ROLE OF MEDIA IN INFLUENCING THE CITIZENS DURING ELECTIONS

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ABSTRACT

***Purpose**: In this technology-driven era, Social Media has become a significant tool of opinion-forming, and Marketing Management has come to realize its significance. The study examines the effect of media as a nation-building tool through political, economic, and cultural democracy. **Methodology:** Collecting data from various secondary resources on recent trends of the role of media in elections, analysing the past trends and current scenario. Use structured questionnaire to explore the opinions of citizens about their political viewpoint and role of media. To find out if there is a generational difference for source of information such as newspaper and social media related to politics. For analysis, Chi-Square test will be used. **Findings:** The media has a high degree of importance and influence over the relationship between some of the factors that affect the decision and behavioural intentions of the voter. **Practical Implications:** The opportunity of this study lies in the fact that we get to know about the preferences of the young generation and the type of media they use for their political quest. This can help create and promote any political propaganda very fast and smoothly. **Originality:** The study presents significant shreds of evidence about the young population, whose voting behaviour is significantly impacted by social media and the videos/reports presented on news channels/newspapers.*

***Keywords:** Media, Elections,Voter Behaviour*

Introduction

Elections are a very important phenomenon in the Democratic as well as the pseudo-democratic countries of the world where the election decides the fate of the entire country as well as of its people. There has been a significant change as to how elections and politicians were perceived earlier when there was no electric and digital medium to see them but with the advancement of technology, everything has completely changed. Digital activism has improved the use of communication technology in a collective manner but also has ignored the role of new emerging media channels in formal political participation.

Through social media, the form of thought and emotions has slowly changed, as it influences all the individual's perceptions whether it is socially speaking, thinking, communicating, or responding to a situation. Degree of speech also applies to alter to social media where people express themselves freely through their pieces of work and blogs on various platforms. The effect of social media also influences the voting trend and the way people vote. It is not only a part of digital platform but also a competitive tool for political parties and candidates for convincing over voting behaviour. Political parties are not only focused on political rallies, manifesto, political conferences, but digital media have become an important part of the political strategy with current dynamics. Twitter, YouTube, Google Plus, Facebook, WhatsApp, and other internet channels have completely transformed the political promotions definition and purpose.

Social Media channels have become virtual networks in the battle which are utilized as a powerful source in the world of politics. Understanding the potential and estimation of these internet platforms to draw in voters, Indian political groups are focussing on turning out to be technically knowledgeable so as to connect with youth which has the ability to change current popularity based political exchange. [1]. There are still some political groups who have faith in regular and conventional strategies for battling like banners, rallies, and house to house peddling for connecting with voters. In any case, they have begun understanding that media channels are prepared to impact up and coming outcomes. [2].

News Channels is also one of the most trusted and influential traditional tools for information. This status has been achieved with years and years of hard work and dedication towards the audience. But with the rise of media platforms, have the news channels lost their charm or do

they still have an influence over the audience.

The findings in this study are expected to benefit voters, especially the younger generation. Social networking has now become an inseparable part of the youth's daily behaviors.

Consequently, the findings of this research are expected to inspire young voters to look for the information they need to develop their political awareness that can be useful to decision- taking in elections. With its versatility and advantage, social media will provide a variety of insights that young people will use to identify the candidates they will vote in the election.

Through this, it is expected that young people's apathy and mistrust towards politicians will be improved, and the disparity could be bridged between the aspirations of young people and politicians.

Literature Review

With the change in the environment of the world and the technological advancements that we have had made over the years, everything associated with humans has changed including the world's oldest traditions of politics. In the 18th and 19th century all the traditional kinds of

Campaigning were to visit towns and villages and advertise themselves there. After some time with the advent of Printing Press, things changed slowly and people were influenced by the opinion of newspapers and what's written in papers about the candidate or the party.

Everything changed with the advent of Television, earlier the people used to determine their candidates by either reading about them in newspapers, or hearing about them on the radio, or going with the popular opinion and word of mouth of the community. On the other hand, the first American TV station began broadcasting on July 2, 1928. Within 20 years radio and newspapers were overtaken by the news channels and other television platforms, this brought us to the new era of performance and visibility. Over the past few years, we have seen how television has successfully positioned the different candidates and the political parties in a certain way which has either changed the way we look upon them and has impacted the results severely which couldn't even be imagined in the 1980s.

In less than 10 additional years, another player came into the market which we know as social media. The youthful age of today is in more profound touch with online platform goliaths like WhatsApp, Instagram, Twitter, and Facebook. A colossal number of this age cast their decisions in favour of LokSabha without precedent for 2019. Thus, it is basically significant for us to know concerning how these political monsters utilize internet based life for their crusading. The main National Party has made a few coalitions with publicizing offices and media purchasing office Madison World and cleared to control in the Lok Sabha decisions with the greatest political race triumph in 30 years, with a promoting spending plan of ₹ 25 crores. This shows the image of the significance of Social media and Visual promotion in times to come..

In 2016 US Presidential Elections, a social media platform was used by both the contesting candidates in order to influence the voters in the US. Various pages were formed highlighting the past of each of the candidate by the opposite candidate, in order to falsely present one's image in the eyes of the audience. One of the instances includes the leaked e-mails from Hillary Clinton. This information could travel such distances within no time only due to the social media platforms. Also, with the rise in the social networks horizon, there has been a shift from newspapers and news channels as a source of information to social media. People now blindly trust social media and don't actually feel the need to read newspapers. Thus, social media now forms a mandatory part of the promotional campaign.

Influence of Social Media: Indian Politics

In 2014 the Vivekananda Foundation was BJP's think tank that formulated the political draft to make MODI the nation's protagonist and gave people the impression that MODI was the political leader and growth idea. Not only did they use social media channels but also all possible modes of communication, i.e. ads, interactions to create MODI as a brand. In 2014 the word "NaMo" was used for the very first time on social media. [3]

Prime Minister Narendra Modi was the one who realized the importance and standing of

social media in concept. He was the one who knew how to use this channel as a tool to interact with people and to influence voters. His team left no stone unturned to communicate with the citizens and used the best social media channels available. Looking at the overall perspective of social networking sites it acts as a stupendous rallying medium for viewing.

In a report, it is identified that young minds are getting more political knowledge as compared to other age group with the time spend on social media channels. It is clear that the resources of social media play a crucial role in setting governmental schemes and influencing public opinion, Journalists and citizen's point of view. Politicians also adopt various social media platforms to express their political ideologies and engage various stakeholders in the propagation and retrieval ofinformation, as well as contribute to critical-rational deliberation.

Recent developments especially in the context of General Elections 2014 and 2019 indicate a strong relationship between the usage of social media platforms and political engagement in terms of awareness, transparency, and participation. Compared with the previous generation, today's youth has become more expressive and responsive to the political scenario.

Social Media and Election Campaign

Social media emerges as an information and technology network that uses communication for content and interaction created by users, and often forms and maintains interpersonal ties.

Some characteristics that could be associated with social media are cooperation between user groups and users, social networking, use of multiple outlets (blogs, search engines, etc.), and engagement.

As per media specialists, there are as many as 100 million first-time voters dynamic via social networking media and the principal focus of the political groups is to broaden their range to this gathering of voters alongside the others.. A user spends 200 minutes every day on mobile internet. Out of which 40 percent is used for social media, Facebook and WhatsApp being the most used. As India is gradually becoming digital, social media is becoming one of the most influential tools used in reaching millions of people in just a click. This is the major reason it is an important role and has huge impact on the elections in India [4]

The 2014 general election (India) was the first in which political parties, using frontline technology and creative concepts for voter outreach, took social media users seriously as electors. Just because, driving Indian publicizing offices, advertising organizations, social media analytics, and marketing firms, and conventional campaigners had accumulated to help their inclination for a political group. Peaking on the rear of an enemy of debasement battle drove by lobbyist Anna Hazare, online networking developed as a focal gauge of general sentiment from 2011 ahead. Those ideological groups that exploited informal communication locales to answer to their supporters demonstrated the best in discretionary terms.[5]

Indian Prime Minister Narendra Modi is another gleaming case of government officials who have astutely used online networking to impact average folks and hence win races. Kenya's 2013 general races also saw the basic pretended by online networking in molding political scenes. [6] During the 2016 US presidential race, social media dramatically upended the traditional conventions and practices of the campaign. Its volume, complexity, and tactics were unparalleled. The Trump campaign has been transformational in relying on social media as the main means of communication [7]. This becomes so important that, Mark Zuckerberg (founder of Facebook), needed to give an explanation that Facebook didn't impact the on-going Presidential Election. [8].

Presently the utilization of social networking has gotten practically basic in numerous nations of the world. The quickly developing prevalence and significance of web-based life can be comprehended from research that uncovers that political Twitter clients are progressively inspired by and occupied with legislative issues when all is said in done and less trusting of the predominant press. [9]

Not only do youth share their personal or professional lives on social media networks, but they also raise awareness and cast their

views on social issues, such as corruption, human rights, insensitivity to gender, sex trafficking, and many more. The research discovered that Twitter was used for political deliberation in Germany's elections, and their tweets measured the participation of the electorate. In the United States, the media's effect on political engagement has been extensively studied. The US presidential election in 2008 proved the importance of social media and Barack Obama made the world realize that social media could be a blessing for politicians. In UK, political leader have been active on Twitter in order to improve and remain dynamic in their electorate. [10]

Here I will try to take up the different regions of India especially focusing on the bigger states with a higher number of seats to acknowledge the demands of the particular state and how the voters can be charmed of different regions so as it can be of political advantage.

This, in turn, has to be planned smartly after focusing on the number of users, their age, the type of social networking sites/ news channels they watch with the mix of beliefs and agendas that they have and also the impact of News anchor. Focus will be on predicting the type of advertisement campaigns to be run on social media and kind of debates required on television to give the right kind of traffic to the political candidate and to ensure that the party which reads this research comes out on the winning side. We will also find the relation between these factors in order to analyse the impact media and its driver over public opinion.

Research Methodology

Purpose of Study: The study examines the effect of media as a nation-building tool through political, economic, and cultural democracy.

Sample: The sample size would be around 100, including voters across Pan India belonging to different age groups and associated to various professions.

Primary Research: Survey and Questionnaire that can help in getting insights about how digital media is being used as a medium to influence the citizens. I will ask questions like how likely they watch the video which is already having millions of views, do they searchfor any content which is related to recent political controversy,etc.

Secondary Research: Literature Review along with understanding the existing situation & behaviour and adopting exploratory research methodology. Collect data from various secondary resources such as news channels & published papers on recent findings of the role of media in elections. This will help in analysing the past trends and current scenario.

Data Collection Method: Conduct descriptive research using Probability Sampling method to find out the opinions of citizens about their political viewpoint, particularly targeting the younger generation for social media use and the older generation for news channel as a source of information related to politics. This survey will be presented to an ample amount of respondents who will be chosen using simple random sampling technique to eliminate the biases of data collected. The pool of respondents will have the people who are most likely to vote at the locallevel.

Analysis of Collected Data: Validating the collected data through questionnaires and finally developing a null hypothesis to find if there is any association between social media and news channels in changing the perception of people about a party or individual. If the hypotheses result is positive then I will find out the strength of the relationship using an appropriate statistical method and interpret the finding if there is any pattern on the basis which we can draw any conclusion.

