementation of the POCSO Act

Despite having such stronger implementations under the POCSO act, the act remains as un-executed at significant levels. This **Indian Penal Code** calls for severe punishments for sexual abuse, however, fails to distinguish between the sexual assaults against the children and adults. It has the special provision of the punishing the wrong doer if he belongs to the defence, public servant, observation homes or any member belonging to the educational institution²². Having such intermediaries within the legal rule book, the law attempts to persecute the felon on the ground rules placed forth by the act. Although having such robust provisions, the implementation remains weak in the sense that the incidents authenticating the act often lack an expedited proceeding and thus the phase of reaching at conclusions remain difficult²³.

It has also been debated by intellectuals, who opine that the proceedings of such cases must be strictly done under the secured environments and that there should be any kind of contact or bad mouthing of the accused against the child victim²⁴. Considering the challenges regarding the implementation of the act, it has been noted further that conducting optimized training to the relative stakeholders pertaining to the process of implementation of the act has been facing a considerable chasm. Incidents of the lack of speedier processing in some of the recent cases like the Delhi rape case and the **Rohtak Shelter Home case of 2012**, where 100 shelter members facing sexual

abuse have not yet been under the legal scanner²⁵. Additionally, the Supreme Court had issued a strong directive in implementing the POCSO act by ensuring that the legal regulatory bodies and the legislative cohort must be proactive and prompt in action and enforcement of the act²⁶. However, the challenge lies in the fact that such intermediary bodies have been partially functional and active in their individual accountabilities.

Thus, looking at the weaker implementation of the act, it has been initiated by the High Court to order to for a mandatory registration of all the child homes and shelters across the nation along with the care centres²⁷. The legal instruction for amending special Children courts have been incepted by the Supreme Court to deal with the child abuse cases individually in order to raise a mass voice against the disgraceful acts of child abuse. Another challenge that has characterized the child abuse act has been the lack of infrastructure that has led to the inadequacy in execution of the legal interventions²⁸. A dearth of child friendly atmosphere and children being exposed to the accused at any point of time during the legal proceedings have been construed as areas of contention and incongruence in delivering the legal provisions of the POCSO act.

Lack of infrastructure includes video-conferencing, curtains and the single-visibility mirrors have been discovered as the areas of much needed rectitude. The act also calls for interventions and engagements of NGOs and experts to assist the child in the case proceeding, under the section 39 of the POCSO

²¹ Seth, R., 2015. Child abuse and neglect in India. *The Indian Journal of Pediatrics*, 82(8), pp.707-714.

²² Kumari, V. and Barn, R., 2018. 002_Sentencing In Rape Cases A Critical Appraisal of Judicial Decisions In India.

²³ Juyal, D., Setia, A., Sayana, A., Kumar, A., Rathaur, V.K. and Dhawan, B., 2017. Lack of special courts under protection of children from sexual offences act: A structural deficit. *Journal of family medicine and primary care*, 6(4), p.881.

²⁴ Patil, B., Hegde, S. and Yaji, A., 2017. Child abuse reporting: Role of dentist in India—A review. *Journal of Indian Academy of Oral Medicine and Radiology*, 29(1), pp.74-74.

²⁵ Raha, S. and Sengupta, S., 2018. Rights of Women with Disabilities under Indian Legislations. *Socio-Legal Rev.*, 14, p.190.

²⁶ Lodha, P. and De Sousa, A., 2017. The Prevention of Child Sexual Offences (POCSO) Act and ethical considerations for children in therapeutic practice. *GLOBAL BIOETHICS ENQUIRY*, p.87.

²⁷ Shetty, C.K., Biradar, G. and Shetty, P., 2017. Sexual assault in Ballari, Karnataka, India: a four year retrospective review. *Arab Journal of Forensic Sciences & Forensic Medicine (AJFSFM)*, 1(6).

²⁸ Singh, S., 2018. Self-Proclaimed God Convicted, POCSO Amended. *Space and Culture, India*, 6(1), pp.7-15.

act²⁹. The provision of recording the child's statement at the place of residence is also missing under the legal intercessions conducted by the legal professionals within the act. However, some of the exemplary cases likely the **Agnelo Valdaris Case** have been a commendable representation of the ensuring severity in punishment and spreading a sense of cognition to raise voice against the highly sensitive issue of child abuse³⁰. Thus, it needs to be stated that POCSO despite being a compact act with having all sorts of provisions must witness higher scalability and levels of implementation rather than squandering over exploring alternatives of the POCSO act.

²⁹ Deb, S. and Ray, M., 2016. Child abuse and neglect in India, risk factors, and protective measures. In *Child safety, welfare and well-being* (pp. 39-57). Springer, New Delhi.

³⁰ Agnihotri, S. and Das, M., 2015. Reviewing India's protection of children from sexual offences act three years on. *South Asia@LSE*.

THE RISE OF VIDEO ON DEMAND IN INDIA: LEGAL ISSUES AND CHALLENGES

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ABSTRACT

Today the technology has evolved to such an extent that the television is not confined to four walls of the home or a theatre. Nor is it bound by any time schedule. Today, the viewers control the content. The change in content delivery and management system due to the emergence of technology has provided the viewers with a huge variety of a la carte, 'unregulated content' through Video on Demand Services commonly known as VoD.

Regulation of content has always been an important concern in India owing to the dynamic and diverse audience in terms of age, language, religion amongst others. In recent times all such restrictions and mandatory guidelines have come to an end due to availability of web content on phones, laptops and tablets without any censorship from any Censor Board or any authoritative body.

There are a few instances which have brought the violations before the courts. Many more remain unreported yet potentially damaging to the legal system. A policy vacuum has been created due to this revolution. There are no specific and dedicated guidelines or policies for the regulation of content on these platforms.

In this paper, the authors state the need for regulation of VoD services by analysing the various reasons behind its growth and the legal issues and challenges it poses to the current regulatory regime.

Keywords: content, censorship, Video on Demand (VoD), regulation, guidelines.

“You on the cutting edge of technology have already made yesterday’s impossibilities the commonplace realities of today.”- Ronal Regan³

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³Ronald Reagan, originally an American actor and politician, became the 40th President of the United States serving from 1981 to 1989, available at: <https://www.whitehouse.gov/about-the-white-house/presidents/ronald-reagan/> last accessed<June,14, 2021>

INTRODUCTION

On the cusp of the Fourth Industrial Revolution (Industry 4), disruptive innovation is quicker, and the global diffusion of new technologies is much faster. Industry 4 comprises of fusion of technologies blurring boundaries between biological, physical and digital spheres. From a regulation perspective, it is challenging in defining legal boundaries in which these technologies operate. Policymakers face massive challenges due to disruptive technological innovation and thus pressing the need for debates to devise dynamic and responsive legal frameworks to regulate technology. These, technologies are bringing about a fundamental shift in decision-making and have begun to reshape operations of the modern legal practice.

In this paper, the author states the need for regulation of VoD services by analysing the various reasons behind its growth and the legal issues and challenges it poses to the current regulatory regime. The author shall state in brief how different jurisdictions around the globe are dealing with the legal issues associated with this fairly new technology. This analysis shall help in making educated decisions in finding out what is the best way to regulate VoD platforms in India.

Lately, every major disruption across different industries has been directly or indirectly due to the influence of technology and its advancements. Early 1920s saw the emergence of electronic television. Its infrastructure was very reliable and worked flawlessly.⁴ The idea that the purpose of televisions will be used for entertainment and movies was inconceivable at that time. Then the cable operated system was replaced that with small satellite dishes installed directly in the homes of the viewers. This made the TV more accessible to majority of viewers and this also removed the geographical barriers as it could be installed even in remote areas where cable operators could not reach. Then came deregulation, liberalisation and globalisation. This further paved way for more disruptive TV models. These newer models used internet as their power to reach more and more people with less expensive infrastructure and much greater reach.

This did not stop there, today the televisions and entertainment has shifted in the palm of hands of every person and this is possible because online curated content is now available on various digital media platforms accessible through smartphones. This model now known as VoD, was earlier known as 'TV Everywhere' platform model.⁵

⁴Baccarne, B., Evens, T. and Schuurman, D., 2013. 'The television struggle: an assessment of over-the-top television evolutions in a cable dominant market.' (2013) *Communications & strategies*, pp.43-61.

⁵Waterman, David, Ryland Sherman, and Sung Wook Ji. 'The economics of online television: Revenue models, aggregation, and TV Everywhere.'

Video on Demand or commonly known as 'Over The Top' is a real time technology that enables the users and subscribers to watch their favourite shows and video content anytime and anywhere, also one can download their must watch content to enjoy binge watching later at the comfort of their couch. It is one amongst the many revolutionary technologies that have proved to own this 21st century with their services and popularity between populations of all age groups as well as making lives simpler.

A video on demand setup doesn't require a complex setup of number of devices, instead a device as small as your pen drive can be installed to your regular television to transform it into a video on demand platform where a person is able to search from an array of channels and then can select and watch them. Also, the consumers can enjoy ott services through accessing internet over their smart phones, computers and laptops etc.

VoD uses an interactive real time technology that enables an end user to select their content at any time form a database of video content and then the user has the option to either to stream it online or to download it for later. The video content to be streamed online is stored in a digital format on a video server. When the user selects the content via an internet connection the video is compressed and transmitted. After being transmitted to the user the content is then decompressed and decoded and the end user then enjoys online streaming without any interruption.

The main reason behind the sudden growth in popularity of Video on Demand content is that it doesn't work on the schedule decided by the channel providers instead it leaves this department on the discretion of the users. Thus, speaking of recent times where everyone finds it difficult to spare out free time for their favourite shows on the scheduled timings, VoD platforms have proved to become a boon in the lives of the millennial, where they have the power to control what and when they enjoy watching.

Video on demand (VoD) services have exploded exponentially in the past few years. One of the major reasons of such increase in its users is the increasing rate of smartphone users in India. The number of users will reach 1 billion by the end of 2025.⁶ It is also estimated that by 2025 the valuation of digital economy in India will be around 1 trillion dollars.⁷ It is

Aggregation, and 'TV Everywhere' (April 1, 2012) (2012).

⁶ Atlas C, 'India estimated to reach 1 billion internet users by 2025' (Atlas VPN, 23 September 2020), <<https://atlasvpn.com/blog/india-estimated-to-reach-1-billion-internet-users-by-2025>> accessed 29 November 2020

⁷Ayan Pramanik, '850 mn internet users key to India's \$1 trillion digital economy: Report' (The Economic Times, 18 May 2018), <<https://economictimes.indiatimes.com/tech/ites/850-mn-internet-users-key-to-indias-1-trillion-digital->

also expected that the VoD industry in India will be worth 823 million dollars by the end of 2022.⁸

Today this industry has evolved. The viewers control the content. The change in content delivery and management system due to the emergence of technology has provided the viewers with a huge variety of a la carte, 'unregulated content'. The VoD can cater any program directly to its viewers, bypassing the traditional regulatory infrastructure.⁹ It lacks the necessary mechanisms and procedures for detecting and preventing the distribution of unsuitable content that is discriminatory based on religion and gender and may be harmful to the nation's social fabric¹⁰.

The terms, OTT and VoD are often used as synonyms to each other but these are two entirely different concepts. Let us try to understand the difference with the help of an example, suppose a viewer is watching a live cricket match over the internet, this is an OTT content. It will not be considered as VoD because the viewer has no control or choice to determine the time to view this content as it is a live match. Instead, VoD allows viewer to be in absolute control of what and when he wants to see. The VoD content includes movies, series, short videos, music, podcasts and much more.

The VoD uses internet, which allows both, the servers and the user's device to directly communicate with each other. There are mainly three types of VoD services. These are:

- i. AVoD (Ad-Supported VoD): These platforms allow users to view content on their platform in exchange of placing ads in the video. This allows the platform to earn its revenue. The most common one is YouTube.
- ii. TVoD (Transactional based VoD): TVoD refers to the viewing of content by buying media disks like CDs and DVDs. This allows the user to watch the content anytime they wish to watch.
- iii. SVoD (Subscription based VoD): This is the most common VoD platform today. This allows the user to view the complete content library of the SVoD platform in exchange of some subscription amount that is charged to

economy-
report/article/show/64193359.cms?utm_source=content
ofinterest&utm_medium=text&utm_campaign=cppst>
accessed 29 November 2020

⁸ 'Video on Demand: Entertainment reimagined', Price Water Corporation (December 2018)

⁹ Venturini, Francesco. 'The race to dominate the future of TV.' (2011), New York: Accenture

¹⁰ Keya K and Singh AP, "OTT Regulation: A Need for Modern Day Entertainment" (Blog on Intellectual Property and Technology Law February 14, 2021) <http://csipr.nliu.ac.in/technology/ott-regulation-a-need-for-modern-day-entertainment. (accessed May 21, 2021)

the viewer. Apple TV, Netflix, Amazon Prime, Hotstar are some popular examples.

Legal Issues and Challenges

Digital disruption is generally caused due to the advancements in technology at an accelerated rate when law, economy and policy take a much slower pace to evolve in response to that.¹¹ The same has happened with VoD services all over the world. It becomes increasingly difficult to form policies for emerging technologies as these policies must maintain a balance between rights of service providers and the customers.

Unlike developed countries, it becomes much more difficult for countries like India to tackle any digital disruption with competent laws in time. Today, the Indian market is flooded with applications that provide VoD services. These applications range from international players such as Netflix, Amazon Prime, Disney Hotstar to locally brewed companies such as Alt Balaji, Voot, Ullu and many more.

Earlier, the content had to pass various tests and had to be in accordance with the standards of the Censor Board before it released for the viewers. And then the viewers were required to reach out to their nearest possible theatres to enjoy the content. But with VoD, you can watch your favourite content on a variety of connected devices using the most popular platforms. Because of technological restrictions, this was never feasible with standard cable TVs.¹²

The VoD services have created a parallel medium to disseminate such content. That has led to a situation where the same content might be censored in cinemas and on television, but not on streaming platforms as regulation of content on VoD services does not exist. The said online platforms broadcast content which must carry reasonable restrictions as enshrined under Article 19(2) of the Constitution of India and should be under some regulation while specifically dealing with such web exclusive content so that it complies with certain standards and regulations in order to prevent them from adversely affecting the population in general.

Early enough India brought the Cinematographic Act, 1952¹³. The Act along with the guidelines of the Central Government played a major role in content filtration through censoring objectionable content. The right to freedom of speech and expression, like other

¹¹ Davis, Charles, and Emilia Zboralska, 'Transnational over-the-top media distribution as a business and policy disruptor: The case of Netflix in Canada.' (2017) The Journal of Media Innovations 4, no. 1, 4-25.

¹² Periwal P, "The Rise of OTT Platforms in India, and the Fall That May Come Soon" (SambadEnglish December 16, 2020) <https://sambadenglish.com/the-rise-of-ott-platforms-in-india-and-the-fall-that-may-come-soon/> accessed May 20, 2021

¹³ The Cinematographic Act, 1952, Sec 5.

fundamental rights is not absolute in nature. The Supreme Court of India in the case of K. A Abbas vs Union of India¹⁴ has justified censorship and stated that “it is the social interest of people that overrides an individual’s fundamental rights.”

In the later 90s when the concept of televisions became more rampant the government thought of bringing another set of independent rules and regulation to keep a check on what can be presented. Though the Indian Penal Code¹⁵ already had provision regarding the circulation, distribution and display of obscene material a need for separate regulations was felt. The operation of television networks, broadcasters and interconnected issues were governed by the Cable Table Networks (Regulations) Act, 1995 and Cable Networks Rules, 1994.

Content regulation has always been an important concern in India owing to the dynamic and diverse audience in terms of age, language, religion amongst others. In recent times all such restrictions and mandatory guidelines have come to an end due to availability of web content on phones, laptops and tablets without any censorship from any Censor Board or any authoritative body. A number of platforms famous for their unfiltered content includes, ZEE 5, Amazon Prime, Netflix, Alt Balaj. Along with entertainment at your fingertips, obscene language, immoral scenes, vague and abusive language also reach out to the youth, children and other vulnerable sections of the society. Few web series are also accused of violating and hurting social, moral and righteous beliefs and thus spreading communal and political hatred. However, these platforms cannot be left to broadcast unrestricted, unregulated content in the name of right to free speech and expression.

A PIL¹⁶ was filed in the Apex court the grievance of the petitioner being that there are no guidelines to regulate the contents which are broadcast on the online platform. This petition was dismissed by the court on the ground that the Information Technology Act is a robust legislation requiring no additional guidelines or regulation to deal with the grievance.

Another petition¹⁷ was filed in the Delhi High Court with a grievance relating to a thriller series titled, “Sacred Games”. It prayed for framing of guidelines for content considered “vulgar and offensive” and prayed to the court to get the offensive scenes deleted completely from the series. The writ petition has been dismissed.

¹⁴1971 AIR 481.

¹⁵ The Indian Penal Code, 1860 ,Sec295 A.

¹⁶Justice for Rights Foundation v. Union of India, W.P (C) No. 11164/2018.

¹⁷Nikhil Bhalla v. Union of India, Writ Petition (Civil) Number 2018/7123.

A writ petition¹⁸ was filed before the Hon'ble High Court of Calcutta on May 26, 2020. Relief was sought seeking relief against the derogatory, defamatory and anti-communal language used in a web series "Patal Lok" airing on VoD platform, Amazon Prime Video.

The case of Divya D/O GaneshprasadGontia vs Union Of India¹⁹, is another instance where a PIL was filed seeking regulation of a popular web series. The PIL apart from demanding bringing in web series under the scanner of a body like Censor board, also demands strict action against the web series makers, service providers, web portals and other stakeholders for promoting obscenity, vulgarity and violence.

CONCLUSION

These are only few instances which have brought the violations before the courts. Many more remain unreported yet potentially damaging to the legal system. A policy vacuum has been created due to this revolution. There are no specific and dedicated guidelines or policies for the regulation of content on these platforms. The result of this space being an unregulated space currently is that a lot of breach of existing laws is taking place and the players are trying to regulate themselves to avoid any government interference and this self-regulatory code is definitely not in accordance to the best suitable law.

No society has ever evolved with an intention to follow a complete ‘ban-culture’ when it comes to technologies. It is important to strike a balance between advancements in technology and the rights of individuals. ‘Censorship’ or reasonable restrictions on the flow of content, has garnered prime attention in the country. It has received mixed reviews. Some are of the view that regulation is must while others call regulation as a hurdle in enjoyment of creative freedom.

However, on the other hand, Excess of restrictions and guidelines may limit the creative flexibility of content creators. The performers and new age content creators who are breaking all moral stereotypes to present us the new vivid face of the entertainment business would be left agitated with excess regulation.

Many countries around the globe have implemented laws to regulate the VoD content. Countries like UK, Turkey, Singapore and Australia have dedicated Laws and guidelines to regulate the online media content.

Earlier, the Ministry of Electronics & Information Technology was the concerned stakeholder for issues regarding regulation of VoD platforms and their content. However, it denied the need for any dedicated set of rules for the regulation and addressing the issues. Instead, it suggested that such regulations are already existing in the intermediary’s guidelines and various

¹⁸Pranay Rai v. Clean Slate Filmz Pvt. Ltd. &Ors, Diary No 1334/2019

¹⁹ Public Interest Litigation No. 127/2018

other provisions under The Information Technology Act, 2000.

On the other hand, Ministry of Information & Broadcasting stated the need to prescribe stringent guidelines and penalties to limit the content being published online. The Government of India on November 9, 2020 published a notification (S.O. 4040(E)) in the official Gazette of India. This notification brings all films and audio-visual contents made available by online content providers under the purview of Ministry of Information and Broadcasting. Currently, the Ministry has asked all OTT platforms to form a self-regulating framework and submit the same within hundred days.

With the proposed Information technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021. A three-tier system of efficient grievance resolution is proposed. It refers to as a "soft-touch regulatory architecture." While the first two tiers provide a system of self-regulation by the platform and self-regulatory organisations for content producers, the third requires the Centre to establish an oversight mechanism.²⁰The major guidelines include non-transmission of prohibited content, assignment of content ratings and providing a viewer discretion advisory. However, these guidelines are not new to the regime. They were already existing even before the rules. The existence of these guidelines is not the solution. The strict implementation of these is required instead.

The three-tier system laid down in the rules includes,

1. At first level, self-regulation and an appointment of a grievance redressal officer and establishment of a grievance redressal mechanism.
2. At the second level, self-regulating and independent bodies shall be established to oversee the adherence of the code.
3. At the third level, the Ministry of Information and Broadcasting shall establish an oversight mechanism by constituting an inter departmental committee of government officials to regulate the digital content.

These rules suggest that there shall be greater scrutiny and regulation on VoD content along with effective grievance redressal mechanism. But these does not seem to be something that we can witness in the near future. It still remains a far-fetched dream. It is still a matter of contemplation that whether these rules will enable better governance or only beautify the text of the code. It has always been necessary to set the legal process into motion when grave issues which affect the society at large are brought to notice which, cause a

²⁰Jha L, "Government Sets out Regulations for Digital Media, OTT Platforms" (mintFebruary 25, 2021) <<https://www.livemint.com/news/india/government-sets-out-regulations-for-digital-media-ott-platforms-11614254583608.html>> accessed May 22, 2021

miscarriage of justice or pose a danger to society. In an era of rapidly changing entertainment media regime, the government and other stakeholders must work together to create a framework that balances freedom of speech with the need for essential limits to maintain peace and order. This effort must not be only in letter but in spirit too.

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BEHAVIOURAL CHANGES OF FEMALE CONSUMERS IN ONLINE AND TRADITIONAL SHOPPING

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ABSTRACT

Female consumers are more interested towards shopping. They are enjoying while doing shopping whether it is online shopping or traditional shopping. Shopping the products through internet gives the opportunity to try on from home at any time. In offline shopping, there is no issue of wait for several weeks. When buying urgent product, it becomes convenient. In this study a survey has undertaken to analyse the behavioural changes of female consumers in online and traditional shopping. It was found that young women have mostly attracted towards online shopping and further it was concluded that selection and availability of different brands are the attractive features of internet shopping.

Keywords: Female consumer, Online shopping behaviour, Traditional shopping behaviour

INTRODUCTION

The retail sector is one of the fastest growing commercial sectors in India. It has become the back bone of the Indian economy. Indian consumers, especially female consumers may have some special interest in the product they buy as well as the mode they buy it. Both online and offline shopping have their own advantages and disadvantages. There is no need to travel long distances in online shopping and consumer can choose from a wide variety of products. It remains functional 24 hours a day and 7 days in a week. Customers get great offers and discounts and have the facility to check reviews of previous customers. Conversely, traditional purchasing has the advantage that customers can physically inspect the product and ensure the quality. Although in the modern age, shopping through internet has become quite a craze among the masses especially among female shoppers. There are many types of online portals. Among those most popular online shopping sites are: Amazon. in, Flipkart.com, Snapdeal.com, Jobong.com and Myntra.com.

Consumers are said to be the leaders of the market. Therefore, studying and analyzing the behaviour and attitudes of consumers are essential and inevitable for the survival of a business. The age of the consumers can influence their behaviour. Purchasing behaviour may vary according to their level of income. Similarly, gender is another significant demographic variable that needs to be studied further. A female consumer uses both types of shopping channels. Some of them consider physical stores as primary shopping channel and internet shopping as supplementary channel while others follow the reverse pattern.

In a common perspective, people with higher learning and higher incomes are favorable to online shopping. The shoppers who are more knowledgeable and more explored to the internet are more in to online shopping. The technological advancement is also creates a

favorable attitude towards online shopping among the customer especially female shoppers.

PROBLEM STATEMENT

Although the customer is the key element of a business, their taste, preference and attitudes are unpredictable. This study will help to understand the problems of female consumers related to online and traditional purchasing. The need for clarity on the factors that make them reluctant to offline and online shopping is relevant. Some specific questions need to be answered. Why do female shoppers rely on internet shopping? Why do they shop from physical market instead of relying on online shopping? The study creates an awareness of electronic shopping and gives an idea about the most beneficial shopping option among female consumers.

REVIEW OF LITERATURE

Given below the summary of previous findings that are significant for this study

Fenigstein, A.,Scheier, M., & Buss, A., (1975) concluded that females in comparison to males are highly knowledgeable about price and types of stores and hence this knowledge can influence the retailer management strategies.

Harris, M., & Rodgers, S.,(2003) Women are less emotionally content with online shopping than men are, this since women found it less convenient. Women also had less trust in online shopping than men.

Sriparna, G.,(2013)found in her study on the changing perception and buying behaviour of women consumer that working women are more involved with purchasing activities. They are more price conscious as compared to the non-working women. It has also been observed that working women are more store loyal than non-working married women.

RESEARCH OBJECTIVES

- To examine the factors influencing female consumers to switch from the traditional shopping to online shopping and online to traditional shopping.
- To bring out the factors influencing the female respondents to purchase solely offline and solely online.
- To analyse whether the educational qualification of the woman shopper affect the online shopping and offline purchasing.

STUDY METHODOLOGY

The study was completed by implementing a research design that is partially descriptive and partially analytical. Both primary and secondary data were used. Primary data was collected by issuing questionnaire. Secondary data was collected through various reference books and journals. The study was conducted in Iritty municipality (Kerala) using convenient

sampling technique. Findings and conclusion are based on 150 sample responses.

HYPOTHESIS

Two attributes, educational qualification of respondent and preference of shopping mode are independent.

LIMITATIONS OF THE STUDY

- The reliability of the findings purely depends on the information provided by the respondents.
- The analysis is based on the research topic so that other area of concern may be neglected.
- The researcher limits size of the sample as 150 respondents due to lack of time, so the result may not be accurate.

DATA ANALYSIS AND INTERPRETATION

Table-1 Educational qualification of the respondents

Qualification	Number of respondents	Percentages
Up to S S L C	8	5.33
Plus two	22	14.67
Graduate	73	48.67
Post graduate	47	31.33
Total	150	100

Source: Primary Data

Qualification is a significant factor which determines mode of shopping. The above representation shows that 48.67% of respondents have qualified as graduate

and 31.33% were qualified as post graduate. The plus two groups consist of 14.67% and the SSLC groups consist of 5.33%.

Table-2 Preference of online shopping portals

Online shopping sites	Number of respondents	Percentages
Flipkart	62	41.33
Snapdeal	19	12.67
Amazon	40	26.67
Myntra	14	9.33
Jabong	10	6.67
Others	5	3.33
Total	150	100

Source: Primary Data

The most relied upon website for online shopping is flipkart, i.e. 41.33%. Next in line is Amazon with 26.67% of people. 12.67% of respondents are reported

to be shopping at Snapdeal. Myntra was chosen by 9.33% and Jabong by 6.67%. Just 3.33% of people rely on other portals.

Table-3 Influenced promotional strategies of online shopping

Promotional strategies	Number of respondents	Percentages
Sale ads	30	20
Discounts	75	50
Festival offers	40	26.67
Others	5	3.33
Total	150	100

Source: Primary Data

Promotional activities play an important role in influencing shopping behaviour. Here, it shows that discounted price attracts 50% of the respondents to online shopping. 26.67% of people are influenced by

festival offers and make online purchases. 20% are found to be affected by sales ads and only 3.33% by other means.

Table-4 Preferred shopping mode if the price is same in the shop and on the internet

Shopping mode	Number of respondents	Percentages
Online shopping	90	60
Traditional shopping	60	40
Total	150	100

Source: Primary Data

One important thing to understand from this study is that if the price of the product is the same, 60% of population chooses online shopping. The reason behind this is that transportation cost and time can be

saved. But 40% of people prefer traditional shopping. This is because the product can be examined directly to ensure quality. Lack of technical knowledge can also be stated as a reason.

Table-5 Is online shopping as safe as traditional shopping?

Opinion	Number of respondents	Percentages
Yes	70	46.67
No	29	19.33
Sometimes	51	34
Total	150	100

Source: Primary Data

As per the table, 46.67% of the population thinks that online shopping is as safe as traditional shopping. 34% said that sometimes they have security problems while

19.33% commented that online shopping is not very safe.

Table-6 Is the selection of goods in online shopping very wide compared to the traditional market?

Comments	Number of respondents	Percentages
Yes	127	84.67
No	8	5.33
Sometimes	15	10
Total	150	100

Source: Primary Data

84.67% of the population says that wide varieties of goods are available in online shopping and it is possible to shop with a single click. But 5.33% of

female shoppers have no such opinion. The remaining 10% are of the opinion that such facilities are available only occasionally.

Table-7 Analysis of reasons for online shopping on the basis of age of the respondents

Age Groups	Saving of time	Door to door services	Saving of transportation cost	Availability of variety of products	Total number of respondents
Up to 18 years	3	3	2	6	14
18-25 years	18	17	19	40	94
25-35 years	6	5	5	15	31
35 and above	3	2	2	4	11

Source: Primary Data

The survey is conducted among 150 female consumers of different age groups. Out of 14 female shoppers up to 18 years of old 3 commented that they chose online shopping because of time savings. Another 3 people attracted towards the feature of door to door service. 2 females stated that they don't need to go outside for shopping purpose and 6 people thinking that wide variety of products are easily available. 94 females are in the age group between 18 and 25. Among them 18 respondents stated that attractive feature of online shopping is time saving and 17 shoppers commented that door to door service is relevant. 19 people gave the reason that they can save transportation cost and majority of them i.e. 40 respondents influenced on wide selection. There are 31 women aging between 25 and 35. 15 of them attracted to online shopping because of wide selection of goods. 6 respondents gave the reason of time saving and 5 customers said that it was door to door service and another 5 commented in favor of the factor 'saving of transportation cost'. 11 women shoppers aging 35 and above were participated

in this survey. Out of them 3 shoppers attracted towards time savings and 2 respondents gave the reason of door to door service and another 2 people influenced on transportation cost saving and majority of them i.e. 4 customers commented that wide selection of goods is the reason behind their online shopping.

Relationship between educational qualification of respondents and preference of shopping mode

H0: Educational qualification and preference of shopping modes are independent

H1: Educational qualification and preference of shopping modes are not independent

$$\chi^2 = \sum (O-E)^2 / E$$

Where O = Observed frequency, E = Expected frequency

Expected frequency = Row total * Column total / Grand total

Table-8 Observed frequencies

Educational Qualifications	Shopping Modes		Total
	Online shopping	Offline shopping	
Up to S S L C	1	7	8
Plus two	7	15	22
Graduate	39	34	73
Post graduate	29	18	47
Total	76	74	150

Table-9 Calculation of χ^2 Value

O	E	O-E	(O-E) ²	(O-E) ² /E
1	4.05	-3.05	9.30	2.296
7	11.15	-4.15	17.22	1.544
39	36.99	2.01	4.04	0.109
29	23.81	5.19	26.93	1.131
7	3.95	3.05	9.30	2.354

15	10.85	4.15	17.22	1.587
34	36.01	-2.01	4.04	0.112
18	23.19	-5.19	26.93	1.161
Calculated χ^2 Value				10.294

Degree of freedom = $(4-1)*(2-1) = 3$, Level of significance = 0.05

Table value = 7.815

Table value is less than the calculated value. So the null hypothesis has been rejected. Hence, it indicates that there is significant association between educational qualification and preference of shopping mode.

FINDINGS AND CONCLUSION

The most important thing that is clear from the data analysis is that highly educated females between the ages of 18 and 25 are more interested in online shopping. Many respondents over the age of 35 are more interested in traditional shopping instead of online shopping. The main reasons behind this are lack of awareness about online shopping sites and lack of technological knowledge. Therefore, it can be stated that online shopping is preferred by young women.

While comparing with traditional shopping, one of the major problems of online shopping is related to payment system. Many respondents are afraid to make payments through net banking or debit card. Most of the participants in the survey are selected 'cash on delivery' as their payment option. It is also a fact that there are so many people complaining about the delivery system of online shopping. Some people are not interested in buying electronic products from online shopping. Although there are many online shopping portals, flipkart is one that mostly supported by respondents.