Approach to Problem

My primary target will be to gather data on social media usage by the public, especially their consumption of digital campaigns formulated by political parties. For Data collection, Primary records and secondary resources will be used. Thereafter, I will try to analyse the possibility of a relation between the impression of campaigning on social media and perception about a political party. Through this, I intend to gauge the influence of social media campaigns of political parties on the voters of the nation. I will also try to analyse the way social media these days only provides us filtered content based on our likes and

dislikes which can eventually lead one to form a single-dimensional viewpoint based on a certain perception. This can create a huge impact on the mind-set of the voters and can change voters' behaviour.

I will try to incorporate a qualitative approach concentrating on the analysis of the effect of Facebook and Twitter handle of politicians, and will try to learn about the social media behaviour of the public. I will specifically focus on how social media handles are operated and are related to campaigning objectives of political parties to influence the public.

In relation to this, my focus will be on the following activities such as:

a. Coverage of politicians in mainstreammedia.
b. Politically related viral content on socialmedia.
c. Impact of "likes" on any politically related post andvideos.
d. Content flow process as awhole,
e. How politicians adapt their messages to appeal tojournalists.

Here adaption is related to politicians' position in political culture. In addition, politicians' efforts to connect with citizens are influenced by all these means.

Altogether, I will try to find out how one's political views can impact the behaviour of the general public and its legitimacy. I will try to conceptualize by critically assessing the consequences of the role of various media channels for political communication, and an extension to democracy.

Primary Data Collection

Primary data was collected through the Questionnaire Survey method. It included 13 different questions related to the following factors:

1. **Age:** It helps in identifying preferences in decisionmaking.
2. **Profession:** Inclination and attitude toward any news incirculation.
3. **Media selection:** On which platform political parties need to promote theircampaign.
4. **Way to propagate agenda:** Which are the effective mean to reach theaudiences.
5. **Frequency of sharing info:** How many people are discussing and sharing thenews.
6. Knowingly or unknowingly using facts acquired form socialmedia
7. **Frequency of sharing views:** Influencing others with your understanding ofnews.
8. Factors which determines what toread
9. **Time spent:** Keenness to understand theinformation.
10. **Verification:** Segregating fake or realnews.
11. Favouring the presence of leadersonline
12. **Influence of newspaper orchannel**
13. **Influence of News anchor oreditor.**

Secondary Research

About Indian Democracy Twitter Profiles Stats in India

Rank	Name	No. of followers	Total Tweets
1	Narendra Modi	**59 572 892**	**26 935**
2	PMO India	**37 164 787**	**26 571**
3	Rahul Gandhi	**15 108 827**	**4 756**
4	ArvindKejariwal	**19 810 442**	**29 689**
5	Amit Shah	**21 446 545**	**11 312**

Facebook Profiles Stats in India

Rank	Name	Fan base
1	Narendra Modi	45 756 827
2	I support Narendra Modi	16 013 060
3	BhartiyaJanta Party (BJP)	16 016 424
4	Amit Shah	14 651 413
5	AajTak	24 901 031

Source: Social bakers

Recent Researches on Impact of Media on Elections

"Donald Trump and the 'OxygPublicity': Branding, Social Media, and Mass Media in the 2016 Presidential Primary Elections" have developed the flow of communication in the campaign using mass media channel through which candidates influence public response and how the public responds to the activity on the central messaging platform.For example, a candidate could tweet about how his part has helped in promoting child education

Sources	Government			
Divisive and Conspirational Content	Junk News & information	28	21	1
Other Political News and Information	a). Video/Imagesharing portals b). Search &Aggregators	10.5 6	1 12.5	1.5 19.5
Other	a). Social MediaPlatforms b). Othernon-political	6 1.5	17.5 0.5	11 0.5
Total Percentage		**100**	**100**	**100**

Type of Source	**Description**	**BJP (%)**	**INC (%)**	**SP-BSP (%)**
Professional News sources:	a).Major News Brands b).Local News and Tabloids c). New Media & Start ups	34 1 5.5	22 2 9	48 1 10.5
Professional Political	Political Party &	5	7	0

Sources	Government			
Divisive and Conspirational Content	Junk News & information	28	21	1
Other Political News and Information	a. Video/Imagesharing portals b. Search &Aggregators	10.5 6	1 12.5	1.5 19.5
Other	a. Social MediaPlatforms b. Othernon-political	6 1.5	17.5 0.5	11 0.5
Total Percentage		**100**	**100**	**100**

A lot of content shared on these platforms by these political parties are junk news, some of them a little sensational and conspirational in comparison to very less amount of hate speech. [11]

Fake news: Acceptance by demographics and culture on social media

Emerging from the United States Elections, counterfeit news has bested exposure across societies to the Arab Spring. Albeit political publicists utilized the language of dread and influence in their promoting for quite a while, online media has ventured up its impact. As indicated by this report, culture has the most substantial effect on the dispersal of phonynews, however, neither gender nor education, but age as a matter of fact in explicit societies affect the acknowledgment of deceiving news. [12].

Towards Prediction of Election Outcomes Using Social Media

The developing political race has an online presence of voters who utilize this gathering to communicate their sentiments and suppositions about political groups, pioneers, and significant themes. Contrasting political decision results and customary strategies utilized by overview organizations for leave surveys and results approval, it was discovered that media information can all the more likely foresee results. It was distinguished that the procedure and timing of information assortment assume a significant job in conveying better exactness in anticipating results and separating important derivations. [13]

Understanding the dynamics of politicians' visibility in traditional and social media

As far as paper detailing, the author found a positive effect of disconnected media inclusion on how much individual applicants are observable in internet-based channels.

Simultaneously, social media platforms frequently predict decidedly the quantity of paper articles that allude to a specific competitor. Additionally, it was seen that driving competitors are profited by rising newspaper inclusion comparative with different up-and-comers in light of the fact that the previous increase consideration via online networking media too. It was additionally discovered that the customary news plan and social media plan affect each other, yet that corresponding impact isn't autonomous of the attributes of government officials[14]

The Combined Effects of Mass Media and

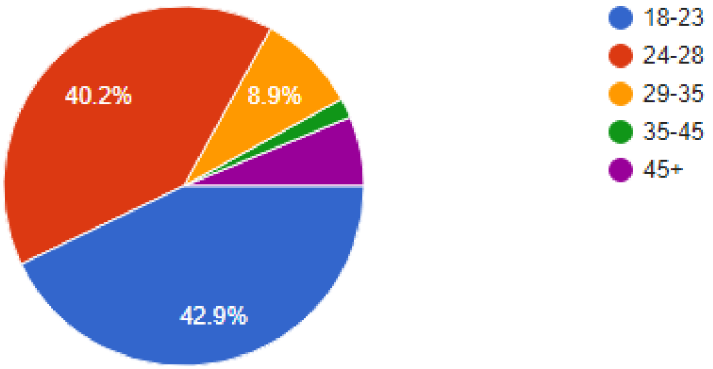
Social Media on Political Perceptions and Preferences

As indicated by the investigation of the 2017 Dutch national races, it was discovered that Political recognitions and inclinations are impacted not just by news inclusion in self-chose broad communications on issue jobs, backing, and analysis yet by true conditions and achievement and disappointment too. Following the speculations on plan setting and issue proprietorship, social recognizable proof, review casting a ballot, and fleeting trend impacts are additionally liable for these desires. Joined outcomes happen when enough individuals utilize the news media just as online networking. The last is accomplishing something beyond improving the inclinations. Social Media frequently has an unadulterated permeability impact and a multi-step course impact that intensifies reports from self-chose prevailing press about Party triumphs and disappointments. [15]

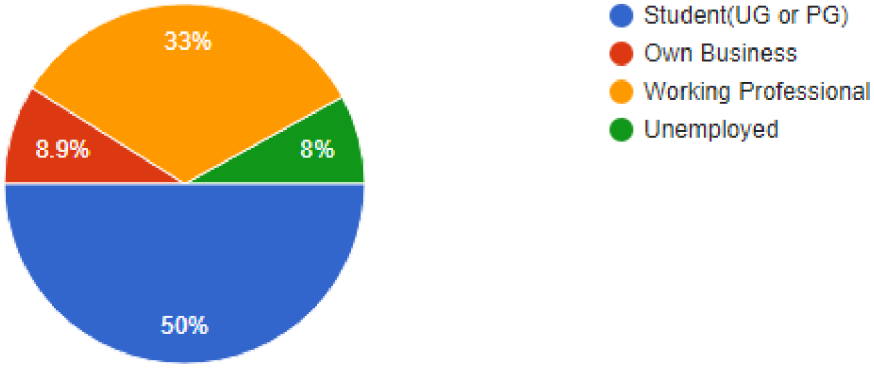
Findings and Implications

1. Demographics of Respondents:

Age



Profession



Source: Primary research

2. Scales used: LikertScale

a) For verification of news: 1= Never, 2= Rarely,3=Often, 4= Regularly,5=Always

b) For Role of newspaper and anchors:

1= Unimportant, 2= Less important, 3=Neutral, 4= Important, 5= Highly Important

c) For use of information: 1= Always, 2= Often, 3= Sometimes, 4 = rarely, 5= Never

Result and Analysis Using Chi Square Test

1. Relation between profession of respondents and preferred media usage

H0: There is no statistically significant difference between the profession of a person and the common form of media used for reading news.

			What is the common form of media you usually use for political reference?					Total
			News Articles	Memes	News channel video	Posters	Speeches of Politicians	
What defines you the best?	Student(UG or PG)	Count	7	12	19	11	6	55
		Expected Count	6.4	11.9	18.3	8.9	9.4	55.0
	Own Business	Count	2	10	12	6	7	37
		Expected Count	4.3	8.0	12.3	6.0	6.3	37.0
	Working Professional	Count	1	0	3	1	5	10
		Expected Count	1.2	2.2	3.3	1.6	1.7	10.0
	Unemployed	Count	3	2	3	0	1	9
		Expected Count	1.1	1.9	3.0	1.5	1.5	9.0
Total		Count	13	24	37	18	19	111
		Expected Count	13.0	24.0	37.0	18.0	19.0	111.0

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	17.652[a]	12	.127
Likelihood Ratio	18.386	12	.104
Linear-by-Linear Association	.015	1	.904
N of Valid Cases	111		

It gives the value of the chi-squared test of 17.652 and the p value (.127) is higher than the threshold value of α (.05), so we can't reject H_0. That is, there is sufficient evidence to conclude that there is no statistically significant difference between the profession of a person and the common form of media used for reading news.

Relationship between media chosen and frequency of sharing the news

H0: There is no significant difference between the common forms of media voter usually use for political reference and his/her frequency of sharing the political news less than 5 times weekly.

Relationship between age of respondents and News Channel

H0: There is no statistically significant difference between the age of the person and role of News channel/ Newspaper while selecting a news report.

Value		df	Asymptotic Significance (2- sided)
Pearson Chi-Square	10.545[a]	16	.837
Likelihood Ratio	12.454	16	.712
Linear-by-Linear Association	1.409	1	.235
N of Valid Cases	110		
Value		Df	Asymptotic Significance (2- sided)
Pearson Chi-Square	10.545[a]	16	.837
Likelihood Ratio	12.454	16	.712
Linear-by-Linear Association	1.409	1	.235
N of Valid Cases	110		

Chi Square test gives the value of the 10.545 and the p value (.837) is higher than the threshold value of α (.05), so we can't reject H_0. That is, there is sufficient evidence to

conclude that there is no statistically significant difference between the age of the person and role of News channel/ Newspaper while selecting a news report.

Findings and Discussions

Social media emerges as an information and technology network that uses communication for content and interaction created by users, and often forms and maintains interpersonal ties.

Some characteristics that could be associated with social media are cooperation between user groups and users, social networking, use of multiple outlets (blogs, search engines, etc.), and engagement.