The study has been conducted to analyse the behavioral changes of female consumers in online and traditional shopping. Females are more passionate

towards shopping. They are finding enjoyment in shopping whether it is traditional shopping or internet shopping. The study is concluded that majority of females especially young women are attracted towards online shopping. Further it may be added that time saving, reduction in transportation cost, wide variety of goods and its selection are the main factors attracted the respondents towards e-shopping. The merit of traditional shopping is that the shopper can directly check and ensure the quality of goods.

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GENERAL ADJUSTMENTS AND WORK-SATISFACTION OF INDIAN EXPATRIATES

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ABSTRACT

With the growing multinational companies and India attracting such companies, over the years the expatriation of Indian employees to foreign countries has been considerably high. The purpose of this paper is to observe the demographic and work profiles of Indian Expatriates and analyze their general adjustments and work-satisfaction in the host country. The study is grounded on data collected from Indian expatriates based in different countries through a structured questionnaire. T-test and ANOVA was used to find the relations of general adjustments and work-related satisfaction and also the various demographic factors affecting. The primary findings of the study are that gender and marital status doesn't impact general adjustments and work-satisfaction. Age of expatriates has considerable significance in general adjustments and work-satisfaction. And also, there is a positive correlation between general adjustments of Indian expatriates and their work-related satisfaction. The study practically contributes towards the understanding of cultural adjustments of Indian expatriates. This gives implications to the organizations in framing expatriation policies

Keywords: Indian Expatriates; General Adjustment; Work-Related Adjustment; Work-Related Satisfaction Levels

INTRODUCTION

Indian Expatriates are the persons of Indian origin who move to other countries with families to do work and settle there for a long time. Over the time, these persons may become citizens of foreign countries. India is the largest country of origin for expatriates. The new economic policies in India boosted globalization. The globalization process led to companies enters into various foreign markets, deputing employees to different global markets. According to the UN report in 2019, globally India is leading in international migration of expatriates at 17.5 million⁴. As a consequence, the employees are exposed to different unknown cultures and diverse workforce. The intercultural interactions may cause challenges to individuals in the form of general adjustments to the lifestyle and workplace behaviour which may impede the proper working of both the individuals and organization. Managers on international assignments face problems in effectively meeting the personal and organizational expectations (Harvey *et al.*, 2002; Yan *et al.*, 2002). Expatriates' adjustments and performance are very much imperative to do better in the international markets. Because of the poor adjustment of expatriates leads to isolation, unhappiness, poor relations with peers and clients thereby leading to poor productivity. For this reason, organizations make utmost efforts and involve resources in expatriate adjustments.

With proper adjustments, the expatriates will be able to respond appropriately and also successfully adapt to such intercultural situations. Towards this end, organizations usually select the candidates for expatriation based on some factors that indicate their adjustability to the new cultures and environment and also provide pre-departure training. Self-initiated expats too make proper preparations way ahead of their departures like learning the languages and food habits. Many factors makeup the adjustability of expats, especially when Indians have to settle in foreign countries as Indian culture is unique and diverse (Sharma & Dahiya, 2017; Pratheepkumar *et al.*, 2017).

Literature Review

There is usually a gamut of factors that influence cross-culture adjustments of expatriates. Moreover, among many others, job satisfaction is tied to the level of such adjustments. A lot of studies indicate the factor 'cultural intelligence' related to expatriates' adjustments and performance. General Adjustments and performance (Sudhakar *et al.*, 2017; Srivel *et al.*, 2018). Jyoti and Kour (2013) revealed through their study that cultural intelligence significantly contributes to the performance of tasks. And there is a complete mediation of cultural adjustment between cultural intelligence and task performance. This study is limited to banking

professionals working in India. This study concluded that with cultural training the managers will be able to understand the culture and be in a better position to interact in out of state assignments. Guamundsdottir (2015) reiterated that Nordic expatriates working in the US had greater cultural intelligence that was related to greater cultural and work adjustments, especially the meta-cognitive and motivational cultural intelligence. In the same context, Ramaluet *al.*, (2010) explored the relationship between motivational cultural intelligence and cross-cultural adjustments using regression analysis (Arokiaraj, 2015). The study concluded that there is a positive relationship between the variables. Gupta *et al.*, (2013) found that self-monitoring does have a significant impact on expatriates' cognitive, emotional and behavioural dimensions of cultural intelligence whereas prior work experience doesn't show any impact on cultural intelligence. This aids the companies in appropriate planning for the training of expatriates for better adjustments and performances (Thummula *et al.*, 2019).

Whereas, Vijayakumar, & Cunningham (2016) examined the relationship between the motives for expatriation and cross-culture adjustments of Indian expatriates working in the US IT industry. The expatriates with stronger financial motives were observed to have less cultural adjustments as compared to the expatriates with strong exploratory motives. Weak but, significant evidence was also found on the relationship of the expatriate type being self-initiated or organization initiated on the cultural adjustment (Feleen Christy *et al.*, 2021). Stoermer *et al.*, (2018) examined the expatriates in South Korea, their cross-cultural adjustments at work based on environmental requirements. The results of this study indicated that expatriates had higher job satisfaction when their cultural skills exceeded the workplace social exclusion and also the perceived organizational support is greater than the information needed by them. Yavas & Bodur (1999) have found a significant relationship between job satisfaction and satisfaction on personal aspects of expatriation process with the commitment on the job and also assignments and for this, high social support is needed. This is due to the unclear roles and emotional exhaustion of the expatriates.

Work-Related Adjustment

The organization tends to ignore human nature and family conditions when sending candidates for foreign assignments. Chen (2019) opined that firms tend to concentrate more on technical skills, ignore personal and family factors when selecting candidates as an expatriate. This study explored the effect of cross-cultural adjustments of expatriates in work stress and involvement (Christy, 2021). The expatriates face difficulties due to the assigned tasks, unknown environments, language barriers and cultural differences.

⁴<https://economictimes.indiatimes.com/nri/nris-in-news/at-17-5-million-indian-diaspora-largest-in-the-world-un-report/articleshow/71179163.cms?from=mdr>

Stronger cultural competence leads to better adjustments by expatriates and better job performance. Bhatti *et al.*, (2013) implied that when selecting candidates for international assignments, the managers must consider personality traits, self-efficacy, and prior international experience and cultural sensitivity and pre-departure training must be there to enhance all these qualities of the expatriates for the reason that all these factors affect the expatriate's performance. Settiet *al.*, (2020) investigated the expatriates working in the energy sector in the Middle East on factors related to cultural intelligence, cross-culture adjustment, performance and cultural distance and concluded that when cultural distance is less employees become culturally intelligent which leads to greater motivation and better cross-culture adjustments. Arttachariya (2016) studied the impact of five variables namely; family support, job satisfaction, learning orientation, organization socialization and cross-cultural training on cross-cultural adjustments of Indian expatriates in Thailand. This study concluded that job satisfaction is the strongest predictor of cross-cultural adjustments followed by family support and for better adjustments; a strong Human resource policy for socializing and training is required. Bhanugopan & Fish (2007) are of the view that role conflict and role ambiguity were the main reasons for job burnouts experienced by the expatriate managers in Papua New Guinea (PNG).

Pre-departure training programs will increase cultural intelligence. So, the firms are supposed to provide pre-departure training to the candidates to make them culturally intelligent, so that the expatriates are not in a cultural shock and quickly and easily adjust to the new conditions. Srivastava (2012) evaluated the expatriate adjustment instrument proposed by Black. The sample was drawn from Indian expatriates working in US IT projects. The results indicated that expatriates may require cross-culture training before they go onsite (Garwal, D *et al.*, 2020). On contrary to this, Puck *et al* (2008) in their study analyzed the effect of pre-departure cross-culture training on the expats adjustments in the foreign country. Different aspects of the training were examined like the differences in participation, length of the training and its comprehensiveness. There was no relationship between the pre-departure training and cross-culture adjustments of US nationals but could establish that the language competence of expats plays a major role in such adjustments.

Other Factors Influences Expatriates Adjustments

Apart from this host country culture plays a role. Nolan & Morley (2013) used person-environment fit to study the cross-culture adjustments of self-initiated expatriates who were doctors in Ireland. The authors stressed upon the host country environment factors for cross-culture adjustments. The results showed that person-environment fit affected cross-culture adjustments in

conflicting and varying degrees. The job demand affected work but factors like supervisor relation had no connection with adjustments. Abugre *et al.*, (2019) took institutional theory as the basis for investigating the expatriates' adjustments in distant and multinational subsidiaries in sub-Saharan countries. An in-depth interview with expatriates was done and the analysis revealed that host country culture plays a major role in expatriate's adjustments. Apart from this, competent cross-culture communication is a significant determinant of expatriate's adjustments.

The findings of Lakenet *al.*, (2019) demonstrate that the performance and adjustments of expatriates are closely related and have an effect on their interpersonal relations as well. Family support during expatriation is of vital importance. According to the outputs of this study career opportunities and support are more important for an expatriate than the financial aspect. The limitation of this study is the focus was primarily on elements important for an organization ignoring the family and work-life balances. Moulik & Mazumdar (2012) found a significant positive correlation between Expatriate Job Satisfaction and Job Considerations & Career Growth. There is an observation that the employee's job commitment is enhanced when there is continuous support from the organization. On the other side, Sharma & Dahiya (2017) made a different study on cultural adjustments of expatriates coming to India. This study concluded that there is an inverse relationship between cross-cultural adjustments and organizational challenges, in the sense that with increased cross-culture adjustments there is a lesser number of organizational challenges. The authors are of the view that India's cultural diversity is a challenge for expatriates to understand and the same may apply to Indian expatriates.

Research Gap

With the extant literature, it is apparent that expatriates face difficulties in adjusting to a foreign culture and there may be a linkage between such adjustments and worksatisfaction. Most of the studies done on expatriates are related to a specific industry like IT, manufacturing, and doctors. And studies either focused on general adjustments or work-related problems but not both. And there are no such studies done on Indian expatriates working in any country. The present study aims to bridge this gap in research, where Indian expatriate's general as well as work-related adjustments are studied and are tested for work satisfaction levels.

Objectives of the study

1. To observe the general demographic and job profiles of Indian expatriates living in foreign countries.
2. To study the general adjustments of Indian expatriates living in foreign countries.

- To assess the work-related satisfaction of Indian expatriates living in foreign countries.

Research Design and Methodology

The exploratory research study is conducted to observe the demographics and job profiles of Indian expatriates. The factors related to general adjustments and work satisfactions are identified and also the satisfaction levels are tested. The study was done with the help of a questionnaire. A structured questionnaire was framed and served to the Indian expatriates to collect the data. The sample size of the study has 61 respondents working in different professions and belonging to countries like the US, UK, UAE, Canada, Australia, France and Malaysia. 47% of the respondents were males and 53% were females. 80 % of the respondents were married. The sample consisted of people working in a variety of sectors which include diverse profiles of IT, financial sector, pharmaceuticals and healthcare.

Variables: The information on basic demographic factors those are pertinent for expatriate adjustments were sourced like age, marital status. The general adjustment was tested with the help of eight items relating to living conditions, food, health facilities and communications. Work-related satisfaction levels were known through eight items which include job goals, responsibilities, working conditions and relation with coworkers.

Findings and Discussions of the Study

To recognize the demographic characters of the expatriates and the relation with general adjustments and work satisfaction, first, a simple correlation test was run in SPSS. Thereon, ANOVA test was run to understand better the variables.

Table 01: Result of Simple Pearson Correlation between The General Adjustment and Work-Related Satisfaction of the Indian Expatriates.

Simple Pearson Correlation		General Adjustment	Work-Related Satisfaction variables
General Adjustment	Pearson Correlation	1	.291*
	Sig. (2-tailed)		.023
Work Related Satisfaction variables	Pearson Correlation	.291*	1
	Sig. (2-tailed)	.023	

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

The above table depicts the Pearson correlation between the general adjustments of the expatriates and their work-related satisfaction. There is a positive correlation between general adjustments and their work-related satisfaction though it is not a very high correlation (29.1%), it is significant. So, it can be inferred that general adjustments of Indian expatriates have a positive

significant impact on their work-related satisfaction. There are living & housing conditions, food, health care facilities, interactions outside work; all effects the satisfaction at the workplace to the expatriates. To understand the expatriate's general adjustments and work satisfaction among males and females, independent sample t-test was performed.

Table 02: The Mean Value of Male and Female with Expatriates

	Gender	N	Mean	Std. Deviation	Std. Error Mean
General Adjustment	Male	28	3.7768	.93316	.17635
	Female	31	3.8952	.89215	.16024
Work Related Satisfaction variables	Male	28	3.9911	.57928	.10947
	Female	31	4.0726	.59317	.10654

Above table shows the mean score of males and females for general adjustments and work-related satisfaction with two degrees of freedom. The mean for general adjustments of males and females is 3.77 and 3.89

respectively, which shows not much difference. The standard deviations also are very close. Similarly, the mean values for work-related satisfaction for men and women are very close at 3.99 and 4.07 respectively.

Table 03: Independent Samples Test of gender towards general adjustments and work-satisfaction

Independent Samples Test		Levene's Test for Equality of Variances		T-test for Equality of Means						
		F	Sig.	T	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
General Adjustment	Equal variances assumed	.343	.560	-.498	57	.620	-.11838	.23772	-.59440	.35765
	Equal variances not assumed			-.497	55.77	.621	-.11838	.23827	-.59574	.35899
Work Related Satisfaction variables	Equal variances assumed	.261	.612	-.533	57	.596	-.08151	.15294	-.38777	.22475
	Equal variances not assumed			-.534	56.63	.596	-.08151	.15276	-.38744	.22442

To make a comparison for general adjustments and work-satisfaction between men and women expatriates, equality of means has been tested. Table no. 3 shows the result of the t-test for equality of means. The significance level for Lavene’s test for equality of means ($p > 0.05$) suggests assuming that there are equal variances of men and women for both general adjustments and work satisfaction. So, accordingly looking into the significance

level also suggests that there are no differences in the mean value for men and women in general adjustments and also work satisfaction. The mean difference for general adjustments for men and women expatriates is - 0.11838 and for work-related satisfaction is - 0.08151. Similarly, to understand the expatriate’s general adjustments and work satisfaction among married and unmarried, independent sample t-test was run.

Table 04: The Mean Value of Married and Unmarried with Expatriates

	Marital Status	N	Mean	Std. Deviation	Std. Error Mean
General Adjustment	Married	49	3.8903	.94945	.13564
	Unmarried	10	3.6250	.70465	.22283
Work Related Satisfaction variables	Married	49	4.0867	.56550	.08079
	Unmarried	10	3.8375	.68224	.21574

Above table explains the group score of married and unmarried for general adjustments and work-related satisfaction with two degrees of freedom. The mean for general adjustments married and unmarried is 3.89 and 3.62 respectively, which shows not much difference. The standard deviations also are very close. Similarly, the mean values for work-related satisfaction for married and unmarried are close at 4.08 and 3.83 respectively. This proves that the general adjustments and work satisfaction for married and unmarried expatriates are not significantly different.

expatriates, equality of means has been tested. Table 5 shows the result of the t-test for equality of means. The significance level for Lavene’s test for equality of means ($p > 0.05$) suggests assuming that there are equal variances for married and unmarried for both general adjustments and work satisfaction. So, accordingly looking into the significance level also suggests that there are no differences in the mean value for married and unmarried in general adjustments and also work satisfaction. The mean difference for general adjustments for married and unmarried expatriate’s is 0.265 and for work-related satisfaction is 0.249. So, whether an expatriate is married or unmarried, they are having similar experiences in general adjustments and have almost the same levels of worksatisfaction.

To make a comparison for general adjustments and work-satisfaction between married and unmarried

Table 05: Independent Samples Test of Married Status towards General Adjustments and Work-Satisfaction

Independent Samples Test		Levene's Test for Equality of Variances		T-test for Equality of Means						
		F-Value	Sig.	T-Value	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
General Adjustment	Equal variances assumed	.385	.537	.835	57	.407	.2653	.3175	-.3706	.9012
	Equal variances not assumed			1.017	16.481	.324	.2653	.2608	-.2863	.8170
Work Related Satisfaction variables	Equal variances assumed	.881	.352	1.227	57	.225	.2492	.2031	-.1575	.6560
	Equal variances not assumed			1.082	11.658	.301	.2492	.2303	-.2543	.7528

This study aimed to know the relation of demographic factors with the general adjustments and work satisfaction of Indian expatriates. The age of the

expatriates may have influence and to test it one-way ANOVA was used.

Table 06: Table showing the results of one-way Anova test for the influence of age on general adjustments and work satisfaction

		Sum of Squares	DF	Mean Square	F-Value	Sig.
General Adjustment	Between Groups	1.526	2	0.763	0.799	0.455
	Within Groups	55.431	58	0.956		
	Total	56.957	60			
Work Related Satisfaction variables	Between Groups	3.419	2	1.71	3.851	0.027
	Within Groups	25.75	58	0.444		
	Total	29.17	60			

The above table showing the results of one-way ANOVA test for age on general adjustments and work-related satisfaction. The value of significance level indicates that there is no difference among various age groups for

general adjustments. Whereas, expatriates belonging to different age groups have different levels of work satisfaction.

Table 07: Duncan Result for Age Group with Work-Related Satisfaction

Age	N	Subset for alpha = 0.05	
		1	2
20-30	8	3.3906	
31-40	18		4.0347
41-50	35		4.1107
P-Value		1.000	.761

As age influences work-related satisfaction, the above table no. 7 further explains it by categorizing the expatriates into age groups. From the table, it can be observed that expatriates between the ages of 41 to 50 years have the highest work satisfaction levels compared

to other age groups. With the increase in age, the experience increases, which exposes them to different situations to learn, grow and challenge things that may lead to satisfaction in work.

Table 08: One-Way ANOVA Result for Host Country OnGeneral Adjustments and Work Satisfaction

One-Way ANOVA		Sum of Squares	DF	Mean Square	F Value	Sig.
General Adjustment	Between Groups	8.466	9	.941	.989	.460
	Within Groups	48.491	51	.951		
	Total	56.957	60			
Work Related Satisfaction variables	Between Groups	2.334	9	.259	.493	.873
	Within Groups	26.836	51	.526		
	Total	29.170	60			

To know whether the host country has any effect on the general adjustments and work-satisfaction of the expatriates. As shown in table8, the ANOVA test results indicate that there is no such significant influence on the host country. Whichever country the expatriates are located in, it is not having any effect on the adjustments as well as satisfaction.

CONCLUSION

This study aimed to observe the demographic profiles of Indian expatriates working across different locations in different countries and their general adjustments in the host countries and thereon the worksatisfaction. For this purpose, a questionnaire was served to the Indian expatriates. There is a significant positive relationship between the general adjustments and worksatisfaction, hence the individual must take an initiative to better adjust to the living conditions, food, and health facilitates and has proper communication with the people outside their workplace so that they are able to perform well on their job and leads to work satisfaction. Gender doesn't have any effect on both general adjustments and worksatisfaction. The organizations have to treat both male and female expatriates with the same policies to not have any downside influence on their adjustments and

satisfaction. And also, the marital status of the expatriates did not affect adjustments and satisfaction. Age of the expatriates doesn't impact general adjustments but showed that age does affect work-related satisfaction. And expatriates of age group 41-50 had higher satisfaction compared to younger aged expatriates. The organization may plan to have some different terms and policies on job goals, responsibilities and working conditions for younger expatriates and the relation they have with coworkers so as to increase their satisfaction at work.

This study did not make any differentiation on self-initiated or organization-initiated expatriates, wherein the adjustments and satisfaction levels may differ. Also, the effect of professional differences was not taken into account. Different professions have different requirements, work stress, satisfaction. The study assumed that expatriates belonging to different workprofiles and professions can be tested on a single instrument.

Studies can be made by differentiating needs and adjustment of self-initiated or organization-initiated

expatriates. Future studies can also consider the different professions, industries, work profiles of expatriates to well understand the adjustments and satisfaction levels. The country-wise study also can be made to know any differences in adjustments and satisfaction levels of Indian expatriates. Future studies can also include behavioural factors, personality traits of the expatriates to understand which of such factors may impact adjustments and satisfaction levels.

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“THE PREVALENCE OF ANEMIA AND ITS ASSOCIATED SIGNS AND SYMPTOMS AMONG ADOLESCENT GIRLS OF SELECTED SCHOOLS IN RURAL MAHARASHTRA, INDIA.”

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ABSTRACT

Background of the study: Anemia is one of the major public health problems, which affects the world's population widely. Among all types of anemia, iron deficiency anemia is commonly seen in people of developing countries. India has the highest prevalence of iron deficiency anemia among women, with 60 to 70 percent of the adolescent girls being anemic.

The aim of the research is to estimate the prevalence of anemia and to identify associated signs and symptoms among adolescent girls.

Materials and Method: This was a population-based cross-sectional study conducted among adolescent girls of age group (13-14 years) studying in selected rural schools of Maharashtra during the year 2018-19. Sample size was 100 girls and participants were selected by non-probability convenient sampling. In this study system model used as a conceptual framework. The Hemoglobin levels were estimated using Hemocue and a tool was designed to understand the associated signs and symptoms and the socio-demographic data.

Results: The results revealed that 73% were anemic in the study group. The percentage of mild, moderate and severe anemia in the anemic population was 84.9%, 11% and 4.1% respectively. 30-40% of the respondents had major signs such as headache, decreased hunger, difficulty in concentrating and leg cramps. Next, 20.5% of them having wage pain in leg and joint and 19.1% were altered in menstruation. 65.7% of them had the symptoms of pallor of skin, conjunctiva and mucous membrane and the least symptoms were brittle nails, spoon shaped nails, dry and damaged hair. Since the majority of respondents fall into mild anemia, large scale signs and symptoms were shown by them than the moderate and severe anemia. The socio-demographic data of the study group was taken into consideration. No Significant association of hemoglobin levels could be established with the socio-demographic data.

Conclusion: Our study highlights, the prevalence of anemia is very high among adolescent girls and majority of them are suffering from mild anemia in the rural population and majority of them have all the signs and symptoms even in mild anemia. Statistically no significant association was found between socio-demographic data and hemoglobin levels.

Keywords: prevalence, anemia, adolescent girls, hemoglobin, signs, symptoms

INTRODUCTION:

Anemia is the most common nutritional deficiency disorder in the world. It is a condition that occurs when the RBC do not carry enough oxygen to the tissue of the body. WHO defines anemia as a condition in which the Hemoglobin content of the blood is lower than normal as a result of deficiency of one or more essential nutrients. Normal hemoglobin level is >12.0 g/dl in women.

Adolescence is a vulnerable period in the human life cycle for the development of nutritional anemia. According to WHO adolescent age group is defined as life span between 10-19 years. In India the prevalence of anemia among adolescent girls was 56% and this amounts to an average of 64 million girls at any point in time. Anemia in adolescent girls contributes to maternal and fetal mortality and morbidity in future. If the anaemic adolescent girl becomes pregnant, it may increase foetal morbidity and mortality, increase the perinatal risk, increase the incidence of Low Birth Weight (LBW), and overall increase in Infant Mortality Rate (IMR) and Maternal Mortality Rate (MMR). Most of the healthcare services in India are for mother and

child groups. Among adolescents, particularly in developing countries where they are traditionally married at an early age and exposed to a greater risk of reproductive morbidity and mortality. In a family with limited resources the female child is more likely to be neglected. She is deprived of good food and education and is utilized as an extra working hand to carry out the household works. The added burden of menstrual blood loss, (normal or abnormal) precipitates the anemia too often.

Nine out of ten anemia sufferers live in developing countries. WHO estimates anemia prevalence among adolescent girls is 27% in developing countries and 6% in developed countries. This world's adolescent population is facing a series of serious nutritional challenges which are not only affecting their growth and development but also their livelihood as adults. Nutritional needs of girls during adolescent periods are generally ignored leading to stunting and poor health. One of the major consequences of the physiological changes and the nutritional neglect which happens during this period is anemia. Anemia not only affects the present life status, but also has deleterious effects in the

future learning, cognitive function and scholastic performance is also severely affected.

This study aims to know the prevalence of anemia and its associated signs and symptoms among adolescent girls.

NEED FOR THE STUDY

A study was conducted by Veena Melwani to assess the prevalence of anemia amongst adolescent girls residing in a selected slum of Bhopal city done in February 2018. A cross sectional study was done for a period of 3 months on adolescent's girl. 96 adolescent girls who were registered in anganwadi and present at the time of study were interviewed. Hb level was also estimated using hemocue. Anemia was present in 57.65% girls. Out of which 34.7% had mild, 44.9% had moderate and 20.4% had severe anemia. 29.4% knew improper diet as the cause of anemia followed by vitamin deficiency (25.8%) and iron deficiency 22.3%. Knowledge regarding anemia, its symptoms, causes and treatment was very poor among participants. Also, knowledge regarding food rich in iron was also very poor among study participants. The high prevalence of mild and moderate anemia demands due emphasis on iron rich food intake, health education regarding personal hygiene and periodical deworming to reduce the burden of anemia among adolescent girls. The overall prevalence of anemia was high in this study.

A national based study was conducted on anemia and its associated signs and symptoms in adolescent Kuwaiti girls. It was conducted in 2015. On physical examination, most frequently reported anemia relevant symptoms were headache, vomiting and nausea. Some girls are observed black stools. Constipation and diarrhea were not reported. The mean Hb value did not differ according to symptom response. Average of 7% of girls reported having a headache. After receiving folic acid tablets for 8 weeks, it has decreased to 2.4%. Nausea was reported in an average of about 2.0% of girls. And it decreased about 1.2% by the 8th week of receiving tablets. Black stools also were reported in this group. And the researcher concluded that associated symptoms were 20% of this study.

A South Indian based study was conducted by Siddharam et al. in 2011 a cross sectional study to estimate the prevalence of anemia among adolescent girls to study the socio demographic factors associated with anemia in selected Anganwadi center of rural area of Hassan district. 314 adolescent girls of 10-19 years were included in this study which was conducted from February –April 2011 (3 months). Data analysis was done by using proportions and chi square test prevalence of anemia was found to be 45.2%, a statistically significant association was found with iron deficiency anemia, weight loss and anemia; pallor and anemia. In the present study it was seen that 40.1% of anemic adolescent girls had mild anemia, 54.92% had moderate

anemia and 4.92% had severe anemia, a high prevalence of anemia adolescent girls was found which was higher in low socio-economic strata. It was seen that anemia affects the present study of all nutritional status of adolescent girls.

The researcher concluded that overall prevalence of anemia among adolescent girls was found to be 45.2% a statistical association was found with iron deficiency weight loss and presence of pallor. Emphasize is needed for corrective measures of anemia before they enter into adolescent age.

A study was conducted by Mr. Antariksh and Suresh Roy, It was done in 2009-2011 to find out prevalence of anemia among adolescent girls and some of demographic variables and menstrual; factor associated in urban school Pune, Maharashtra. A cross sectional community study was conducted among 300. A non-probability convenient sampling method was used to select the sample from urban (150) and rural school (150) and the research tool was found valid and reliable after the process of validity and reliability of hemoglobinometer. Hemoglobin estimation was done by Sahli's method and a structured questionnaire was used to assess dietary habits and menstrual history after taking informed consent. 53.4% adolescent girls from urban school and 58.0% adolescent girls from rural schools were 14 years of age the family income of 43.3% of adolescent girls from urban and 48.7% of girls from rural school was 5000-10,000 per month. Majority (75%) were non vegetarian 58.7 % adolescent from urban school and 64% from rural schools were consuming egg in their diet 74% adolescent girls was vegetarian majority of school girls are having the habit of skipping meals 44.7% of adolescent girls from urban school and 51.3% from rural school girls started their menstruation at age of 12 years, hemoglobin level among school girls is 10.53gm% and 10.44gm% respectively. There is no significant difference between the rural and urban school going girls.

Researcher concluded overall among all prevalence of anemia adolescent girls from rural and urban schools was 59.5% it is seen that anemia affects overall nutritional status of adolescent females.

A study was conducted by Dr. Meenal Vinay Kulkarni, it was done on June 2009 to February 2010. To find out the prevalence of anemia and to study some of the socio-demographic and menstrual factors associated in an urban slum of Nagpur, Maharashtra. A cross sectional community-based study was conducted among 272 adolescent girls in an urban slum area. Out of five areas one area was selected by simple random sampling. Hemoglobin estimation was done by hemoque technique... Information regarding socio-demographic and menstrual factors was recorded in pre-designed, pre-tested proforma. Out of 272 adolescent girls in the study population, 245(90.1%) girls were found to be anemic.

Majority of girls (88.6%) were having mild to moderate anemia and only 1.5% girls were severely anemic. It is seen that anemia affects the overall nutritional status of adolescent females. A significant association of anemia with socio-economic status and parent's educational status. The prevalence of anemia is due to emphasis of iron and folic acid deficiency in adolescent girls.

There was an urgent need to develop interventional programs in these slum areas in the form of nutritional supplementation along with prophylaxis of iron-folic acid tablets for prevention of anemia. Regular nutritional education sessions had to be carried out to increase the awareness in adolescent girls regarding anemia.

A cross sectional study conducted by Dr. Vinod Mehta to find out anemia in rural school girls aged 12 to 16 years in January 2004. The sample size was aged 12 to 16 years. The hemoglobin estimation of identified girls was done using cymehemoglobin technique under laboratory technician. The data analysis was done by chi square method. The result was found in the 12 to 16 age group in both urban and rural areas. There were 691 girls in the study out of which 350 belonged to government school located in Shimla (urban) 341 were from 4 government schools of rural area of Shimla (Kumarsain block) situated 120 km from Shimla four rural school had to be selected for getting the required equal no as the urban school in the rural area. The prevalence of anemia severity found that mild (10.0gm/dl-11.9gm/dl) anemia was more prevalent than the moderate (7.0-11.9) and severe (less 7 gm/dl.)

Present study highlights that prevalence of anemia among school girls is a major public health problem in Shimla district. Efforts are needed to prevent it by approaches which are feasible and cost effective. If these girls enter pregnancy with adequate iron reserves, iron supplements provided during pregnancy will be more efficient at improving the iron status of mother and of the fetus. As a result, the risk of maternal anemia at delivery and anemia in early infancy will be reduced and the integrational life cycle of malnutrition can be effectively broken. What is required is an effective nutritional programme along with a sustained supplementation programme for these adolescent girls. Moreover, the real causes and the determinants are required to be identified by taking up further research studies on a larger proportion.

A Nagpur based study was conducted by Sanjeev M Chaudhary, Vasant R Dhage on October 2002 to march 2003. To estimate the prevalence of anemia among adolescent females and to study socio demographic factors associated with anemia. Out of 296 subjects, 104(35.1%) subjects were found to be anemic. 72 subjects (69.2%) had mild anemia. 32 subjects (30.8%) had moderate anemia. None of this subject had severe anemia. Hb estimation done by the Cyanmethemoglobin method using a klett-summerson photoelectric Cori

meter with green filter. In this study a significant association of anemia was found with socio economic status, which may be due to the availability of high-quality food with better socio-economic status. It also reported that prevalence of anemia was higher in government schools compared to private schools. It was seen that anemia affects the overall nutritional status of adolescent girls. A statistically highly significant association of anemia was found with the mothers and fathers' educational status. And the statistical analysis was done by using chi square test, student t test, mean, slandered error of proportion etc. Other factors like age group, attainment of menarche, type of family, family size, and type of diet were not significantly associated with anemia. It was concluded that anemia is a major problem in Indian school children.