Social networking platform used for consuming political news:

A review revolving around social media platforms was conducted to determine the preference of journalism for students of news consumption and the purpose behind it. Many participants described social media networks as their only source of news consumption, while others believed that TV news channels and newspapers, for being reliable and informative, were better sources of political news. However, most of the students in journalism claimed that social media had changed the youth's public discourse in the sense of political news, and they were more knowledgeable and involved compared to five years ago.

Social media platforms popular among Youth:

Since the introduction of the Internet, and subsequently social media platforms, the number of Internet users has grown. The number of smartphone users in India is expected to reach 829 million by 2022 according to the Cisco report. The study further notes that mobile datausage in India will increase by five times by 2022, demonstrating the dominance of smartphones as the social media messaging platform, news, video usage, messaging, and business purposes. India's most influential social network is YouTube, Whatsapp, and Facebook with a total penetration among Indian youth of around 90 percent.

Social Media and Reliability

Social media advent has opened several news consumption platforms, and with multiple news sources, fake news and misinformation are also on the increasing trend. In the digital age, where a massive amount of free information in the public domain is easily available, the issue of misinformation, disinformation, and propaganda is very evident. With the increasing importance of using social media sites, particularly Facebook, and its potential for propagating misinformation, it is becoming more important to be able to evaluate reliable information. Social media users should pay attention to the authenticity of details, because online rumours may cause serious harm to individuals.

Lately, India has seen exceptional degrees of deception, lies, and fake insights offered to individuals through its cell phones. As a result, this leaves the open confounded among phony and genuine. While Facebook has found a way to perceive counterfeit reports, bogus cases as "examined by outsider truth checkers," show less phony articles in news sources for clients and assist users with maintaining a strategic distance from accidentally sharing deceiving articles by telling them in due time.

Information through various media channels is conveyed to voters regularly to reflect the candidate's character and personality, their accomplishments, the key issues of interest to them, and the activities performed during the campaign which may give voters a good image of the person they will support in the election, and if this information is consistently conveyed, it can acquaint users with the candidate. Ultimately, this knowledge is supposed to instill confidence in voters to like the candidates.

In addition to having transparency properties, social media is also a tool that incorporates text, audio, visual and with these benefits, people can quickly see what the candidates are doing, and whether the candidate's character and personality deserve to be selected.

Many people now choose to use social media to access information, as it promotes the benefits of social media. Social media will provide the public with reports and personal knowledge about the candidates, who are often taken up late by reporters and television crews. Hence it needs a willingness to share openly, communicate events and different activity images so that a candidate's reputation can be maintained. Intheend,

Conclusions and Recommendations

The conclusions which can be drawn using the above statistical methods and observations are as follows:

1. UG and PG students prefer memes, news videos, and posters as their preferred means of media usage for politics. People having their own business prefer memes and news videos whereas the working professionals primarily like to view the speeches of the politicians.
2. There is a significant relationship between the profession of a person and the common form of media used for his political knowledgequest.
3. There is no significant impact of the type of media used for political news and frequency of sharing and spreading of that politicalnews.
4. There is a significant impact of the age group which has its bearing on the importance of the particular news channel and newspaper being chosen bythem.
5. There is a significant impact of the age group which has its bearing on the importance of the particular news anchor and newspaper editor/writer being chosen bythem.

The benefit of social media is that it will change young people's level of involvement in political activities. Media should inspire young people to take part in the elections as it would make them more conscious of the political problems that have been communicated. Earlier youth have always been seen as, a community not concerned with politics but with the presence of social media, this perception slowly shifts. It is therefore important to allow full use of Media as a platform for promoting youth participation in election activities.

Limitations

The sample data considers only the people who are graduate and above and are mostly working professionals. This data does not represent the rural population or the people who are uneducated and out of the workforce.

Considering the current environment after the pandemic, conducting an in-depth interview to understand the reactions and to gather emotions of the respondents towards government and social media apart from a limited regular survey was not possible.

The survey among the respondents while giving their views is likely to be impacted by current external situations pertaining to border tensions of India with neighbouring countries, current economic conditions, and life amidst the on-going pandemic.

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COST OVERRUN IN CONSTRUCTION PROJECTS IN INDIA – A REVIEW

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ABSTRACT

A construction Project is called to be successful when it gets completed timely and within budget and quality adhered. As the number of construction projects are increasing day by day cost overruns have been identified as a major issue for all the stakeholders.
The paper has tried to review the current literature regarding cost overrun that occurs in Indian construction sector in order to identify the major potential causes which lead to cost overrun and divides them according to the 3 phases of a construction project, i.e., 1. Initiation, 2. Planning & 3. Execution and monitoring. This paper will help the clients, Contractors and other concerned parties in identifying the risk factors and provide solutions for better performance of the project.

Keywords: *Cost overrun, Budget, Cost performance, Construction*

Introduction

The Construction industry is one of the key industries in India which largely adds in Indian national economy. This industry adds to the GDP and work pace of the numerous countries and hence it's viewed as significant for the financial advancement of country. Cost invades in development ventures bring about an ascent inside the capital-yield proportion for the entire economy. Yet, it experiences various issues that influence time, cost and quality exhibitions. In creating nations, essential marker of the advancement is development businesses and its chances to become quicker. The development business is dynamic in nature because of the expanding of vulnerabilities in innovation, spending plans and advancement forms the world over. Cost invade is the most significant issue in construction industry. Late in gaining ground installment, ill-advised arranging and game plans by Contractors, blustery climate, absence of experienced specialized staff, unnecessary works for contractual worker, absence of works, denied liquidity of contractual workers, hauling to endorse the distinction and additional work, denied oversight and site the board of temporary workers, contractual worker needs beneficial time the executives are the components that impacts cost invade in development ventures. Effective administration of development ventures depends on three main considerations for example time, cost and quality. Time and cost are the life savers of any and each venture. The achievement or disappointment of any venture relies to a great extent upon these two factors separated from its quality.

That is the reason to oversee, effectively arrange, and complete an undertaking is an impressive issue. The customer and temporary worker in an undertaking, in spite of the fact that, have a typical target for example to finish the undertaking on schedule. The customer so as to use the final product of the task, which has an incentive to him, the temporary worker so as to end aberrant consumption on it as right on time as conceivable so as to begin further ventures. All things considered, a large portion of the activities cross the restrictions of time. Postponement in finishing brings about clear increment in cost, due to colossal summarizes held, which bring no pay. Truth be told, a few tasks frequently become uneconomical because of the time and cost invade.

When estimates are made for any project a fixed inflation rate is considered, which means it is considered that the prices of materials will increase at a definite rate, which usually does not happen. And when these prices increases beyond the estimation the cost of the project increases significantly. And these changes in the prices are subjected to market. Material prices are not the only factor which accumulates cost overrun but also the prices in fuel greatly. Since a large number of machines are used for the construction, not only in the commencing but also in the logistics and procurement of these materials. Therefore, the

impact of fluctuations in these fuel prices can impact the cost of the project.

Accidents and strikes also have a great impact on the final cost of a project. Accidents are inevitable but when these accidents occur on a large scale during the commencement the Contractoris held responsible and has to pay for all the damages not only for the materials but also for the human resource.

India being a developing country needs a lot of infrastructure and with the new projects, like Bharatmala and Sagarmala, a lot of investment is done by not only development banks like World Bank and Asian Development Bank but also from the private investments. With new PPP (Public Private Partnership) projects in the Indian Railways which includes modification of the railway stations and private operation of the trains a huge amount of investment is made into these projects therefore we cannot afford to bear the risk of getting cost overruns in these projects anymore.

Therefore there is need to use proper planning so that the commencement of these projects can be done without any delay and without any cost overrun.

The paper also tells the measures that should be used for proper implementation of these projects which includes changes in law and order, changes in policies, improvement in the regulatory process, shortage of materials and labours, poor site management etc.

Literature Review

Prof. Yogini K. Patil, researched the variables affecting Cost invades in Indian development ventures. These variables are assembled into 8 classes for cost invades and conveyed to Contractors, Consultants, and Owners of skyscraper construction projects. The result from the study show that there have been 5 major causes that have accumulated to cost overrun which being high transportation cost, change in material determination, and acceleration of material cost, visit breakdown of construction plants and equipment's, and rework. [1]

Mr. Dinesh Bhatia, concentrated to find out which are the main components that accumulate to project delays and cost overruns, in Pune by analyzing the project schedules and the costs which was contracted upon and the costs at which they get completed. The results of the investigation showed that the maincomponents causing delay and cost overwhelms in development of private projectswere: Delays in schedules; Poor time and cost estimation of the undertaken project; clashes among the Contractor party group; Poor work done or rework[2].

SurabattuniMurali&Sanjeet Kumar, distinguished and organized the significant reasons for time and cost invade in development industry utilizing a finished task. Information is gathered from Shan-E-Awadh-ground securing venture, the information has been broken down and contrasted & evaluated and real spending timetables to comprehend the reasons for cost and time overwhelms. Elements are distinguished from the task utilizing poll with the assistance of individuals, who worked for the undertaking through different gatherings like experts, contractual workers, site engineers, and so on. The consequences of the investigation shows that principle variables of cost overrun are helpless material administration, incompetent works, Contractor money related troubles, conditions of site, machines and equipment challenges[3].

Shah MohdShahbaz, SohitAgrawal and Dr. Mukesh Pandey completed their work to locate the main considerations that were liable for cost invaded inside development industry in Gwalior district of Madhya Pradesh (INDIA). A questionnaire for the study has been set up by writers dependent on 32 basic factors that were taken from past work on cost overwhelm in various locales from writing surveys, articles, diaries and so forth. The review was taken from the individuals who engaged with development businesses for the most part contractual worker, site engineer, venture chief, modelers and different other respondent identified with development ventures/industry. The outcome originated from study uncovered that the top most basic factors that causes cost invades during development ventures are lesser Involvement of Contractor during Design and Supervision, Theft on location, Frequent Design Changes, Poor Site Management, imperfect plan and Change in Material requirements[4].

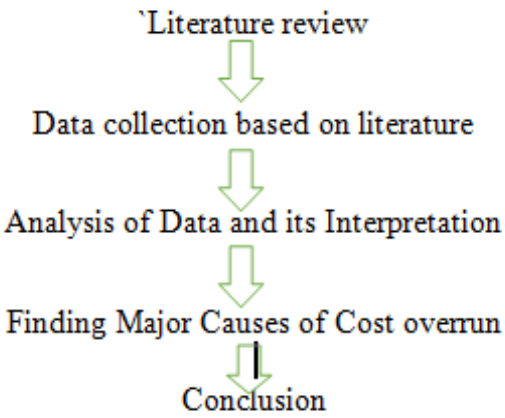
Salim S. Mulla, Ashish P. Waghmare distinguished the variables liable for invades in

time and cost of the development extend and propose the reasonable therapeutic arrangements. The examination depended on an example meet for a few tasks which were land ventures and could fluctuate for framework ventures. Helpless venture evaluation and detailing, helpless usage of plans, delays in dynamic, helpless observing and power over exercises, lacking utilization of present day advances accessible, no satisfactory measures were taken for the accessibility and appropriate progression of assets, no propelled activity taken by any of the gatherings in question, no propelled clearances from the nearby specialists and different offices, approximately confined agreements are the fundamental explanations behind time and cost overwhelms in development ventures in India. Since the vast majority of the components are notable but are controlled if an appropriate course of action is made. This paper suggests a few signs as a healing arrangements with the end goal that better detailing and examination of ventures, Sound execution arranging, advance activity, confirmation supports assets, better agreement the executives, punishments and motivations, observing, the board procedures and Systems [5].

In their paper, Abdulelah Aljohani, Dominic Ahiaga-Dagbui, and David Moore fundamentally surveys the writing concerning cost overwhelm in development ventures in various nations to distinguish the principle possible causes. In this paper 173 reasons for cost overrun have been found by the author in which the major causes have been identified as visit configuration change, contractual workers' payments, installment delay for finished work, and absence of temporary worker experience, helpless cost estimation, poor offering documentation, and helpless material administration. With an extension in the amount of improvement adventures in a singular territory, the local grandstand can't meet the raised degree of enthusiasm for building materials. Along these lines, a task's contractual worker may confront a deficiency of development materials available or an expansion of the fabric costs, which brings about cost overwhelm. For large and complicated construction projects where materials which are rarely found within the local area, there are significant chances that the delivery of materials will get delayed. Material value variance and helpless management has been considered as the primary factor adding to the cost overrun, a portion of the nations that experience the ill effects of this reason are: Nigeria, Indonesia, Vietnam, Ghana, and Saudi Arabia. [6].

In his paper, Abinraj R S tried to address some of the common issues that could or are arising in the construction sector. A major issue that has been found in his research was the contractual provisions. Since almost all the construction activities have been of a halt in this epidemic there have been losses due to unavailability of labours and materials. The paper talks about the force majeure and doctrine of frustration due to COVID-19. The paper also talks about the methods that can be used to revive the construction sector post COVID-19.

Research Methodology



A very large number of factors that lead to project cost overruns have been identified in previous studies. The goal of this is study is to identify some critical factors which leads to cost overruns so that the performance of a construction project can be increased and a project can be completed within the specified budget. The research methodology in this paper is based on the collection of factors that lead to cost overrun in construction projects from the current literature available. These factors have been investigated and being divided according to the phases in which they occur. These factors have also been categorized on the basis of which who is related to causing these factors

i.e., client, Contractor, Consultant or external factors. Among those factors the critical factors have been identified which results in cost overrun.

50 factors have been identified as being the critical factors that causes cost overruns in a construction project and being divided into 3 phases, i.e., 1. Initiation, 2. Planning & 3. Execution, control and monitoring, which phase they occur and who is responsible for mitigation of the respective cost overrun.The factors have been identified from the current literature available.

The various factors that have been identified being as causes for cost overrun were collected from the literature study are as follows

1. Delay in decision making by the owner[7][8][4]
2. Budget availability for the project[7][7]
3. Review delay and approval of documents by the owner[7]
4. Delay in approval of drawings[7]
5. Selecting the lowest bidder[7][5]
6. Inappropriate planning and scheduling of project by Contractor[7]
7. Rework due to errors during execution[7]
8. Delay in Decision by Architect [7]
9. Delay in solving design problems[7][5]
10. Bad project cost estimation[7][5]
11. Delay in issuing the drawing[7]
12. Insufficient experience by Consultant[7]
13. Design documents approval delay by Consultant[7][5]
14. Land acquisition[7][5]
15. Insurance problems[8]
16. Changes in the scope of the project[7][8]
17. Ineffective construction method implemented by Contractor[7][5]
18. Lack of experience in project[7][8][9]
19. Contractor's poor site management[7][9][8][5][4]
20. Irregular Flow of Finance[7][5][4]
21. Improper communication between Contractor and other project stakeholders[7][8]
22. Owner interference during execution of project[7][8]
23. Payment Delay by owner[7][8][9][4]
24. Improper communication on behalf of owner [7]
25. Suspension of work by owner[7][8]
26. Unexpected subsoil[7][8]
27. Frequent design change[7][9][8][5][4]
28. Incomplete drawings[7][8][4]
29. Inaccurate quantity take-off[7][8]
30. Deficiency of competent person for monitoring sitework[7][8]
31. Approval delay of changes in the work scope by Consultant[7][8]
32. Lack of coordination[7][8]
33. Deferral in performing testing and investigation by Consultant[7]
34. The standard of training for originators as to imparting utility data on drawings isn't unmistakably characterized [7]
35. Difficulties in obtaining work permits[7]
36. Change in government regulations and rule[7][8][5]
37. Fluctuation of prices of materials.[9][8][5][4]
38. Increase in wages[9][8]
39. Shortage of site workers[9][8][5][4]
40. Poor quality of work/ Rework[8][5]
41. Insufficient Numbers of equipment.[9]
42. Equipment availability and failure.[9]
43. High cost of machinery and maintenance[9][4]
44. Mode of financing, bonds and payments[9]
45. Labour Absenteeism.[9][4]
46. Severe overtime.[9]
47. Shortage of materials[7][9][5]
48. Act of God[5][4]
49. Bad weather condition[4]
50. Change in orders[4]

FACTORS	RELATED TO
INITIATION PHASE	
Delay in decision making by the owner	Client
Budget availability for the project	Client
Review delay and approval of documents by the owner	Client
Delay in approval of drawings	Consultant
Selecting the lowest bidder	Client
PLANNING PHASE	
Inappropriate planning and scheduling of project by Contractor	Contractor
Rework due to errors during execution	Contractor
Delay in Decision by Architect	Consultant
Delay in solving design problems	Consultant
Bad project cost estimation	Consultant
Delay in issuing the drawing	Consultant
Insufficient experience by Consultant	Consultant
Delay in reviewing and approving design documents by Consultant	Client
Land acquisition	Client
Insurance problems	Contractor
Changes in the scope of the project	Client
EXECUTION, CONTROL AND MONITORING PHASE	
Ineffective construction method implemented by Contractor	Contractor
Lack of experience in project	Contractor
Contractor's poor site management	Contractor
Irregular Flow of Finance	Contractor
Improper communication between Contractor and other project stakeholders	Contractor
Owner interference during execution of project	Client
Payment Delay by owner	Client
Improper communication on behalf of owner	Client
Suspension of work by owner	Client
Unexpected subsoil	External
Frequent design change	Consultant
Incomplete drawings	Consultant
Inaccurate quantity take-off	Consultant
Deficiency of competent person for monitoring sitework	Consultant
Approval delay of changes in the work scope by Consultant	Consultant
Lack of coordination	Consultant
Deferral in performing testing and investigation by Consultant	Consultant
The standard of training for originators as to imparting utility data on drawings isn't unmistakably characterized	Consultant
Difficulties in obtaining work permits	External
Change in government regulations and rule	External
Fluctuation of prices of materials	External
Increase in wages	External
Shortage of site workers	Contractor
Poor quality of work/ Rework	Contractor
Insufficient Numbers of equipment	Contractor
Equipment availability and failure.	Contractor
High cost of machinery and maintenance	Contractor
Mode of financing, bonds and payments	Client
Labour Absenteeism	Contractor
Severe overtime	Contractor
Shortage of materials	Contractor
Act of God	External
Bad weather condition	External
Change in orders	Contractor

Results and Analysis

It has been found that 68% of the factors that cause cost overrun occur in the execution and monitoring phase, 22% in planning phase and 10% in the initiation phase of a project. It has also been found that 36% factors are to Contractor, 26% factors are related to Consultant and Client each and 12% are External factors. The results show that in execution phase 41% of factors Contractor is held responsible, 24% factors Consultant is held responsible and 18% factors client and external factors each are held responsible.

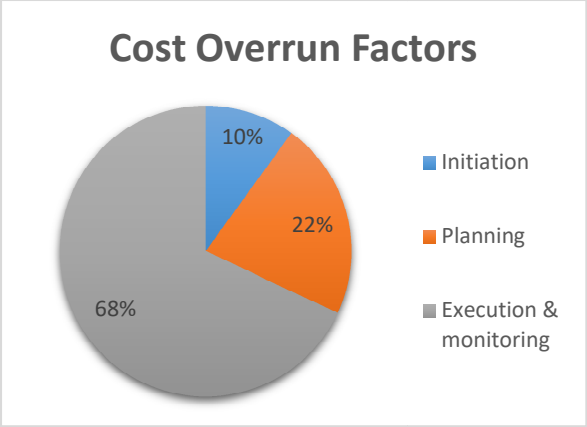


Figure 1

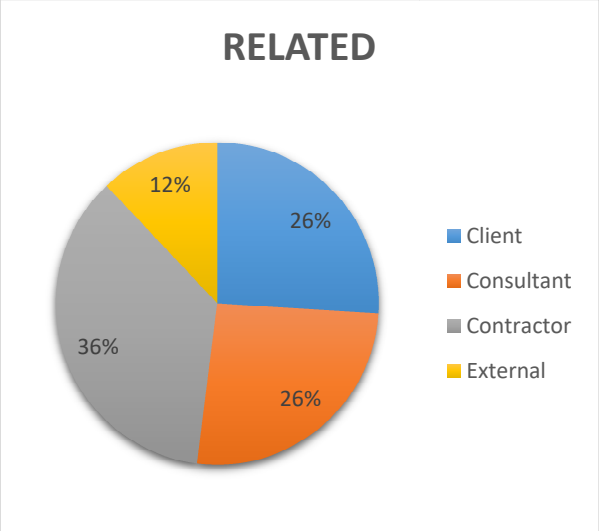


Figure 2

Client Related factors

- Delay in decision making by the owner
- Financial stability of client for the project
- Review delay by the owner
- Selecting the lowest bidder
- Design documents approval delay by Consultant
- Land acquisition
- Changes in the scope of the project
- Interference by the client during execution activity
- Delay in payment of progress by client to the Contractor
- Improper communication by owner and other project stakeholders
- Suspension of work
- Scope change of project
- Mode of payment, bonds and payments

Contractor Related factors

- Delay in affirming shop drawings and test materials
- Improper arranging and planning of undertaking by Contractor
- Rework due to errors during execution
- Insurance problems
- Primitive technologies used
- Lack of experience in project
- Contractor's poor site management
- Payment problems between Contractor and his employees
- Improper communication between Contractor and other project stakeholders
- Shortage of site workers
- Poor quality of work/ Rework
- Non availability ofproper equipments.
- High cost of machinery and maintenance.
- Labour Absenteeism.
- Severe overtime.
- Shortages of materials.
- Equipment availability and failure.
- Act of God
- Bad weather condition
- Change in orders

Consultant Related Problems

- Delay in performing testing and assessment by Consultant
- Delay in Decision by Architect
- Delay in solving design problems
- Inefficient project cost estimation
- Discrepancies among determinations and architectural drawings arranged by Consultant

- Delay in issuing the architectural drawing
- Experience of Consultant
- Changes during construction by Consultant
- Incomplete drawings
- Delay in endorsing significant changes in the extent of work by Consultant
- Improper communication by Consultant and other stakeholders
- The standard of training for planners concerning conveying utility data on drawings isn't unmistakably characterized
- External Problems
- Difficulties in obtaining work permits
- Change of government and its rules and regulations
- Increase in material prices
- Lack of equipped individual to screen the advancement at site
- Increase in wages
- Act of God
- Bad weather condition

Conclusion and Recommendations

From the findings and analysis, it can be concluded that certain critical success factors are essential to avoid cost overruns and for the better performance of construction projects. The objectives of construction projects, like budget, performance and quality, and completion of project on time are also affected by these critical success factors.

Cost overwhelms is an extreme issues looked by construction projects in India. It is come about because of different elements which had been recognized in this examination. A sum of 50 examples were found as legitimate and broke down. It has been discovered that the issue of Schedule and cost overwhelm isn't bound to a specific kind or size of project, neither one of it has any similarities for the area or locale. Every one of them confronted pretty much comparable issues of time and cost overwhelms. The result shows that a significant number of the issues from the execution of the project; project execution requires that controlling these kinds of factors , project management techniques of planning, directing, controlling, monitoring, procedures can be implemented to overcome these overruns.