From the above study, it is observed that the percentage of anemia varies from one geographical region to the other, in the slum of Bhopal city 57.65% of girls were anemic. out of which 34.7% had mild, 44.9% had moderate and 20.4% had severe anemia. The major cause of anemia here was improper diet followed by vitamin deficiency and iron deficiency. Another study conducted in the southern India where an Anganwadi center of rural area of Hassan district, out of 314 adolescent girls of age group 10-19 years in which 40.1% mild 54.92% had moderate and 4.92% had severe anemia, prevalence of anemia was found to be high among low socio-economic strata. In a study conducted in Nagpur, the study revealed that the prevalence of anemia was higher in government schools compared to private schools. Hence the researchers decided to study the prevalence of anemia in rural government schools and also to study the associated signs and symptoms as very few studies are conducted to learn the association.

LIMITATION

- Serum iron level is not assessed in this study.
- The cause of anemia is not identified.

RESEARCH METHODOLOGY

The aim of the present study was to assess the prevalence of anemia among adolescent girls and its associated signs and symptoms. This study was a population based cross sectional descriptive study with quantitative perspective.

The present study was approved by the Research Ethical Committee of Fortis Institute of Nursing. The researchers were trained under the guidance of Dr. Lalit Dhantole, Consultant transfusion medicine, Fortis hospital Mulund. Tool was prepared and given to five experts of different specialties of nursing faculty of Fortis Institute of Nursing and tools were modified accordingly as per their suggestion. The reliability of hemocue method was checked from the Blood Bank Department of Fortis hospital, Mulund after approval by them. The investigator used hemocue to assess the Hemoglobin

level in the blood. A pilot study was conducted in October 2018 to test the applicability and feasibility of the research design and the tools. The design and tools were found to be feasible and applicable.

In the final study, a total of 100 school children aged 13-14 were examined from Z.P School Chandranagar (Zillha Parishad Kendra Shala Chandranagar) and J.M.T high school chandranagar, Vangoan. This school was selected as per the convenience and feasibility of the researchers and also because as its location was in a rural setting. The samples were selected by using a non-probability convenient sampling technique. The study was carried out with ethical standards. Prior to the data collection formal permission was collected from the school authorities and consent was taken from them as well as the parents/guardians of children after explaining to them about the assessment and their required participation. The researcher's included all the students those who were present during the data collection from class 8th and class 9th standard and participants were excluded those who were having any hematological disorder or any other anemia other than iron deficiency anemia and who were on any kind of treatment. The privacy was provided for the study subjects while collecting the data.

First, the investigator collected socio-demographic data by using the interview method for basic information from the study subjects.

Second, the investigator did the screening of anemia by using the hemocue method to estimate the prevalence of anemia and its severity.

Hemocue method

Principles of method:

It utilizes the principle of oxidation of hemoglobin to hemoglobin by sodium nitrate and the subsequent conversion of hemoglobin to hemoglobinazide by sodium azide. The reagent for these reactions is contained within a small disposable microcuvette of approximately 10 microliters in volume.

The following protocol was carried out only to the students who gave signed consent.

- Clean the index finger with a cotton swab.
- Take a lancet and give a prick on the cleaned finger.

- Take a drop of blood in the microcuvette.
- Place the microcuvette inside the hemocue machine.
- Note the value of hemoglobin shown by the machine.
- Remove the microcuvette and discard it.

The following disinfection protocol was followed during the procedure:

- Used cotton ball and mask will be discarded in yellow liner.
- Microcuvette and the lancet will be discarded in the white container.

Third, the investigator assessed signs and symptoms only those who were found anemic. The signs were assessed by using observational methods and symptoms were assessed by using interview technique.

Finally, the researcher prepared the reference card for anemic students and referred them to the nearest Primary Health Centre.

DATA ANALYSIS PLAN

After the collection of the data according to the inclusive and exclusive criteria for the respondents, the researchers further proceeded with the data analysis and interpretation plan.

The data which was gathered from respondents were organized on the excel sheet for the statistical process. After putting it on the excel sheet, the demographic data was tabulated and graphically presented. The prevalence of anemia and its associated signs and symptoms were tabulated and graphically presented with frequency and percentage. Fisher test was used to find out the association between the prevalence of anemia and socio-demographic data by using SPSS package 22 version.

RESULT AND INTERPRETATION:

The result of the respondent's data is analyzed based on the objectives of the study. The data is analyzed by using the excel sheet and the statistical formula imported into it. The elements that are covered in this chapter include descriptive analysis and inferential analysis (Fisher's test). To ensure a clear picture, results obtained are presented in chart and table form. Lastly, this chapter is concluded with a summary on the supporting hypothesis findings.

Table I: Demographic Data of the respondents N=100

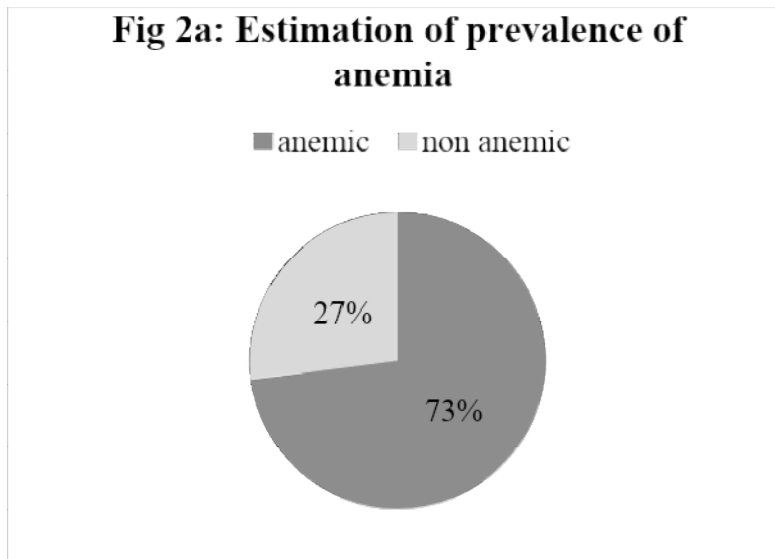
Sr. No.	Variables	Frequency	Percentage
1.	Age in years		
	13 years	45	45%
2.	14 years	55	55%
	Class of study		
3.	8 th standard	45	45%
	9 th standard	55	55%
	Family Income		
4.	5000-5999	28	28%
	6000-6999	53	53%
	7000-8000	19	19%
	No. of family members		
	4-5	57	57%
	6-7	34	34%
	8-9	09	09%

In the age group of 13 and 14 the sample are 45% and 55% respectively, in class 8 and 9 the samples are 45% and 55% respectively, sample with family income 5000-5999,6000-6999 and 7000-8000 is 28%, 53% and 19% respectively, and the samples having number of family

members 4-5, 6-7 and 8-9 is 57%, 34% and 09% respectively.

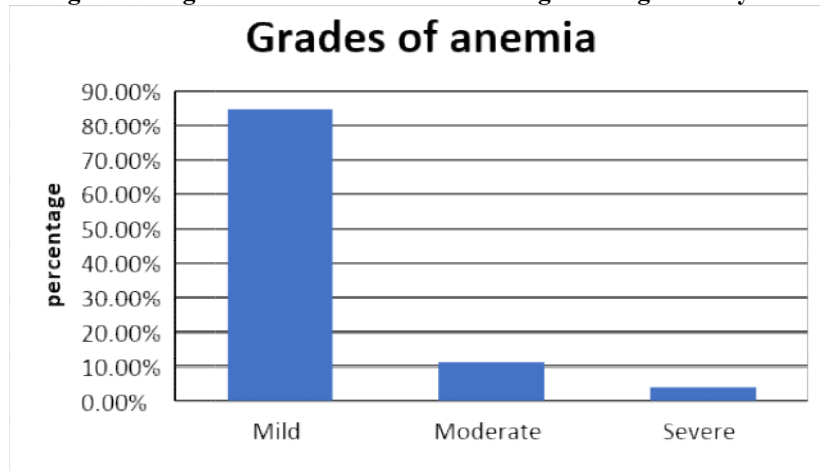
Section 2: To assess the prevalence of anemia in adolescent girls of age 13-14 years.

Fig 2a: Overall prevalence of anemia in adolescent girls of age 13-14 years.



Out of 100 samples 73% are anemic and 27% are non-anemic in adolescent girls of age 13-14 years.

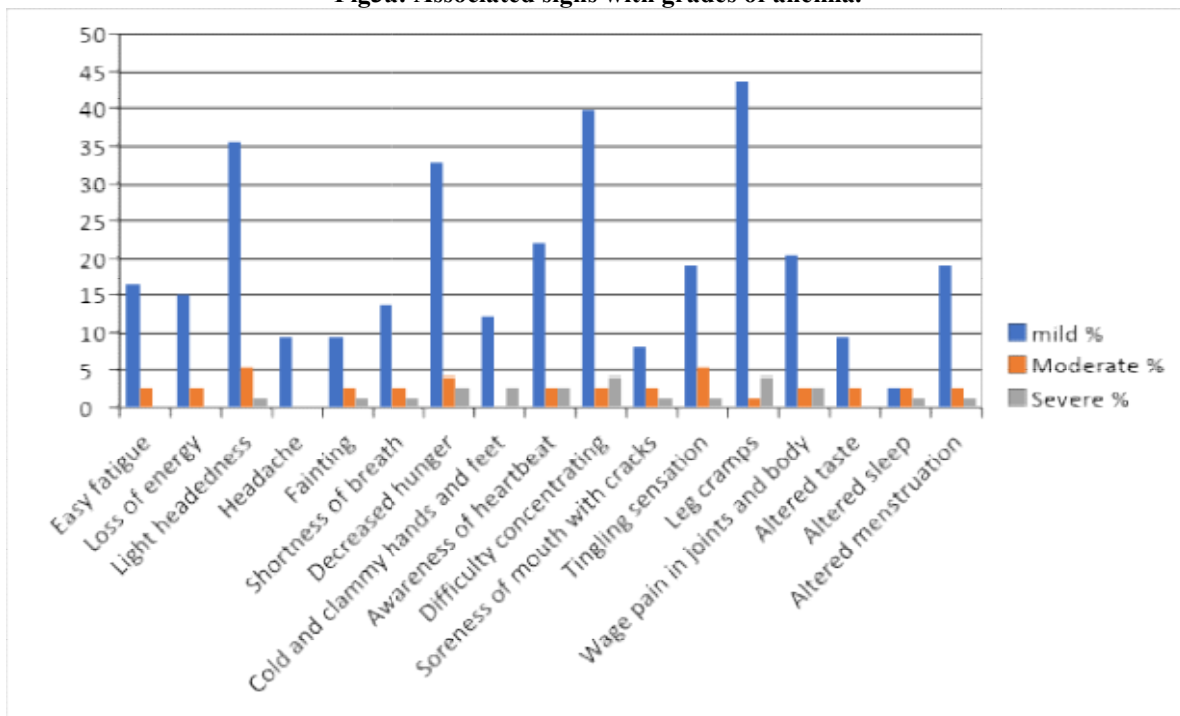
Fig 2b: The grades of anemia in adolescent girls of age 13-14 years



In the grades of anemia, the percentage of mild anemia is 84.90%, the moderate anemia is 11% and the severe anemia is 4.10%.

Section 3: To identify the associated signs and symptoms of anemia.

Fig3a: Associated signs with grades of anemia.



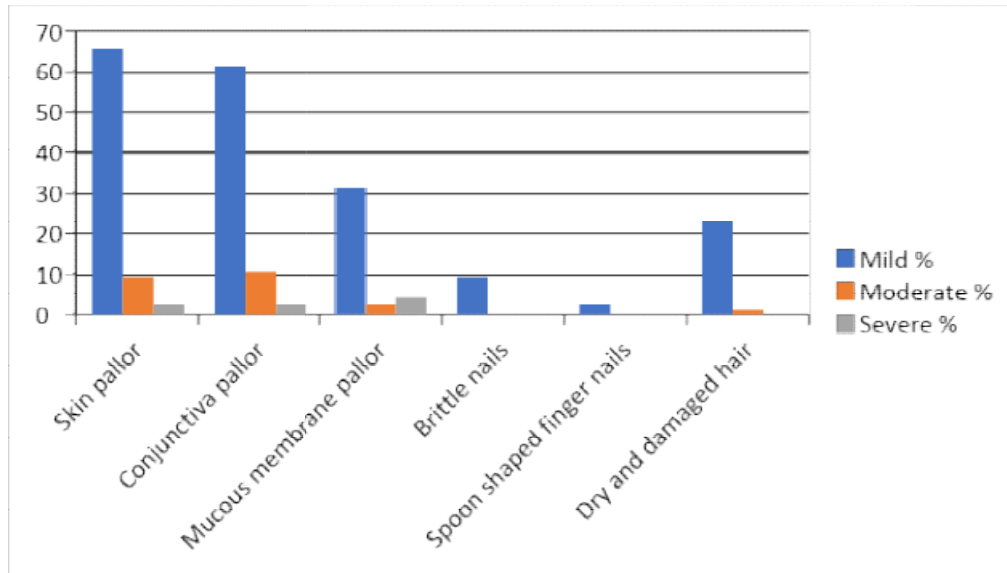
In anemic adolescent girls the percentage of signs of easy fatigue in mild, moderate and severe is 16.4%, 2.7% and 0% respectively. In loss of energy the percentage of mild, moderate and severe is 15%, 2.7% and 0% respectively. In light headedness the percentage of mild, moderate and severe is 35.6%, 5.4% and 1.3% respectively. In headache the percentage of mild, moderate and severe is 9.5%, 0% and 0% respectively. In fainting the percentage of mild, moderate and severe is 9.5%, 2.7% and 1.3% respectively. In shortness of breath

the percentage of mild, moderate and severe is 13.6%, 2.7% and 1.3% respectively. In decreased hunger the percentage of mild, moderate and severe is 32.8%, 4.1% and 2.7% respectively. In cold and clammy hands and feet the percentage of mild, moderate and severe is 12.3%, 0% and 2.7% respectively. In Awareness of heartbeat the percentage of mild, moderate and severe is 21.9%, 2.7% and 2.7% respectively. In difficulty concentrating the percentage of mild, moderate and severe is 39.7%, 2.7% and 4.1% respectively. In soreness

of mouth with cracks the percentage of mild, moderate and severe is 8.2%, 2.7% and 1.3% respectively. In tingling sensation, the percentage of mild, moderate and severe is 19.1%, 5.4% and 1.3% respectively. In leg cramps the percentage of mild, moderate and severe is 43.8%, 1.3% and 4.1% respectively. In wage pain in joints and body 20.5%, 2.7% and 2.7% respectively. In

altered taste the percentage of mild, moderate and severe is 9.5%, 2.7% and 0% respectively. In altered sleep the percentage of mild, moderate and severe is 2.7%, 2.7% and 1.3% respectively. In altered menstruation the percentage of mild, moderate and severe is 19.1%, 2.7% and 1.3% respectively.

Fig 3b: Associated symptoms with grades of anemia



In anemic adolescent girls the percentage of symptoms of skin pallor the percentage of mild, moderate and severe is 65.7%, 9.5% and 2.7% respectively. In conjunctiva pallor the percentage of mild, moderate and severe is 61.6%, 10.9% and 2.7% respectively. In mucous membrane pallor the percentage of mild, moderate and severe is 31.5%, 2.7% and 4.1% respectively. In brittle

nails the percentage of mild, moderate and severe is 9.5%, 0% and 0% respectively. In spoon shaped finger nails the percentage of mild, moderate and severe is 2.7%, 0% and 0% respectively. In dry and damaged hair the percentage of mild, moderate and severe is 23.2%, 1.3% and 0% respectively.

Section 4: To associate the prevalence of anemia with socio demographic data

N=73

Variables	Mild	Moderate	Severe	P value
Age				
13	30	1	1	0.14
14	32	7	2	
Class of study				
8th standard	30	1	1	0.14
9th standard	32	7	2	

Monthly income				
5000-5999	19	5	3	0.08
6000-6999	34	3	0	
7000-8000	9	0	0	
Total family members				
4-5	28	4	1	0.57
6-7	27	2	2	
7-8	7	2	0	

The above table shows that as per the fisher test, the p value is greater than 0.05 so all the variables such as age group, class of study, monthly income and number of family members had a statistically not significant association between socio-demographic data with hemoglobin levels.