The examination gives data and information to the undertaking directors and contractual workers to concentrate on the most impacting variable of cost overwhelm in development ventures. Prior to giving the agreement to the temporary worker, the undertaking prerequisites ought to be encircled effectively with proper capability models, for example, adequate number of equipment's and significant expense apparatus and so on for developing lofts. Once in the wake of meeting the standards, the undertaking ought to be given over to the contractual worker. As contractual workers have more than one task, it is outlandish for them to fund and deal with the activities. Thus the development organizations and task directors ought to guarantee that the temporary worker ought not to have any undertakings and furthermore ought to survey whether the contractual worker is sufficiently proficient to back and deal with the ventures. The project administrators ought to likewise survey whether the proprietor could gain convenient ground installment to the contractual worker. In light of every one of these contemplations and appraisals, the agreement ought to be given over to the Contractor.

Discussions

Government Interference

Block in work was situated as the essential severest explanation related to Government. As demonstrated in the states of agreement, the Government has the choice to suspend any bit of work if it is required to restudy or update the undertaking to make the basic changes. If obstruction by Government is visit and without reason it may frustrate crafted by Contractor and causes delay for the task.

Difficulties in obtaining work permits

Check in work was situated as the essential severest explanation related to Government. As demonstrated in the states of agreement, the Government has the alternative to suspend any bit of work if it is required to restudy or update the errand to make the key changes. If impedance by Government is exceptionally visit and without reason it may prevent crafted

by contractual worker and causes delay for the undertaking.

Regulatory Process

The problem with current tendering system is that it requires a long list of clearances which are to be issued before commencing of any project. These clearances not only require time but also requires a lot of money to issue these clearances. So it is required for the authority to make a single window clearance system. This will ease up the documentation process, screening and bring transparency in the documentation and approval of the project. A study done by World Bank stated that India lies on the 182nd place among 185 countries in the ease of obtaining permits for the construction projects. In India several states have successfully implemented a single window system for the clearances.

Providing a single window for will allow the authority to promote investment and will provide smooth implementation of the projects. There is also a need to provide appropriate budget for new innovations and technologies for smooth running of single window clearance. Since these databases are extremely important it will require investments not only in developing technology but also in safeguarding these databases.

Tendering and Bidding Process

The government projects in India are awarded through a competitive bidding process. In which a criteria is being set which is generally that the lowest bid will be awarded the contract. This the flaw in this process. Generally better quality of work requires more of the capital investment. But when a Contractor bids lower it leads to cost cutting in the quality of materials which will be used.

The solution to this problem is reverse auction. Under reverse auction there is a transparency in the bids as they are able to see the other competitors' bidding. Thus the reverse auction will allow the authority to save costs and time, provide transparency in the bidding process, increase the participation of the Contractors and will also provide feedback of the Contractors to the bidding process.

Design Changes

All the designs that are made for the construction are made before commencing of the project. But when these designs are changed on a very frequent basis the complexity of the project increases. Since all the schedules and orders are to be revised it not only delays the project but also increases the cost. The Client is usually responsible for the design changes as the scope changes from time to time. Therefore clarity in the project scope is needed before commencing of the project. It is not taken that a project can be delivered without any design changes but changing the designs very frequently causes overrun in the costs. Design changes are also to be done under certain circumstances like boulders in the soil, low soil bearing capacity etc. So to avoid the cost overrun because of design changes measures should be taken in the planning stage itself. Using better technologies and experience of the Consultant.

Land acquisition

Land getting is a fragile issue so thoughtful, exact and clear approach ought to be grasped for exactly on schedule and quiet acquirement. Land making sure about must happen in a manner that totally guarantees the interests of land-Governments and besides of those whose employments depend upon the land being obtained. So a palatable compensation pack which will included reasonable compensation for land and resettlement and rebuilding measures to ease the sufferings of the impacted individuals and exercises.

Decision making Issues

The results show that delay in making decisions is the second most problematic issue related to Government. Delay in progress portions by Government: the results shows that progress portion is third severest explanation related to Government. This may happen due to difficult to reach budgetary resources for various exercises. Without giving the money related arrangement, the endeavor remains just in papers without execution.

Shortage of materials

The Contractor commits himself to give the necessary hardware and other things to

complete the project inside the time plan. Deficiency or inaccessibility of the necessary gear and materials may impede the advancement of work which may lead the project to be delayed.

Installment issues among contractual worker and his representatives: Some temporary workers experienced decrease in their monetary assets due to the "Credit Crunch", the worldwide budgetary emergency. Money prerequisite for obtainment of materials and different costs could lead the temporary worker into an exceptionally basic circumstance which may hinder the advancement of work and delay the task finishing time.

Lack of involving Contractor during design

Lack of including contractual worker is positioned first by and large respondents appeared in table 1. Development organizations was exceptionally relies upon temporary workers work than other. On the off chance that contractual worker take part prior during configuration to see all the arrangement, at that point numerous issues ought to be abstained from during development in regards to drawing understandings.

Poor site management

Compelling administration on location by temporary workers is essential to guarantee that undertaking should finish on schedule and helpless site the board adds to postpone the task which expands the expense. Helpless site the board may happen when contractual workers need more understanding and experience the ill effects of an absence of information in dealing with the undertaking group. Anyway helpless site the executives from the development venture chief's side will influence the entire group and furthermore the advancement of works, bringing about the odd result of task encountering development cost invade as time increments[4].

Improper Estimates

While gigantic quantities of an endeavor's accomplices are restless to kick the endeavor's structure off, if you have defective schedules and spending plans regardless, your undertaking is set out toward an attack from the earliest starting point. In view of the genuine thought of the contribution method, appraisals may encounter the evil impacts of out of line wants for the degree of work associated with the endeavor. When in doubt, a couple of exercises will in like manner be assessed on a one size fits all reason, with chances of outperforming that fundamental examination high. As such, it's basic to your errand's thriving to do your inventiveness in the pre-improvement orchestrating organize and be exact and viable about endeavor cutoff times and costs from modelers and legally binding laborers. Assessing the undertaking correctly can even be started in the RFP methodology. This is the open entryway where engineers, impermanent specialists, and owners can convey their inclinations over spending plan and courses of occasions of the endeavor. If both of the social affairs emits an impression of being strange about arranging or spending plan, this should be a brief admonition that the endeavor is setting out legitimately toward an attack.

In spite of the way that pre-advancement and design organizations may contribute up to as much as 15% of your spending plan if this method can successfully separate likely issues before improvement truly begins, that 15% will be nothing appeared differently in relation to the money got a good deal on the methodology down the line. Considering the open entryway for cost save reserves, pre-advancement is seen as also as noteworthy as the structure stage as it truly lays the reason for a staggering endeavor. A solid masterminding stage before critical ensures that you will have a prevalent methodology of documentation, less confusion among administrators, and a solid endeavor plan, all helping with diminishing future expenses [2].

“Cost estimation is an activity which could be characterized as the procedure where an estimator calculate how much the project would cost using his resources and how the market would affect the rates of materials in the near future.”[6]. Cost estimation for construction projects is a really unpredictable exercise to begin with. Even though with the improvement in the technologies and techniques, estimation methods have improved as long as the construction has started, yet they are still viewed as being unreliable and flawed. Even though customers working alongside the

Contractor have become educated about the innovative technologies and materials that are required of the task works after an undertaking moves from the structure stage to the execution stage. Eg. helpless ground conditions. "Those who plan do better than those who do not plan, even though they rarely stick to their plan." – Winston Churchill.

There are a few foundations for a mistaken quote, and a portion of these causes might be like different reasons for cost invade. One of them is the brain science cause. Therapists accept that the vast majority will in general be more idealistic than reasonable which is called good faith predisposition. In this circumstance, estimators and contractual workers settle on their choice dependent on whimsical positive thinking (higher than genuine rewards and lower than real dangers) as opposed to reasonable estimating of benefits and misfortunes [6].

Payment Delay

Not being paid on time by either the Contractor or the client has always been an issue for all the workers involved in a construction project. It has been found that the projects especially in which the government is the client or so called the public projects are often faced by this problem. It takes a lot of time for the Contractor for their bills to be paid by the government since there is a lot of documentation involved even for receiving the payments. And if the Contractor himself is not capable of funding the project on its own then this results in even more delay and causes even more cost overruns.[6].

When a task is endorsed for venture and 'proceed' is given, assets ought to be resolved to meet the necessities (both for the undertaking and for the between connected exercises/activities of different organizations on which it is needy) as decided from the Program of work anticipated by asset based system. There ought not to be piecemeal or adhoc based system. It might be fitting to decide year-wise prerequisite of assets for all tasks under execution for the entire arrangement time frame, which might be refreshed at every yearly arrangement. Essentially, year-wise prerequisites for key materials like concrete; steel can likewise be turned out to be ahead of time which ought to be submitted by the individual designating offices, till the finishing of the venture [5].

Material Shortage

Installment issues among contractual worker and his representatives: Some Contractors experienced decrease in their money related assets due to the "Credit Crunch", the worldwide budgetary emergency. Money necessity for acquirement of materials and different costs could lead the contractual worker into an extremely basic circumstance which may deter the advancement of work and delay the venture fulfillment time [7].

Materials that are used in construction play a very vital role in execution of any construction project.The significance of material management can be concluded from its definition itself "the system for planning and controlling all of the efforts necessary to ensure that the correct quality and quantity of materials are properly specified in a timely manner, are obtained at a reasonable cost and most importantly are available at the point of use when required"[10].

The result of miss-material management may originate late conveyance of materials or danger of shopping for a more significant expenses, subsequently bringing about postponement and value invade. With an expansion in the quantity of development ventures in a solitary area, the nearby market can't meet the elevated level of interest for building materials. In this way, an undertaking's contractual worker may confront a deficiency of development materials available or an expansion of the material costs, which brings about cost invade [6].

Limitations

It has been found that there has been a shortage of research of cost overruns in India. Most of the research which has been done are on the construction of apartments and roads. Other infrastructure cost overrun research were not found. Also the amount of overrun in these projects cannot be found.

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A STUDY TO IDENTIFY VARIOUS FACTORS AFFECTING CUSTOMER LOYALTY IN INDIAN TELECOMMUNICATION SECTOR

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ABSTRACT

In this fast-moving world rapid economic development, ever-increasing population, escalation in per capita income, better and cheaper communicating connectivity had made India a highly competitive market for telecom companies. Government policies and technological development, especially after the introduction of Jio, has made it possible to avail mobile services in remote regions of India, particularly in rural locations of the nation. Considering the widely used mobile service across India and the outbreak of COVID-19 across the country which has significantly led to a huge rise in the data usage, the aim is to find and analyze the factors impacting customer loyalty in the telecommunication sector. A survey analysis was conducted among 100 users from various regions of India to understand their sentiments regarding the selection of a particular telecom organization. Using factor analysis, it was found that the service quality affected the selection most significantly and there was a minor impact of support attributes on the loyalty of users. A similar trend was seen when the respondents were prompted for a switch from their current telecom provider to another. As of now there are four major telecom providers in India namely Airtel (Private), BSNL (govt.), Jio (Private) and Vodafone-Idea (Private), another survey was conducted with the same respondents to get an idea about which telecom provider was preferred by users during the lockdown period, enforced during the COVID-19 situation. Using descriptive analysis, it was found that users preferred Airtel over others

Keywords: *COVID-19, Customer Loyalty, Factor Analysis, Telecom Provider and Service Quality*

Introduction

Telecommunication has become an essential part of today's world, it impacts the lives of every person on this planet. It has become so important that if it's taken away the functioning of the whole world can collapse. Since the 1990s, the telecommunication industry has seen a rapid growth in India and with the onset of globalization it has become a key pillar of the Indian economy. India has the world's second biggest telecommunication network with an aggregate of 117 crore telephone subscribers (Dec'19) and 151 crore mobile subscribers (Dec'19). India additionally ranks as the world's second biggest Internet client base with a total of 687.62 million Internet users (Sep'19) and 661.94 million broadband subscribers (Sep'19). It accounts for 17 percent of the world's total Internet user base. India is perhaps the biggest customer of information comprehensively and it has the most elevated information utilization per cell phone at a standard of 9.8GB every month. Rural subscribers account for 43.50 percent of the total telephone subscribers and with 70 percent of the Indian population residing in rural areas, the Indian market would be a key market for the major telecom companies around the world to invest in.