DISCUSSION:

The exact figures for the prevalence of anemia vary from study to study, but anemia is an extremely serious public health problem in India. This study was conducted to assess the prevalence of anemia and its associated signs and symptoms among adolescent girls of age 13 to 14 years. The overall prevalence of anemia was 73(73%) out of 100 samples. Out of 73 anemic girls, 62 (84.9%) had mild anemia, 8(11%) were suffering from moderate anemia and 3(4.1%) girls were severe anemic. This present study findings were supported by a study conducted at urban slum of Nagpur, Maharashtra. Here, they reported out of 272 adolescent girls, 245(90.1%) girls were found to be anemic. Majority of girls 88.6% had mild to moderate anemia and only 1.5% had severe anemia. In present study, mild anemia is 84.9%, moderate anemia is 11% and severe anemia is 4.1% where it shows a huge population falling in mild anemia.

In a south Indian based cross-sectional study, revealed that adolescent girls of age 10-19 out of 314 samples, 45.2% were anemic, 40.1% had mild anemia, 54.92% had moderate anemia and 4.92% had severe anemia. This study findings are lower than the present study.

In the present study - in mild anemia the signs observed largely were light headedness (35.6%), in moderate anemia the signs observed were tingling sensation (5.4%), light headedness (5.4%), decreased hunger (4.1%) and in severe anemia main signs observed were

difficulty in concentrating and leg cramps 4.1%, 4.1% respectively.

According to the WHO, if the prevalence of anemia at the community level was more than 40%, it was considered as a problem of high magnitude. The present study thus brings out the fact that the problem of anemia was prevalent in wider population rather than commonly considered group of the pregnant and lactating females. The present study found that there is no association between socio-demographic data with hemoglobin levels. This study is contradictory to Nagpur study and South Indian study which proved that there is significant association between socio-demographic data and hemoglobin levels.

CONCLUSION:

Our study highlights, that the prevalence of anemia is very high among adolescent girls and majority of them were suffering with mild anemia in rural population and majority of them having all the signs and symptoms even in mild anemia. The researcher suggests that there is a need for well-planned, systematic and large-scale study by using standardized methodologies to estimate the prevalence of anemia at the community level among all the age groups, and the representatives of the different regions of India.

Conflict of interest: The author declares that there is no conflict of interest in the publication of this article.

Ethics Approval: The study was approved by the independent ethics committee of the Fortis

Institute of Nursing.

Authors' Contributions: Deepa Reddy and Rita Lakhani are responsible for research concepts

and design, data collection and analysis, manuscript writing, and critical review of important

knowledge content.

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“THE IMPACT OF MARKETING MIX AND CUSTOMER VALUE ON CONSUMER LOYALTY TO PURCHASING PERSONAL CARE PRODUCTS THROUGH COMMERCIAL CHANNELS”

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ABSTRACT

The purpose of this research is to analyze the impact of marketing mix and customer value on customer loyalty. Online survey data from 516 online consumers in Coimbatore was used to test the research model using SPSS. The analysis results show that there is a significant positive correlation between value, customer loyalty and brand portfolio, which means that if a seller provides high customer value to its customers, the seller may attract potential loyal customers. In order to achieve customer value and customer loyalty, sellers must provide products or services that customers really need. When customers get good products, reasonable prices, and convenient purchases, they are more likely to become loyal customers. Future research can also use different methods, such as focus groups and interviews.

Keywords: Personal Care products, SNS, S-Commerce, Customer value, Customer loyalty etc.

1. Introduction of the Study

Consumers today use technology as a tool to improve their shopping experience (Pookulangara & Koesler, 2011)¹. Through social networking sites (SNS), consumers can create personal information, personal networks, and share interpersonal feedback. (Lenhart & Madden, 2007).² Thus, social networking sites (SNS) like LinkedIn, Facebook, and WhatsApp can play a significant role as a marketing medium (Cha, 2009)³. To give out information related to product and services, SNS can be used as powerful medium for eWOM (Chu & Kim, 2011). Scommerce is the subgroup of e-commerce which use social media for selling and purchasing of goods and services via internet. (Marsden, 2011)⁴. Social electronic shopping and s-commerce are the two kinds of internet social network which let customers/consumer to take part in the selling and marketing of services and goods in business and different internet communities

(Stephen & Toubia, 2010)⁵. For social electronic shopping use of s-commerce perform vital role in changing the retail industry. In 2008, when Groupon orgroupon.com successfully started in the United States, Scommerce became popular all over the world. The difference between e-commerce and e-commerce is that through e-commerce, consumers can directly use SNS to promote products. In Information and Communication Technology (ICT), e-commerce has received attention as a new business model. E-commerce was previously measured by researchers using two different methods. First of all, e-commerce has commercial features, these features are added to your social media site (SNS), so that customers can shop like Facebook. (Liang et al., 2011)⁶. Another is, established electronic commerce websites have added social characteristics and data. so customers can socialize when buying something examples are eBay and Amazon (Shen & Eder, 2009)⁷.

1.1 Research Objective

The purpose of this research is to analyze the impact of the marketing mix and customer value on customer loyalty.

1.2 Research Question

¹Pookulangara, Sanjukta&Koesler, Kristian. (2011). Cultural influence on consumers' usage of social networks and its' impact on online purchase intentions. *Journal of Retailing and Consumer Services*. 18. 348-354. 0.1016/j.jretconser.2011.03.003.

² Lenhart, M. and Madden, M. (2007) *Teens, Privacy and Online Social Networks. How Teens Manage Their Online Identities and Personal Information in the Age of MySpace.* Pew Internet & American Life Project Report, 1-45.

³ Cha, Christine B. and Marin K. Nowak. 2009. Emotional intelligence is a protective factor for suicidal behavior. *Journal of the American Academy of Child and Adolescent Psychiatry* 48: 422-430

⁴ Marsden, Peter V. 2011. "Survey Methods for Network Data." *The Sage Handbook of social Network Analysis*, edited by John Scott and Peter J Carrington, 370-388. London: Sage Publications.

⁵ Stephen, A. T., & Toubia, O. (2010). Deriving value from social commerce networks. *Journal of Marketing Research*, 47(2), 215–228. <https://doi.org/10.1509/jmkr.47.2.215>

⁶ Liang, X., Madrid, J., Saleh, H.S., Howard, J. (2011). NOMPC, a member of the TRP channel family, localizes to the tubular body and distal cilium of *Drosophila* campani form and chordotonal receptor cells. *Cytoskeleton (Hoboken)* 68(1): 1--7.

⁷ Shen, J. & Eder, L.B. (2009). Intentions to Use Virtual Worlds for Education. *Journal of Information Systems Education*, 20(2), 225-233. Retrieved July 4, 2021

What is the impact of Marketing Mix and Customer Value on Customer Loyalty?

1.3 Significance of the Study

The purpose of this research is to analyze the impact of the marketing mix and customer value on customer loyalty. This research will benefit online business owners, business marketers, and those who want to engage people on their social media pages so that they can attract more followers, audiences, and customers for their business. This research will also allow academics and managers to better understand how marketing mixes promote e-commerce. Future researchers will also be helped by this research and understand the impact of the marketing mix on customer loyalty.

1.4 Limitation and Delimitation

The limitation of our research is that our variables are limited because we have studied selective variables. The sample size of our study is also limited because the total number of respondents is 516. Our sample is limited to online social shoppers. The border is that we collect Coimbatore data for research only.

2. Review of literature

The S-O-R theory, is proposed by Woodworth (1928)⁸, It is used to describe how the relationship between stimulus and response is regulated by the body, assuming that there are many different regulatory mechanisms at work in the body. These intermediary mechanisms, that is, organisms, transform environmental stimuli into responses, which are the result of the process, and are represented as CB, that is, consumer behavior. For example, buy and not buy (Lichtenstein et al., 1988). Starting with the SOR program (stimulus, organism, and response), Mehrabian and Russell (1974) also started a model to extend the environmental stimuli that affect a person's cognition and effective response, and these stimuli affect one's behavior one by one. SOR (stimulus, organism, and response) theory is popular in the study of consumer behavior; it is also regarded as a psychological theory. SOR theory is used to confirm that environmental cues (ie stimuli) from blinds affect customer perception and internal conditions (ie organisms), and then affect the generation of their buying behavior (ie answers) (Eroglu et al., 2003). Similarly, perceived value (i.e. organism) is based on the needs or wants of buyers. For example, utilitarian pleasure is initiated by stimulus from the website environment and acts as an intermediary to particularly affect customer loyalty results, such as search, retention and recommendation .

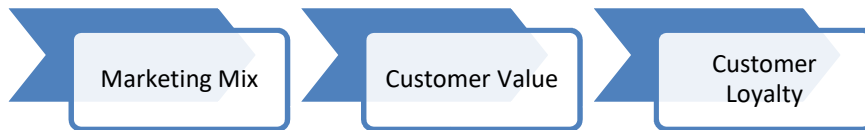
Alhulail, Dick, and Abareshi (2018) determined the impact of word-of-mouth on customer loyalty of social commerce sites. Customer loyalty to social commerce sites has been used as the dependent variable, and word-of-mouth has been used as the independent variable. Structural Equation Modeling (SEM) technology has been used to analyze this relationship. The results show that word of mouth is the most important factor affecting customer loyalty. Customer trust is very important in the field of e-commerce, which affects e-commerce loyalty.

2.1 Research Gap

There are many studies investigating different aspects of e-commerce, but there are still gaps in customer loyalty (CL). Liang conducted an empirical study on social networking sites to understand the impact of social factors such as the quality of relationships and social support on users who intend to participate in the future of electronic commerce.

⁸Woodworth, R. S. (1928). *How emotions are identified and classified*. In *Numerous Contributors, Feelings and emotions: The Wittenberg Symposium* (pp. 222–227). Clark Univ. Press.

2.2 Conceptual Model



2.3 Model Hypothesis

H1: Customer Value has a significant and direct relationship with Customer Loyalty.

H2: Marketing Mix has a significant and direct impact on Customer Value

3 Research Methodology

This study used explanatory research purposes. This research is a preliminary study of speculative thinking. Interpretative research connects different ideas and understands the causes, causes, and effects. Test and revise previous theories (Raza et al., 2020)⁹

Research methods include three types: qualitative research, quantitative research, and pragmatic research. Use quantitative methods for research. Quantitative research is expressed through graphs and numbers. This method is used to analyze hypotheses and theories. (Qazi et al., 2020).¹⁰Data collection for quantitative methods can be done through a Google form survey. The correlation design is the research used in this study, which shows the relationship between variables. This study uses convenience sampling techniques; Convenience sampling is a non-probability sampling method that collects data from suitable people. The target population for this study are buyers of personal care products on social media. The sample size is based on the recommended sample size, that is, the poor sample size is 50, the good sample size is 300, the very good sample size is 500, and the excellent sample size is 1000, which is used for factor analysis. (Raza & Hanif, 2013)¹¹.

Hence, the researcher collected the data from 516 respondents.

In this study, the researchers used IBMAMOS for Conduct (SEM) to analyze the data of this study and the Social Science Statistics Package (SPSS) to obtain a demographic summary. Reliability test, factor analysis and regression test are performed on the data, and the internal reliability of measuring instruments is tested by reliability test

⁹ Raza, S. A., Qazi, W., Umer, B., & Khan, K. A. (2020). Influence of social networking sites on life satisfaction among university students: a mediating role of social benefit and social overload. *Health Education*.

¹⁰ Qazi, W., Qureshi, J. A., Raza, S. A., Khan, K. A., & Qureshi, M. A. (2020). Impact of personality traits and university green entrepreneurial support on students' green entrepreneurial intentions: the moderating role of environmental values. *Journal of Applied Research in Higher Education*

¹¹ Raza, S. A., & Hanif, N. (2013). Factors affecting internet banking adoption among internal and external

customers: a case of Pakistan. *International Journal of Electronic Finance*, 7(1), 82-96

4 Data analysis and interpretation

Table :1 – Respondents Profile (N=516)

Demographic Variable	Frequency	Percentage
Gender		
Male	268	51.9
Female	248	48.1
Age		
18 – 23 Years	143	27.7
24 – 29 Years	204	39.5
30 – 35 Years	123	23.8
More than 35 Years	46	8.9
Education		
Schooling	158	30.6
Graduate	178	34.5
Post Graduate	101	19.6
Others	79	15.3
How often do you buy online?		
Extremely often	101	19.6
Moderately often	231	44.8
Slightly often	136	26.4
Not at all	48	9.3

Interpretation

The detailed information of the demographic data is shown in Table 1. The gender category shows that 51.9% are men and 48.1% are women. The education category shows that 34.5% of the respondents are university students, 30.6% have completed their studies, 19.6% are graduates and 15.3% of the respondents belong to other categories. The characteristics of the age category show that 39.5% of those surveyed are 24-29 years old, 27.7% are 18-23 years old, 23.8% are 30 or 35 years old and 8.9% are 35 years old or more. In addition, the category of frequency of online purchases shows that 19.6% of the respondents buy online very frequently, 44.8% of the respondents buy online moderately, 26.4% of the respondents shop online slightly and 9.4% of respondents have never purchased online.

4.1 Reliability Test

In reliability analysis, the reliability of the set of items internal consistency is examined (Raza et al., 2019¹²).

Table : 2 – Reliability Statistics		
Construct	Cronbach's α	Items
CL	.899	5
CV	.834	3
MM	.855	3

¹² Raza, S. A., Qazi, W., & Umer, B. (2019). Examining the impact of case-based learning on student engagement, learning motivation and learning performance among university students. *Journal of Applied Research in Higher Education*.

Table 2 shows the reliability of all variables. According to Uma Sekaran (2003)¹³, the more the reliability coefficient Cronbach's Alpha gets closer to 1.0, the better the reliability is there. According to Tabachnick and Fidell, (2007)¹⁴ Cronbach's Alpha value must be greater than 0.55. The first variable Customer Loyalty has 5 elements, and the alpha value of these elements is 0.899. The second variable Customer Value has 3 elements; the alpha value is 0.834. The third variable Marketing Mix is 3, and the alpha value of these elements is 0.855. Therefore, they all meet the 0.55 standard established by Tabachnick and Fidell (2007), and the reliability of the data is guaranteed.

4.2 Factor Analysis

To convert huge no. of variable into lesser number of factor, data reduction technique is used which is called Factor analysis.

¹³Sekaran, U. (2003) *Research Methods for Business: A Skill-Building Approach*. 4th Edition, John Wiley & Sons, New York

¹⁴Tabachnick, Barbara G, and Linda S. Fidell. *Using Multivariate Statistics*. Boston: Pearson/Allyn & Bacon, 2007.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.797
Bartlett's Test of Sphericity	Approx. Chi-Square	3652.634	
	df	55	
	Sig.	.000	

The Kaiser-Meyer-Olkin (KMO) test has been used to measure the sampling adequacy, based on the correlations and partial correlations of the variables. If the test value, or KMO measure has been closer to 1, then it has been considered appropriate to employ factor analysis where, it has been acknowledged to be inappropriate to use factor analysis for the variables and data if KMO has been closer to 0. It has been noted from the table 3 that the value of test statistic has been 0.708 which means the factor analysis for the selected variables has been found to be more appropriate.

Bartlett's test of sphericity depicted in table 3 has been used to test whether the correlation matrix has been an identity matrix. i.e., all the diagonal terms in the matrix has been 1 and the off - diagonal terms in the matrix has been 0. In short, it has been used to test whether the correlations between all the variables has been 0. The test value (3652.634) and the associated significance level ($P < 0.01$) given in the table 3 has enunciated that the correlation matrix has not been identity matrix, i.e., there has been authentic and reliable.