As of now, there are four major players in the Indian telecom industry Airtel, BSNL, Jio and Vodafone-Idea. The fact that the Indian telecom industry has become one of the fastest growing industry, with the telecom industry's contribution to the Indian GDP estimated to reach 8.2 percent. An intense competition has started between the companies for their share in the market. But over a period of time they have realized that rather than focusing on acquiring new customers, the key to success would be to retain the customers.

The entry of Reliance Jio shook the whole telecommunication market, it set out the beginning of a telecom transformation realizing solid rivalry. The aggressive pricing strategy from Jio forcedthe other telecom companies to drop their voice and data tariffs. It focused majorly on one thing that was the internet which accelerated the adoption of data in India and because of its VoIP structure they were able to provide users voice calls without any additional charges. The below fig. shows that data price reduced significantly after the launch and significantly increasing the data usage per month. Today 1 GB (gigabyte) of mobile data costs $0.26 = ₹19 making it the cheapest across the whole world.

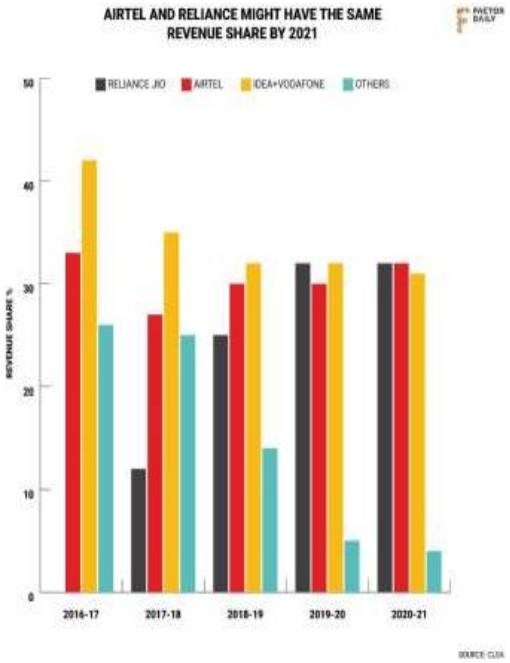


Fig. 1. Consequences of Jio

With the outbreak of COVID-19 forcing people to stay at home meant that the need for data and telecom services grew significantly. As people were forced to stay at home for around 3 months, they turned to online platforms like Netflix, Hotstar, YouTube etc. to keep themselves entertained leading to a surge in daily average usage in India. People working from home also meant that the people relied more and more on the telecom companies for data which meant significant increase in daily usage of data.

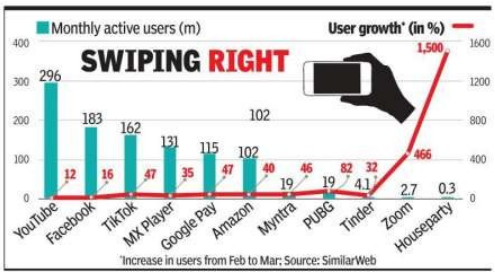


Fig. 2. Growth of users due to COVID-19

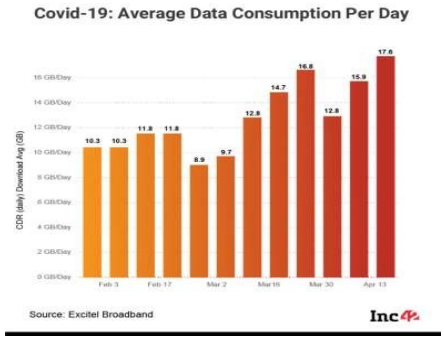


Fig. 3. Increase in daily data usage during lockdown

The challenge that today's market face, is how to retain customers that is how to make them loyal for long-term profit. Loyal customers are the ones who have had a good experience with brand whether it be the goods / services or the overall experience and have a higher chance of returning and this likeliness increases as the number of transactions increases. Thus, identifying and measuring the factors which affect the customer loyalty towards a particular brand and analyzing the consumer behavior in the India telecom industry becomes very important. The study has been conducted with reference to the Indian telecom industry involving 100 respondents from the country. The cost of acquiring a new customer is 5 times more than the cost of retaining the old customers and it has also been seen that the business profits go up by 25 percent to 95 percent when the customer retention rates increase by 5 percent. In this scenario customer loyalty becomes a key for the success of an organization.

A. Customer Loyalty

Customer loyalty is the measure of a customer's willingness to do repeat business with a brand. This is achieved by ensuring customer satisfaction, providing positive customer experience and making sure that the goods or

services is made as per the customer requirements. Customers are willing to pay extra for quality goods and products if they are loyal to a particular brand. Also, they are not easily influenced by availability or pricing of other brands. Loyal customers can become brand ambassadors as they are more willing to influence their family and friends to adapt to a particular brand. It is often seen that loyal customers spend more than the first time customers. If a company has a large base of loyal customers planning becomes effective as it enables businesses to predict growth more accurately, thus helping in marketing and financial planning. And that is why regardless of the brand size, it is very necessary to have a loyal customer base.

Literature Review

Error! Reference source not found. In his theory "Disconfirmation of Expectation" stressed on the fact that only when the expectation matches or performance of the product exceeds the expectation of the customer a customer can be said to be satisfied. And a customer can be said to be dissatisfied when the performance of the product deceeds the expectation of the customer. 1claimed that customer expectations develops from the personal experience that a customer has with the goods/ service and the company and that it can be extremely tailored, which makes measuring customer satisfaction a rather problematic task. He further claimed that the customer satisfaction for a particular is not dependent on a single factor and that there are many factors. Sometimes a customer maybe satisfied with one aspect and at the same time dissatisfied with another aspect which ultimately leads to a conflict in the mind of the customer regarding the product. 6also said the same, claiming that various components of a product had different effects on the customers in different ways.

B. *Service Quality*

Service quality is termed as the notion of competitiveness and since it is quite difficult to measure and define service quality, it has generated interest among academicians and researchers and there is no clear consensus on the definition of service quality 5. Traditionally service quality has been often explained as the gap between customer expectation about the service and customer perception of how the service has been executed 8. **Error! Reference source not found.** proposed a model for measuring customers perception towards service quality, this model was known as the SERVQUAL model. 20developed a model known as Nordiac model of administration quality. This model suggestedthat two types of characteristics are given by the administration associations, which are: technical quality and functional quality. The technical quality is the thing that the client really gets and the functional quality alludes to the way where administrations are conveyed to clients or how the client gets the administrations or the interaction between the company and the customer at the time of delivery.

It was also highlighted that firms can increase profitability by focusing on service quality as it leads to zero defection from customer's side which results into decrease in customer defection and hence leads to increase in firm's profitability. 3described that behavioral benefits like positive recommendations and positive word of mouth can be achieved if customers have greater perception of service quality. The integrated model developed recommends that service quality is a mentality. Thus consumer loyalty and disappointment alongside earlier demeanor assists withshaping the disposition in regards to support quality. The general nature of service is the overall desires for clients, their experience during administration conveyance experience, these are viewed as base for recognition definition about the worth of services. The outcome of this assessment comes out to be behavioral intentions of the customer. In their investigation they affirmed unwavering quality to be the key driver of by and large service quality. In their investigation 21 underlined on the way that organizations can gainfully serve the clients by zero absconding which may later outcome into lesser client surrender and subsequently can prompted increment in firms productivity. 7 in his examination proposed on the way that client conduct is an intervening variable between service quality and money related execution of the firm and improved assistance quality may increment good social expectation thus improving the financial performance of the firm.

29 estimated that customer uses interaction with the service employer, environment quality and the outcome of service to form their perception towards service quality and thus forming a perception towards the firm. 22 established and demonstrated that service quality ought not be considered as a shack between supposed service quality and anticipated service quality, relatively the claim was that the perception of customer can be heavily influenced by the customer's expectation. He additionally asserted that general service quality can be viewed as assessment of administrations. 23 recommended that for effective service recovery from the organizations side is the key for satisfying and retaining the customers, ultimately developing a base of satisfied customers leading to loyal customer base.

2 built up a service quality model in particular; behavioral procedure model. It aides in recognizing the technique for discernment development by the clients about the nature of services. Additionally this model distinguishes the outcomes on singular level social aim because of these recognitions. In their paper, 55 proposed a model to explore the relationships between service quality, service worth and customers' social aims. It was unfaltering with the models recommended by 542. The investigation was led in setting of hospitality operations and on observation and analysis they concluded that the consumers' word of mouth intentions were significantly influenced by the performance of the front desk employees. By and large assistance quality and worth were found intervening factors between representatives' execution characteristics and purchasers' word of mouth goals.

C. *Customer Satisfaction*

10 portrayed satisfaction as pleasurable fulfillment which is detected by clients in the utilization. What it implies is that "the buyer feels that the utilization of the item satisfies afew needs, desires, goals of the consumer and this fulfilment is pleasurable to the consumer." 10.According to **Error! Reference source not found.**3031 and 32 a consumer is said to be satisfied when the products and services affects the decision of a buyer to continue the relationship with the company. The chances of likelihood of a customer leaving the relationship and negative verbal drops altogether when the clients are fulfilled 33. 34 recorded the three temperance's of consumer satisfaction: 1) Satisfaction is uncertainly identified with relationship dependability and relationship duty. 2) Customers who are exceptionally fulfilled spread positive verbal exchange and in this manner become a mobile, talking commercial channel for the association whose service has enchanted them. 3) Satisfied clients will in general be all the more lenient, where fulfilled client is somebody who has appreciated great service conveyance.

A model was proposed by 53 to contemplate the connection between characteristic level exhibitions, by and large fulfillment, and repurchase goals. Discoveries uncovered that at whatever point there is a negative execution on a trait, it largely affects by and large fulfillment and repurchase goals than what positive execution has on a similar property and generally speaking fulfillment, this portrayed purchasers' declining feeling to characteristic level execution. 35 affirmed a couple of indicators of consumer satisfaction specifically; call quality, client care, and value included services. Researchers additionally affirmed that consumer satisfaction and exchanging hindrances has positive impact on client loyalty 52.

29 argued that there was no impact of sacrifice whereas there was a huge impact of service quality on service value, both service quality and service esteem were seen as huge indicators. In light of their examination, they ideated guiding further investigations based on comparable sort of composite model including some more dynamic factors like substantial nature of services and desires for improvement of the investigation. Another examination demonstrated that consumer satisfaction particle is a component of service quality, value, comfort, and ingenuity **Error! Reference source not found.**. Scientists and experts consent to the way that consumer satisfaction is the way to make progress in this profoundly serious and complex market **Error! Reference source not found.**. 383911 accentuates on the point that there exists a huge positive relationship between consumer satisfaction and the dependability that clients feels towards a firm while additionally bringing

up that it isn't vital that serious extent of client dedication doesn't generally goes connected at the hip with a serious extent of consumer satisfaction. Business drifts these days are moving more towards picking up clients' fulfillment and it has a high order in the objectives of the associations around the globe.

They distinguished a couple of indicators of consumer satisfaction; these were specifically nature of system, value appraisal and individual advantages. They additionally investigated explanations behind maintenance conduct and found that the cost of the service, singular advantages and alternative for porting telephone number affected the general consumer loyalty. Another investigation conducted by 50 indicated that client faithfulness was fundamentally affected by the two components service quality and consumer satisfaction. Execution of the item prompted apparent client execution **Error! Reference source not found.**.

D. *Customer Loyalty*

Client Loyalty is fundamental if an organization needs to hold its clients. Nonetheless, numerous discussions are focused round what customer loyalty really is, as 40 expressed,

"Client loyalty is a mind boggling, multidimensional idea". 41 characterized client loyalty as: causing clients to feel committed and when the advantages are important to them, they will remain with the organization. Client loyalty as characterized by 10 is "client unwaveringness is fundamentally the client's generally speaking association or solid responsibility to a service/product of an organization.

1312 claimed that consumer loyalty is preceded by service quality and customer satisfaction that is customer loyalty is only achieved after service quality is maintained and client is fulfilled. 10 characterize buyer faithfulness as "a profoundly held pledge to rebuy or repatronize a favored product/service continuously later on." According to Oliver, it can happen at four distinct levels these were: intellectual, emotional, conative, and social levels.

14 characterized client loyalty as how much a client shows continue buying conduct from a specialist co-op, has a positive attitudinal statement towards the supplier, and considers utilizing just this supplier when a requirement for a comparable service exists. Service organizations by and large consider client unwaveringness as a significant wellspring of upper hand. The meaning of client loyalty 15 gave can be said to be the most convincing definition, he characterized loyalty as "profoundly held responsibility to rebury or frequently purchase a favored item or service reliably later on, accordingly causing redundant same brand or same brand-set buying, in spite of situational impact and promoting endeavors having the capacity to cause a change of conduct." 3 claimed that a customer's loyalty can be defined in terms of behavior as the customer's present behavior towards the product of interest which gives support to the claim made by 11 that customer loyalty is a mixture of attitude and behavioral components of the customers. It was suggested by 16 that client satisfaction is achieved by providing high quality service and satisfied customers tend to become loyal customers over time. 10 claims that if a person acts in a positive manner towards loyalty products it can be said to be loyalty in terms of attitude. It has been contended that for steadfast purchasers, organizations must put resources into relationship assembling and keeping up closeness to clients so as to cause them to feel that the organization cares 24.

Based on the three models of customer loyalty, customer loyalty can be expressed as an attitude, it can be expressed as far as uncovered conduct and purchasing dependent on the attributes of person or on the basis of purchase situation. A strong base of loyal customers can be developed if a good relationship between the company and customers is maintained 25. It focused on the 20-80 principle which states that, the top 20 percent customers of a company may create around 80 percent profit for the company. They also claimed that their customer loyalty projects multidimensionality. This multidimensionality was recognized as social faithfulness and seven distinct sorts of attitudinal reliability. Utilizing this he finished up on the way that there are different sorts of dependability that exists and clients can be faithful to a product and company in many different ways. Upgraded client loyalty in firms that provide service has regularly helped the firm to increase profitability, this has also been

concluded by numerous existing studies which have examined the association between client loyalty and its precursors 29.

Clients can be classified into three sorts based on their social and attitudinal qualities, these were single client, various clients and non clients, and they additionally centered on the way that attitudinal devotion goes about as a base for client loyalty. According to the literature stated by 26 the most significant objective while executing relationship promoting exercises is accomplishing reliability. Loyal customers lead to decrease in operating cost, planning cost and overall expenses and thus a company can become profitable in the long if they have a strong base of loyal customers 17. Organization success has been often associated with customer loyalty by many researchers over the period of time 18. In their study 14 concluded on the fact that a loyal customer can generate multiple effects such as giving personal recommendation to new customers, which leads to positive word of mouth and also repeat purchase.

51 in light of the discoveries of the examination recommended that worth driven loyalty is a significant segment in client repurchase plan. More than some other mix in the examination, this mix, end up being the most remarkable driver which influenced the clients' choice to stay a client. It also been seen during many of the researches that faithful clients will, in general, have a more elevated level of proposal expectation and significantly more grounded repurchase goal 43. Different examinations conducted by researchers have inferred that loyalty expands repurchase conduct in light of the fact that dependable clients show more noteworthy protection from the negative informal exchange and are not handily influenced by counter influence. Faithful customers will, in general, be less price concerned, and in this manner decline the danger of departure because of any limited-time activities undertaken by the competitors' 44.

45 inspected client dedication in the media transmission industry in Pakistan, utilizing information gathered by reviewing 146 mobile phone clients. The examination discovered: trust, service quality, staff dependability, and changing expense to be the principle molding factor for client unwaveringness. Undoubtedly, different explores led prior propose that the accompanying four individual highlights are key drivers of the client esteem in the cell administrations industry 46.

1. The system quality: which is speculated by superb indoor and open air coverage and in the lucidity of voice propagation with no connection break-downs.
2. The cost paid for acquiring access to and utilizing the system.
3. The highlights summed up below the title of client care, specifically the nature of the trading of data among client and provider (1) in reaction to client (phone) enquiries(2) over the span of intuitive practices started by the network administrator.

E. *Service Quality and Customer Loyalty*

Three sides of service quality; unwavering quality, compassion and quality was determined to have a positive correlation 27. A study conducted in the retail banking sector of Bangladesh found that there was existence of a positive connection between all the properties of service quality traits and client faithfulness with an intervening impact of client on them. Customer loyalty has a direct relationship with tangibles, responsiveness and reliability in the Telecommunication industry in Ghana, this was shown by a study in which it was found to be consistent with the result of various studies conducted previously by various researchers and educationists. Another examination demonstrated that sympathy had the most elevated positive relationship while affirmation had the least connection with client dedication. **Error! Reference source not found.** tried directing the impact of apparent client estimation of the connection between service quality measurements and consumer loyalty. During this investigation, they likewise found the positive critical impacts of different components of service quality on consumer loyalty. It distinguished a few satisfiers and dissatisfies as the identifiers of service quality. He presumed that communication between staff and clients affects client devotion.

In their examination they discovered assertive relations of exchanging cost, service quality, and consumer loyalty with client dependability,

anyway they closed consumer loyalty to be the most significant indicator of client reliability. An examination found that client assistance (0.262), valuing structure (0.232) and charging framework (0.148) are the service quality measurements that have the best effect on consumer loyalty, which thusly affected client devotion. The investigation additionally affirmed the interceding job of consumer loyalty on the administration quality and client loyalty relationship.

In an investigation in the Kenyan versatile network transmission division, it was discovered that client loyalty had a positive connection with all the pointers of service quality (of SERVQUAL). It was discovered that client dedication was most impacted by sympathy over some other variables. In the investigation of 28 it was discovered that with the exception of substantial-quality all the variables of clients' apparent assistance positively affected client loyalty. All the five develops of SERVQUAL was seen as unequivocally significant on client loyalty in the investigation of directed in the telecom business of Ghana.

19analyzed the effects of various factors of service quality on customer satisfaction and service reliability in telecom industry. He used a 5 point Likert scale to measure the attributes that impacted customer loyalty. He further used various analysis to study the effects of service quality on customer satisfaction and thus its impact of customer loyalty. It was confined to Delhi and hence it cannot be generalized for the whole nation as India is a big and diverse nation and studying a particular city doesn't cover up India as a whole. Findings revealed that not all the dimensions of service quality affected customer satisfaction and customer loyalty and that only empathy and reliability had significant effect on customer satisfaction. And empathy, assurance, responsiveness and tangibility impacted customer loyalty significantly. It also highlights on dimensions on which the telecom organizations needs to focus on while trying to serve the customers to convert them into loyal customers and in doing so increase the overall profitability of the company. The study shows that only empathy and reliability have significant effect on customer satisfaction, whereas, customer loyalty is affected significantly by empathy, assurance, responsiveness and tangibility. When it comes to mediation, Customer Satisfaction partially mediates between Empathy and Customer Loyalty.

49 studied the factors which impacted customer loyalty in the Indian Telecom Services Sector. The study comprised of a sample size of 411 respondents, which was collected by the use of multistage random sampling method and a pilot survey, after which responds which were not found to be suitable were eliminated. The study was conducted using a structured questionnaire comprising of close ended questions. The response was measured using a five point Likert scale. It was found that customer satisfaction was indirectly influenced by service quality attributes. Fascinatingly, customer satisfaction was significantly impacted by employee performance whereas it was not directly affected by customer value. It also confirmed the fact that customer satisfaction and customer loyalty were significantly impacted by customer value. It was also observed that the indirect effect of customer value on customer loyalty through satisfaction had a significant impact which indicated an insignificant mediation effect among the variables.

The paper by 47 examines how customer loyalty is impacted by the dimensions of relationship marketing. To test the proposed model a survey of 120 sales professionals who are using mobile services was taken. The data were factor analyzed, to determine the key dimensions of relationship marketing. It shows that relationship marketing strategies have a significant impact in developing a lasting relationship with customers in the Indian telecom industry and hence shows the importance of building a loyal customer base. So in order to develop a loyal customer base the various companies should improve on service quality, maintaining trust of the customers, building a long term relationship and developing the brand image.

In their paper 48 show how Reliance Jio emerged as a new service provider Reliance Jio in the Indian telecom sector and how with their initial wave of free services quivered the whole telecom sector. They offered free voice calls,

free 4G internet and free SMS. This led to a decline in the customer base of old players like Vodafone, Idea, Airtel etc. as customers started opting for Jio which enforced other companies to make strategic changes. The authors did primary data collection through survey which was quantitative in nature. They came up with the following three conclusions:

1. Customer switching behavior was impacted significantly by factors like monthly charges paid by them for using the services, the variety of plans offered, and offers that impacted the decision of a customer to but new plans.
2. Other telecom providers had a decreased revenue when compared before and after launching of Reliance Jio
3. Reliance Jio was able to capture a significant amount of the market shortly after its launch because of the aggressive strategies used by them.

F. Gap Analysis

The world has suffered a lot because of the COVID-19 pandemic and the impacts that it has had on the world. Talking about its impact on the telecommunication industry, it has rather had a positive impact. As it has forced people to stay locked in their homes for almost 4 months now. Due to this people are forced to work from home, attend classes online, use OTT platforms for their entertainment and a lot of other internet-dependent activities. As this becomes a daily habit of people, the overall usage of internet and mobile increases significantly which has led to a surprising growth in the declining telecom industry of India. Since people are stuck in their home it is very important to understand what their needs and aspirations are from a telecom company because these times are different and staying in the home for so long has led to a change in demands and the requirements of customers. So, it becomes necessary to understand how the needs of customers have changed and what can be done to satisfy the customer and convert him/her into a loyal customer.

Research Methodology

This study made use of survey method to achieve the set objectives. Using both primary and secondary data collection techniques, data was collected. Primary data was collected online using a structured questionnaire with close ended questions from the respondents. A total of 100 respondents across India were surveyed. For the purpose of the study random sampling method of data collection was used. The data was collected from telecom users who fall into non-business telecom service users. The study is focused on the four telecom service providers Airtel, BSNL, Jio and Vodafone Idea.