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	5.020	45.636	45.636	5.020	45.636	45.636	3.497	31.794	31.794
2	1.716	15.599	61.235	1.716	15.599	61.235	2.475	22.502	54.297
3	1.688	15.342	76.576	1.688	15.342	76.576	2.451	22.280	76.576
4	.622	5.657	82.233						
5	.421	3.824	86.057						
6	.375	3.405	89.463						
7	.319	2.904	92.367						
8	.254	2.312	94.679						
9	.242	2.202	96.882						
10	.211	1.921	98.802						
11	.132	1.198	100.000						

Extraction Method: Principal Component Analysis.

	Component		
	1	2	3
CL_1	.870		
CL_2	.778		
CL_3	.857		
CL_4	.650		
CL_5	.841		
CV_1		.824	
CV_2		.857	
CV_3		.839	
MM_1			.788
MM_2			.878
MM_3			.878
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 4 iterations.			

Interpretation

If the value is in the range of 0.01 to 0.3, it means that the relationship between the variables is weak. Also, if it is in the range of 0.31 to 0.7, then it is a medium relationship between variables, and if it is greater than 0.7, it indicates a high correlation. It can be

seen in Table 5 that all these variables have a high correlation with their respective variables, because the values are greater than or equal to 0.7.

4.3 Regression analysis

Regression Analysis is used to find the relation between dependent and independent variables.

Hypothesis	Regression Path	Effect type	B-Co efficient	P Values	Remarks
H1	CV - CL	Direct	0.759	0.000	Supported
H2	MM - CV	Direct	0.852	0.000	Supported
Notes: MM=Marketing Mix, CL=Customer Loyalty, CV=Customer Value					

Regression test result is shown in Table 6. The result of the 1st hypothesis shows there is a significant and positive relationship between and Customer Loyalty Customer Value as ($\beta=0.759, p<0.01$). The studies which supported that relationship include Wu and Li (2017)¹⁵ and Chang, Lee & Chen (2008)¹⁶. The result means that

if salespeople provide high customer value to their customers, salespeople are likely to be able to attract loyal potential customers. Since customer preferences vary from person to person, sellers must match preferences to attract customers to participate in e-commerce and provide SC value and benefits to obtain higher customer loyalty. In order to achieve customer loyalty and value, sales staff must provide products or services that customers really need. The result of the second hypothesis shows that there is a significant

¹⁵ Wu Li. Institute for Advanced Study, Shenzhen University. Verified email at cea.fr - Homepage ... *Journal of Physics: Condensed Matter* 29 (33), 335702, 2017.

¹⁶ Chang, T. H., Lee, J. Y., & Chen, R. H. (2008). *The effects of customer value on loyalty and profits in a*

dynamic competitive market. Computational Economics, 32(3), 317.

positive correlation between marketing mix and customer value ($\beta = 0.852$, $p < 0.01$). This result is supported by previous research. In previous studies like Baig, Mirza Wajahat et al (2020)¹⁷ Marketing Mix has positive and significant relation with customer loyalty, but there is no study which has positive and significant relationship between Marketing Mix and Customer Value as our result is different which means the more the seller offers product, reasonable price, promotional strategy the more customer will get benefit and value.

CONCLUSION

It turns out that there is a significant positive correlation between value, customer loyalty and brand portfolio, which means that if the seller provides high customer value to its customers, the seller may attract potential loyal customers. In order to achieve customer value and customer loyalty, sellers must provide products or services that customers really need. When customers get good products, reasonable prices, and convenient purchases, they are more likely to become loyal customers.

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¹⁷<https://mpra.ub.uni-muenchen.de/104683/>

EXPERIMENTAL STUDY ON FLEXURAL STRENGTH OF GEOPOLYMER CONCRETE WITH AND WITHOUT HYBRID FIBRES

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ABSTRACT

A large amount of waste coming out from industries has posed a great challenge in its disposal and effect on the environment. In recent years, it has been found that geopolymers may give solutions to waste problems and environmental issues. Hybrid fibres play a vital role in geopolymers concrete, mainly due to their low price, easy availability, excellent characteristics in improving tensile strength, flexural strength, resistance to plastic shrinkage during curing and crack propagation by controlling the crack widths tightly, thus improving durability. In this research work, an experimental investigation is carried out to study the optimization of materials in geopolymers concrete with hybrid fibres (glass fibres and polypropylene fibres). The glass and polypropylene fibres were added each at equal quantities of 1% of the volume of the geopolymers concrete. Activated liquid to GGBS ratios are taken as 0.4, 0.45 and 0.5 by mass. Sodium hydroxide solution of 8 molarity is used as alkaline activator. Ratio of sodium silicate to sodium hydroxide is kept constant as 2.5. This study is intended to find the effect of constituents on mix design of geopolymers concrete with hybrid fibres. The compressive strength, split tensile strength, and flexural strength of geopolymers concrete with and without hybrid fibres were tested for 14 and 28 days, and the results were compared to traditional concrete. As compared to geopolymers concrete without hybrid fibres, ggbbs-based geopolymers concrete with hybrid fibres has the maximum compressive strength, whereas geopolymers concrete with hybrid fibres has the best split tensile strength and flexural strength.

Keywords: geopolymers concrete, ggbbs, sodium hydroxide sodium silicate, hybrid fibres.

1. INTRODUCTION

Portland concrete is the most consumed product in the world because of its availability, versatility, low cost, and high structural performance [1]. Green-House and Global Warming are major concerns in emerging countries when it comes to long-term development. Geopolymers green chemistry will create new types of low-CO₂ cements for building and infrastructure applications, based on geological and industrial waste materials (coal fly-ashes, coal-mining waste, etc.) [2]. Geopolymers concrete has a lot of potential for reducing the effects of climatic change caused by cement production. Geopolymers can cost up to twice as much as OPC, but they can reduce greenhouse gas emissions by 44-64 percent [3]. The compressive strength of geopolymers concrete is reduced when ggbbs is partially replaced with Flyash, Metakaolin, and Silica Fume. [4] When compared to conventional concrete specimens, the compressive strength of GPC cubes, split-tensile strength of GPC cylinders, and flexural strength of prisms were all increased. [5]. When the ratio of Na₂SiO₃/NaOH is 2.5, the compressive strength is higher. Compressive strength is not increased by increasing the NaOH molarity. [6]. The effect of an alkaline liquid is determined by its molarity and the sodium silicate to sodium hydroxide ratio. The compressive strength of Geopolymers concrete increases

as the molarity rises from 8 to 16 and the alkaline liquid ratio (Na₂SiO₃ / NaOH) rises to 2.5 and 3 respectively. [7]. The properties of Geopolymers concrete will be significantly affected by an alkaline solution. 0.40 is the ideal alkaline liquid to flyash ratio. Increasing the alkaline liquids ratio reduces the properties of geopolymers concrete. [8]. The mechanical properties of geopolymers concrete were significantly influenced by sodium hydroxide. [9]. The wet density and dry density of geopolymers concrete increased steadily as the steel fibre content increased, whereas the workability of geopolymers concrete decreased. [10]. GPC's compressive strength, splitting tensile strength, modulus of rupture, modulus of elasticity, and Poisson's ratio all improve when steel fibres are added. The compressive strength of GPC with 1% of the volume of steel fibres is slightly improved. For a 1% volume fraction, the strength increases to 8.51 percent. The modulus of rupture, or splitting tensile strength, increases as the fibre volume fraction increases. For every 1% increase in fibre volume, the splitting tensile strength increased by 23.26 percent to 61.63 percent. For each 1% increase in steel fibre volume, the modulus of rupture increased by 24%. [11]. Using the optimum material ratios from GPC specimens, the highest mechanical properties were identified as 1 percent hooked-end steel fibre, 1 percent hooked-end steel fibre with 4 percent NS, and 1 percent hooked-end steel fibre with 6 percent NMK [12]. At the

age of seven days, the geopolymer had reached 90% compressive strength. The compressive strength of geopolymer mortar increases by up to 70% as the GGBS content rises. [13]. The majority of the compressive strength for geopolymer concrete will be reached in 21-28 days, and curing methods for low strength will have no effect. Polypropylene fibres have improved the compressive strength and ductility of geopolymer concrete in general. [14]. The presence of micro cracks in the concrete is dealt with by hooked steel fibres, which improves the compressive strength. The use of hooked steel fibres increases the splitting tensile strength significantly. [15]. The addition of 2% polypropylene fibres to the volume of geopolymer concrete reduces compressive strength while increasing split tensile strength for all fibre mixtures. [16].

1.2 OVERVIEW

Based on the previous research, this project focuses on a comparison of the mechanical properties of geopolymer concrete (G30) with and without hybrid fibres, as well as conventional concrete (M30). This study's Hybrid Fibres are a mix of hooked steel and polypropylene fibres. A total of 105 moulds were cast for compressive strength, split tensile strength, and flexural strength. The optimum value of hybrid fibres (HF) was determined using compression tests on cubes, split tensile tests on cylinders for 14 and 28 days, and flexural strength tests

on beams for direct 28 days under ambient curing for geopolymer concrete with and without hybrid fibres.

2 EXPERIMENTAL WORKS

A Ground Granulated Blast Furnace Slag (GGBS) based geopolymer concrete mix is built for G30 grade with constant value of $\text{Na}_2\text{SiO}_3/\text{NaOH}=2.5$, while Alkaline liquid GGBS varies i.e., 0.4, 0.45, 0.5 and hybrid fibres is used in this analysis. Conventional concrete of M30 mix designed as per Indian standards. The details of the mix proportion are shown in Table 3. The properties of fibres used in this study were sorted in below Table 1 and 2.

In this analysis, GGBS-based geopolymer is used as the binder instead of Portland cement paste to make concrete. The GGBS-based geopolymer paste connects the loose coarse aggregates, fine aggregates, and other materials together to form the geopolymer concrete, which contains hooked end steel fibres with a 0.7 aspect ratio and polypropylene fibres with a 0.6 aspect ratio (properties of hybrid fibres were shown in below table 3,4).The alkaline solution was a mixture of sodium hydroxide (NaOH) and sodium silicate (Na_2SiO_3) solutions. In the laboratory, sodium hydroxide solution was created by combining NaOH pellets with distilled water. A sodium silicate solution obtained from a local supplier has a mass ratio of SiO_2 to Na_2O of 1.74 ($\text{SiO}_2 = 31.4$ percent, $\text{Na}_2\text{O} = 18.005$ percent, and water = 50.59 percent).

TABLE 1: PROPERTIES OF SODIUM SILICATE.

Specific gravity	1.6
Molar mass	122.06 gm/mol
Na_2O (by mass)	18.005 %
SiO_2 (by mass)	31.40%
Weight of solids (by mass)	49.405 %
Water (by mass)	50.595 %
Weight ratio (SiO_2 to Na_2O)	1.74

TABLE 2: PROPERTIES OF SODIUM HYDROXIDE.

Molar mass	40 gm/mol
Appearance	White solid
Density	2.1gm/cc
Melting point	318 ⁰ C
Boiling point	1390 ⁰ C
Amount of heat liberated when dissolved in water	266 cal/gm

TABLE 3: PROPERTIES OF HOOKED STEEL FIBRES.

HOOKED FIBRES	
Length of fibre (L)	35mm
Diameter of fibre (D)	0.5mm
Aspect Ratio (L/D)	70
Tensile Strength	1100 Mpa
Melting point	1370 ⁰ c

TABLE 4: PROPERTIES OF POLYPROPYLENE FIBRES.

POLYPROPYLENE FIBRES	
Length of fibre (L)	12 mm
Diameter of fibre (D)	0.2 mm
Aspect ratio (L/D)	60
Density	0.9 kg/m ³
Melt point	164c
Thermal conductivity	Low
Water absorption	Negligible
Specific gravity gm/cm ³	0.9 – 091

2.2. Mixture compositions

The aim of this experimental investigation was to achieve the study's research objectives. The mix design consists of three different mixtures prepared using GGBS and the additives shown in the table below, and it is the same for geopolymer concrete with and without hybrid fibres, although the alkaline liquid to ggbs ratio differs (i.e., 0.4, 0.45 and 0.5). The sodium silicate/sodium hydroxide solution ratio was kept constant at 2.5. All of

the mixtures had 8 molar of sodium hydroxide. 10% of extra water is added to the mixtures. The grade of concrete used in standard concrete was Birla cement's OPC 53 grade.

2.3. MIX DESIGN FOR G30:

The below mix design is for 8M concentration, sodium silicate/sodium hydroxide=2.5, alkaline liquid/ggbs=0.4

- Geopolymer concrete has a unit weight of 2400 kg/m³.
- The combined aggregate mass (coarse and fine aggregates) as 0.78 percent of the total mass of concrete, i.e. 0.78 x 2400 = 1872 kg/m³.
- GGBS and alkaline liquid mass = 2400-1872 = 528 kg/m³
- Considering alkaline liquid to GGBS ratio as 0.4.
- Mass of GGBS = (490)/(1+0.4)= 350 kg/m³
- Mass of alkaline liquid= 528-350 = 178.0 kg/m³
- Considering the ratio of Na₂SiO₃ to NaOH = 2.5.
- The mass of NaOH solution = (178)/(1+2.5)=50.85 kg/m³
- Mass of Na₂SiO₃ solution=2.5(50.85)= 127.125 kg/m³

Now calculating the total amount of mass of water and mass of solids in the sodium hydroxide:

➤ **Sodium Hydroxide solution (NaOH):**

8M concentration (NaOH) solution consists of 24.24 % of solids (pellets) and 75.76 % of water.

8 X 40(molecular weight) = 320 grams of sodium hydroxide solids per one liter of sodium hydroxide solution.

This solution comprises 24.4% of NaOH solids and 75.76 % water by mass.

- Mass of solids = (24.4/100) x (50.85) = 12.32 Kg
- Mass of water = 50.85 - 12.36 = 38.53Kg

Table 5: Optimized mix proportions for various grades of Geopolymer concrete (Kg/m³)

Molarity	8M	8M	8M
Sodium silicate/sodium hydroxide	2.5	2.5	2.5
Alkaline solution/GGBS	0.4	0.45	0.5
GGBS	316.8	290.4	264
Sodium hydroxide	60.34286	67.8857143	75.42857
Sodium silicate	150.8571	169.714286	188.5714
Fine aggregates	675.063	675.063	675.063
Coarse aggregates	1145.765	1145.765	1145.765
Extra water	22	22	22

2.4. Casting and curing of samples

The alkaline solution was made 48 hours before the experiment by dissolving 320 grams of sodium hydroxide pellets in 1 Liter of distilled water at regular intervals and allowing it to cool before mixing with the solids. After 24 hours, add sodium silicate solutions to the sodium hydroxide solution that was produced the day before. Mortars were hand-mixed in a laboratory. The Robo sand and binder solids were thoroughly mixed. The alkaline solution was then applied and thoroughly mixed for 5-6 minutes. Cube samples (150x150x150 mm³), cylinder samples (150mm diameter and 300mm height),

and beams (700 x 150 x150 mm³) were casted for compressive strength tests, split tensile tests, and flexural strength tests. After removing the samples from the moulds, they were left in a room environment for ambient curing (23°C, relative humidity 70–10%) before testing to ensure a consistent environment for all samples rather than varying ambient conditions.

3 RESULTS AND DISCUSSIONS:

3.1 COMPRESSIVE STRENGTH:

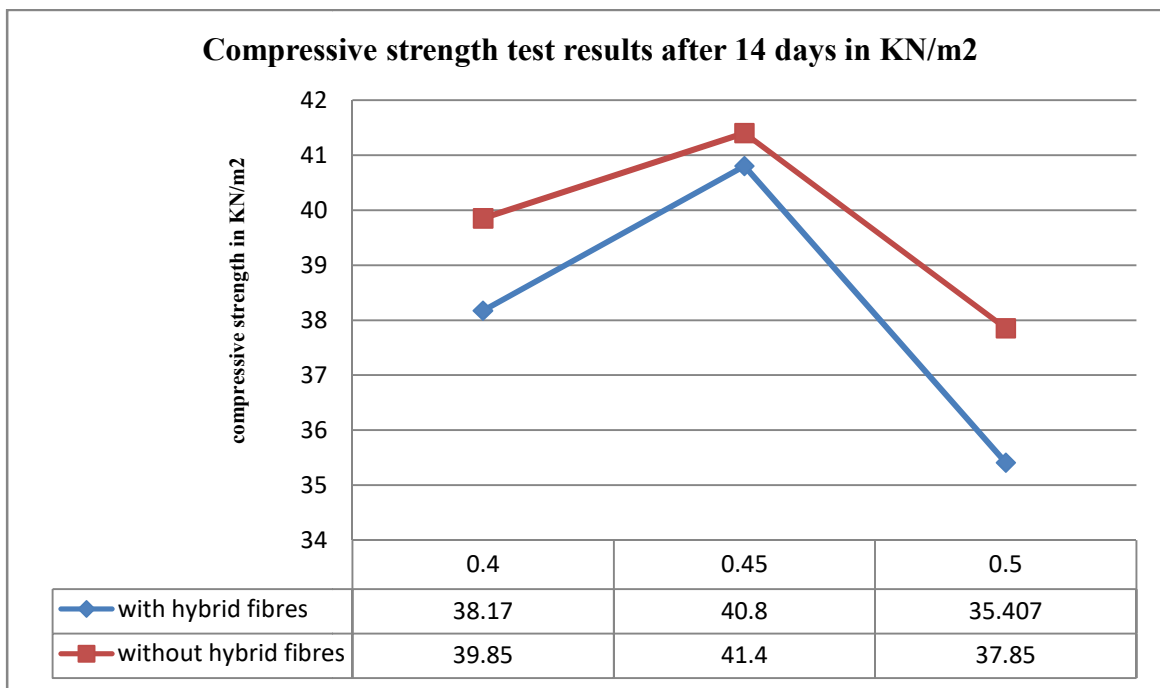


Fig: 1 14 days compressive strength of geopolymer concrete with and without hybrid fibres

- The graphical representations of compressive strength after 14 and 28 days are shown in fig 1. Both the geopolymer concrete with and without hybrid fibres have the highest compressive strength when the alkaline liquid/Ggbs ratio is 0.45.
- As compared to conventional concrete, geopolymer concrete without hybrid fibres shows a 14.08 percent increase after 14 days, whereas geopolymer concrete with hybrid fibres shows 4.40, 2.4, and 6.89 percent as compared to geopolymer concrete with hybrid fibres after 14 days.

3.1.1 COMPRESSIVE STRENGTH: After 28 days in KN/m2

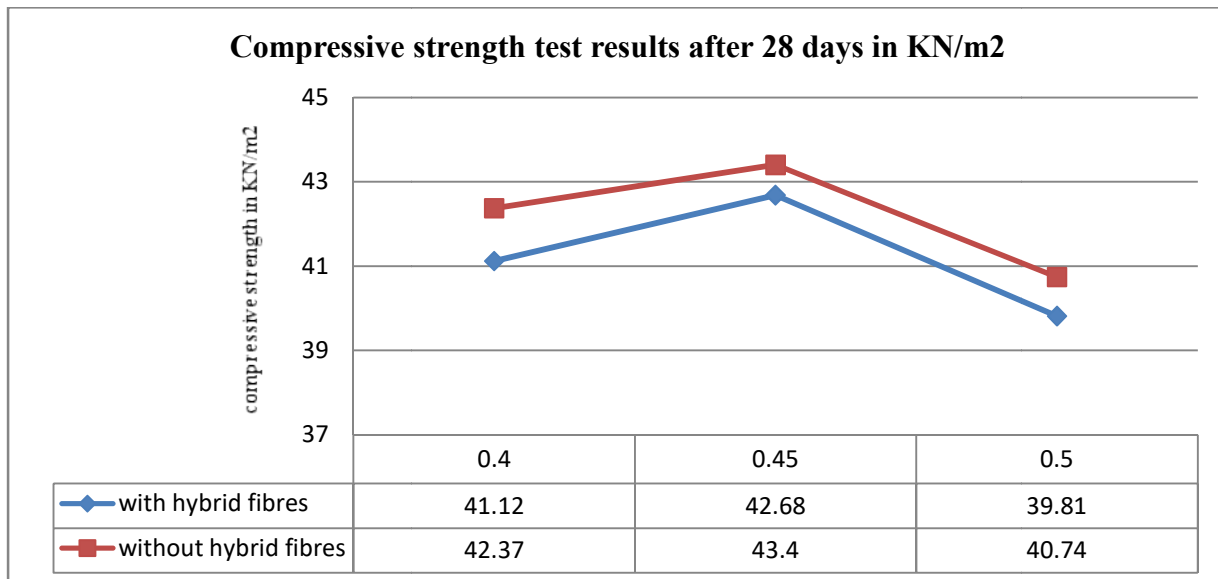


Fig: 2 28 days compressive strength of geopolymer concrete with and without hybrid fibres

- Geopolymer concrete without hybrid fibres when compared with conventional concrete

shows 10.7% increment after 28days and 3.03, 1.6 and 2.33 percent increment when compared with geopolymer concrete with hybrid fibres.

- A decrease in compressive strength of sodium silicate to sodium hydroxide of 0.5 mix is

caused by an increase in sodium silicate and sodium hydroxide content and role of fibres in compression is low.

3.2 SPLIT TENSILE STRENGTH:

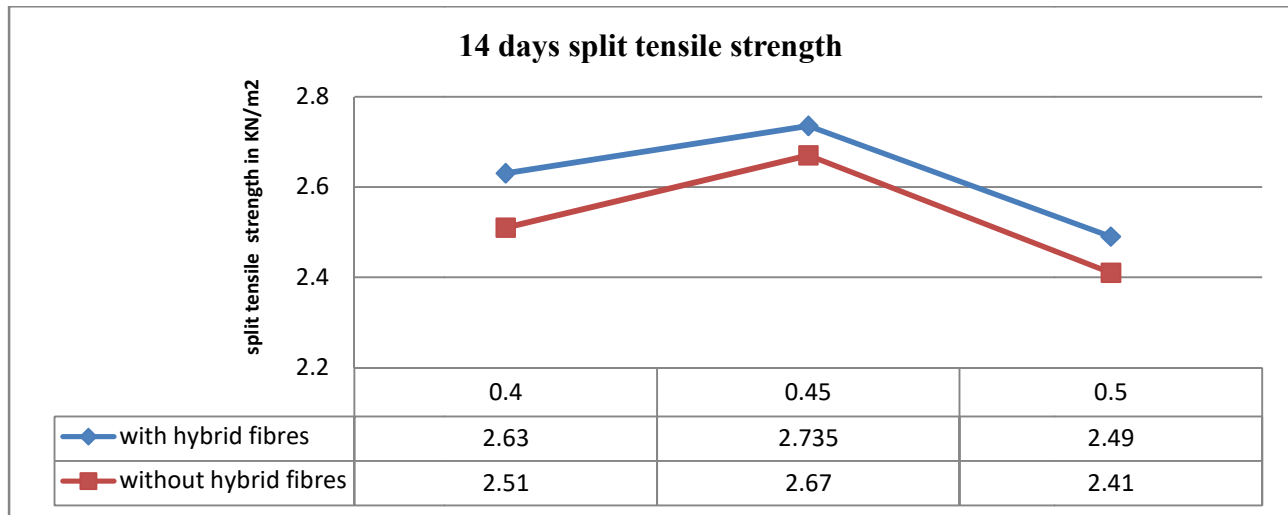


Fig: 3 14 days split tensile strength of geopolymer concrete with and without hybrid fibres

- Figure 3 and 4 shows graphical representation of split tensile strength after 14 and 28 days tests. Split tensile strength is maximum at alkaline liquid/Ggbs ratio of 0.45 for both the geopolymer concrete with and without hybrid fibres.
- As compared to traditional concrete, geopolymer concrete with hybrid fibres shows a 20.8 percent increase after 14 days, and 4.7, 2.4, and 3.3 percent as compared to geopolymer concrete without hybrid fibres after 14 days.

3.2.1 SPLIT TENSILE STRENGTH:

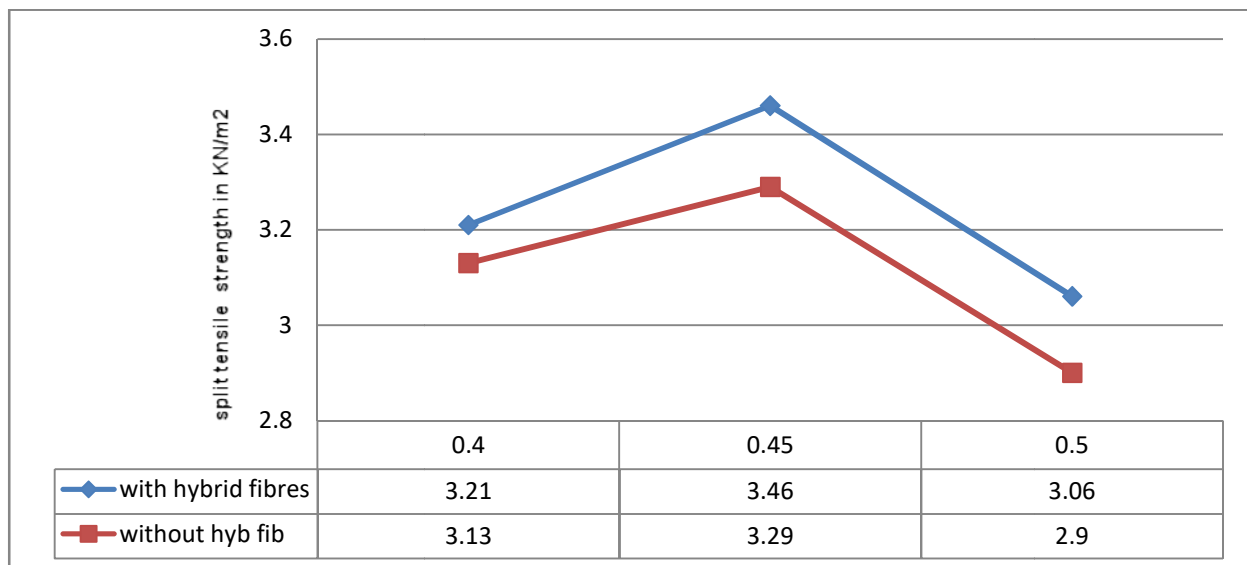


Fig:4 28 days split tensile strength of geopolymer concrete with and without hybrid fibres

- After 28 days, geopolymer concrete with hybrid fibres increases by 20.9 percent for normal concrete and 2.5, 5.1, and 5.5 percent for geopolymer concrete without hybrid fibres for alkaline liquid/GGBS ratios of 0.4, 0.45, and 0.5.
- Geopolymer concrete with hybrid fibres shows the optimum results when compared with geopolymer concrete without hybrid fibres and conventional concrete.
- For an alkaline liquid/GGBS ratio of 0.5, there is a reduction in split tensile strength due to the addition of sodium silicate and sodium hydroxide.

3.3 FLEXURAL STRENGTH:

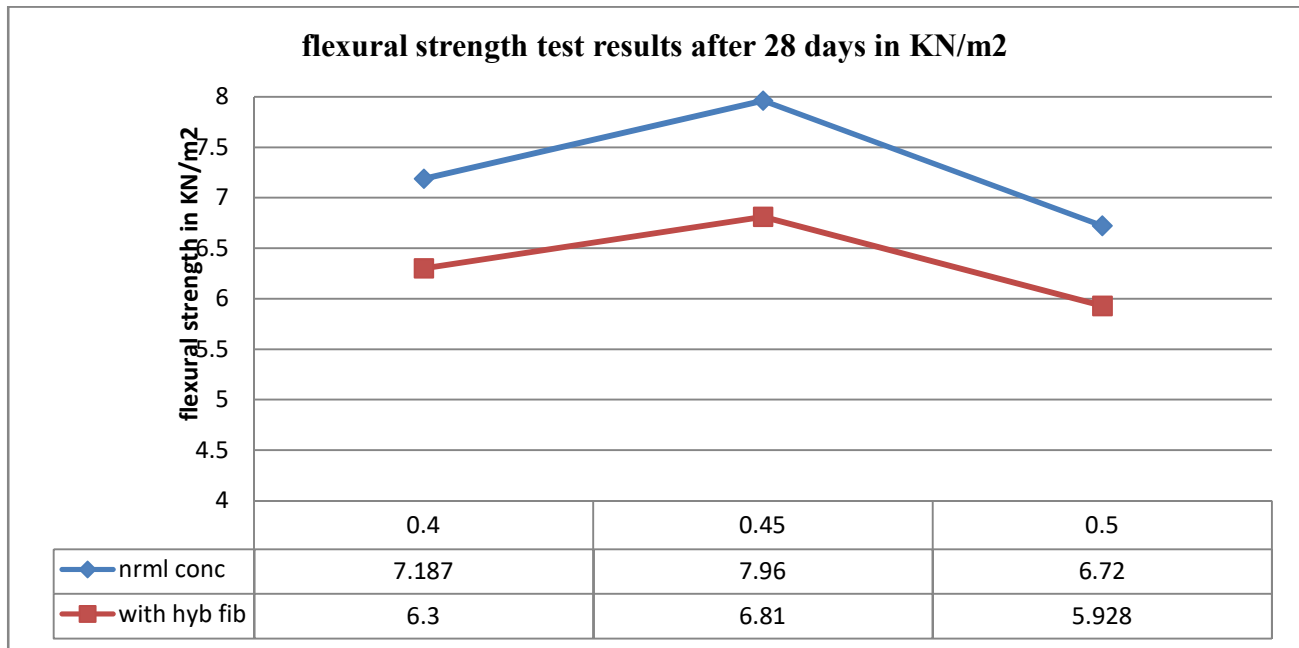


Fig: 5 28 days flexural strength of geopolymer concrete with and without hybrid fibres

- The flexural strength test results of geopolymer concrete after 28 days under ambient curing are presented in Figure 5. Geopolymer concrete with hybrid fibres shows the optimum results when compared with geopolymer concrete without hybrid fibres and conventional concrete.
- After 28 days, there is a 64.46 percent increase when comparing geopolymer concrete with hybrid fibres to conventional concrete, and 14.07, 16.8, and 13.36 percent increase when comparing geopolymer concrete without hybrid fibres. The addition of hybrid fibres, which have a post-cracking behaviour and increase the specimen's yield stress, is responsible for this.
- increased by 3.03, 1.6, and 2.33 percent over geopolymer concrete with hybrid fibres, and by 10.7 percent over traditional concrete.
- For a 28-day test, split tensile strength for geopolymer concrete with hybrid fibres increased by 20.9 percent and 2.5, 5.1, and 5.5 percent, respectively, as compared to conventional concrete and geopolymer concrete without hybrid fibres.
- On a 28-day test, the flexural strength of geopolymer concrete with hybrid fibres improved by 64.46 percent and 14.07, 16.8, and 13.36 percent, respectively, as compared to conventional concrete and geopolymer concrete without hybrid fibres.

4. CONCLUSION:

- As per the previous studies, alkaline liquid/GGBS ratio will be optimum for 0.45. From this experimental study, I can conclude that the strength parameters of geopolymer concrete with alkaline liquid/GGBS ratio beyond 0.45 will decrease Split tensile strength and flexural strength values.
- For a 28-day test, the compressive strength of geopolymer concrete without hybrid fibres
- The properties of the hybrid fibres have a great impact on the behaviour of reinforced beams in flexure.
- Split tensile strength and Flexural strength of geopolymer concrete show optimum results when compared with geopolymer concrete without hybrid fibres and conventional concrete. Role of fibres in flexural strength provides additional strength to the concrete.

- This results explains us that hybrid fibres i.e., steel and polypropylene fibres will imparts additional strength for split tensile strength and flexural strength but not much in case of compressive strength.
- Since geopolymers concrete has a higher strength than ordinary Portland cement, it can be used to replace conventional concrete in the face of environmental concerns such as global warming and CO₂ emissions.

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