A. Demographic Profile of Respondents

1) Age

2) Gender

3) Marital Status

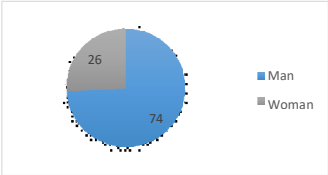


Fig. 5. Demographics: Gender

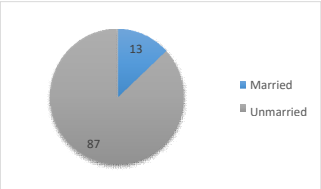


Fig. 6. Demographics: Marital Status

4) Educational Qualification

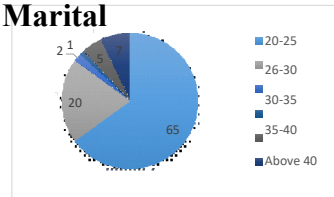


Fig. 4. Demographics: Age

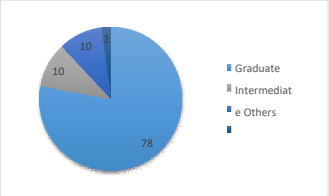


Fig. 7. Demographics: Educational Qualification

5) Employment Status

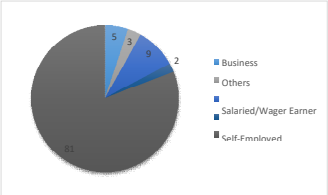


Fig. 8. Demographics: Employment Status

6) SIM Owned

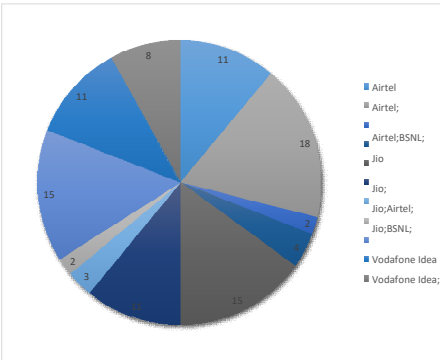


Fig. 8. Demographics: SIM Owned

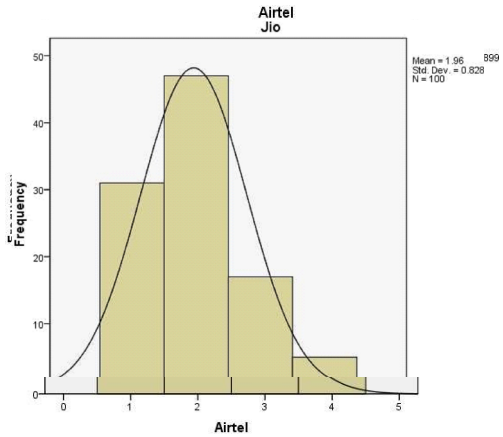
Data Analysis & Interpretation

The mean values of the data collected via the survey was examined and calculated through the frequency descriptive statistics analysis, and for reduction in the number of variables factor analysis was conducted. Maximum Likelihood method of extraction was chosen to extract the factors.

Using the descriptive statistics we were able to analyze which telecom provider was preferred by the respondents during the lockdown which was enforced because of COVID-19. The respondents were asked to rank the companies from 1-4 with rank 1 symbolizing the most preferred telecom provider. From table 1 it is clear that Airtel was the most preferred telecom provider followed byJio, Vodafone Idea and BSNL in the respective order. This can be concluded by looking at the values of mean and median in table 1 where the company having the lowest mean and median was the most preferred one.

TABLE I. STATISTICS OF COMPANY PREFERRED BY RESPONDENTS DURING LOCKDOWN DUE TO COVID-19STATISTICS

		Airtel	Jio	BSNL	Vodafone_Idea
N	Valid	100	100	100	100
	Missing	0	0	0	0
Mean		1.80	1.96	3.70	2.54
Median		2.00	2.00	4.00	3.00
Variance		.808	.685	.455	.857
Skewness		.664	.620	-2.583	-.275
Std. Error of Skewness		.241	.241	.241	.241



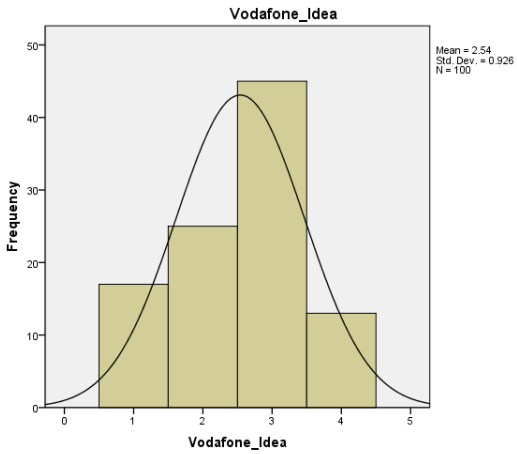


Fig. 11. Frequency distribution of Vodafone_Idea

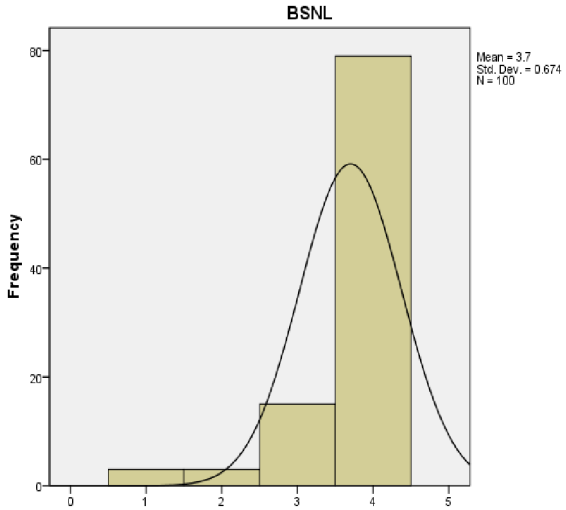
Table 2 shows the KMO and Bartlett's test. The table2 Table 2 consists of significance value which is used to examine the hypothesis. H0: There is no significant correlation among

variables. H1: There is significant correlation among the variables. For the data, sig. = 0.000 which is less than 0.05 and hence we reject H0 and accept H1. Had the sig. value greater than 0.005 we would have not proceeded with the analysis. And would have to redo the entire literature review and redefine the variables.

TABLE II. Kmo and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.815
Bartlett's Test of Sphericity	Approx. Chi-Square	766.965
	df	55
	Sig.	.000

Communality is the amount of variance each



variable shares with the rest of the variables. The minimum value of communality of a variable should be 0.5. In table 3, we can see that every variable except Reputation of Customer Care has a communality above 0.5.

TABLE III. Communalities

	Initial	Extraction
Network_Availability	1.000	.896
Internet_Speed	1.000	.887
Price_Of_Plans	1.000	.745
Review_from_Peers	1.000	.661
Variety_Of_Plans	1.000	.600
Advertisement	1.000	.696
Closeness_to_Store	1.000	.744
Reputation_of_CustCare	1.000	.433
Brand	1.000	.863
Offers	1.000	.738
Voice_Clarity	1.000	.838

Table 4 explains the total variance observed among the components. From the table it is observed that component 1, 2 & 3 have Eigen values > 1. From these we can form 3 groups/ factors, where component 1, 2 & 3 explain maximum variance in data and from component 4 onwards % of variance is less. Component 1, 2 & 3 have cumulative % variance = 73.654. We can accept this since the minimum cumulative variance should be 60%, for those components having Eigen value> 1.

TABLE IV. 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	5.175	47.043	47.043	5.175	47.043	47.043	4.826	43.876	43.876
2	1.845	16.768	63.812	1.845	16.768	63.812	1.702	15.474	59.349
3	1.083	9.843	73.654	1.083	9.843	73.654	1.574	14.305	73.654
4	.833	7.577	81.231						
5	.564	5.130	86.361						
6	.507	4.609	90.970						
7	.333	3.028	93.998						
8	.258	2.343	96.341						
9	.214	1.944	98.286						
10	.142	1.292	99.578						
11	.046	.422	100.000						

Figure 14 is a scree plot which is the pictorial representation between the number of components and their respective Eigen values.

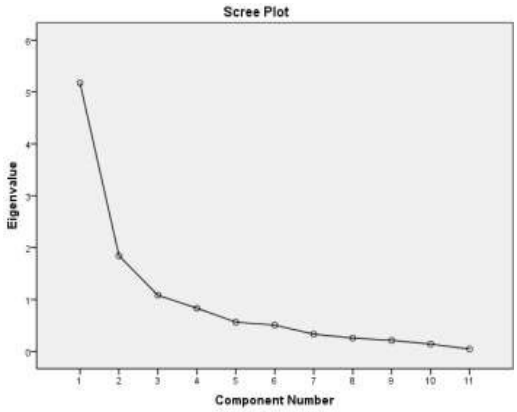


Fig. 13. Scree Plot

Table 5 is a rotated component matrix also known as factor matrix and the values in this matrix are known as factor loadings. Factor loadings shows correlation between the various variables and the three components. Principal Component Analysis is used here to extract the three components. For any variable the minimum factor loading should be 0.5 and from the table we can see that out of 11 variables 10 of them satisfy the condition and the variable reputation of customer care doesn't fall into the region and hence is not categorized into any component. The principal component analysis uses orthogonal rotation which is Varimax with Kaiser Normalization as the rotation method to extract the three components and after 5 iterations the rotation converges. From the table we can reduce the 11 variables into the following three components:

1. Network Availability, Internet Speed, Price of Plans, Variety of Plans, Advertisement, Offers and Voice Clarity can be grouped into component 1.
2. Review from peers & Closeness to store can be grouped into component 2.
3. Brand can be grouped into component 3.

TABLE V. ROTATED COMPONENT MATRIX[A]

	Component		
	1	2	3
Network_Availability	.924		
Internet_Speed	.928		
Price_Of_Plans	.846		
Review_from_Peers		.738	
Variety_Of_Plans	.562		
Advertisement	-.615		.507
Closeness_to_Store		.795	
Reputation_of_CustCare			
Brand			.874
Offers	.789		
Voice_Clarity	.863		

From the variables that have been grouped into various components we can name the three components as: Component 1 – Service Quality, Component 2 – External Factors and Component 3 – Brand.

Table 6 shows the component transformation matrix which shows the correlation between the components formed after reduction of the variables. From this we observe that the component 1, 2 & 3 each have a correlation less than 0.5 and hence has a low correlation.

TABLE VI. COMPONENT TRANSFORMATION MATRIX

Component	1	2	3
1	.948	.187	.259
2	-.302	.790	.533
3	-.105	-.583	.805

CONCLUSION

The study examines two things

1. The most preferred telecom service provider during the lockdown in India, which was enforced due to COIVD-19.
2. To find and analyze the aspects which impacted customer loyalty in the Indian telecom industry.

Four Indian telecom service providers (Airtel, BSNL, Jio, and Vodafone-idea) were compared and it was found that Airtel was the most preferred service provider during the lockdown period because of Network Availability, Internet Speed, Price of plans, Reviews from peers, Brand, Reputation of customer care centers, Advertisements and

Closeness to respective stores in the respective order.

A total of 11 variables were tested and reduced to three components: 1) Service Quality 2) External Factors and 3) Brand. It was found that quality of service variables had a noteworthy influence on customer loyalty. It provided insights to marketers for focusing on service quality variables toincrease the loyal customer base. And a proper understanding of these variables will help the organization develop a lasting connection with the customers helping them in retaining the present customers and hence attain customer loyalty.

Limitations

Following are the limitations of the study:

1. The study was conducted using a sample size which was rather small. To study further about customer loyalty in the Indian telecom sector a larger sample size would have been quite handy.
2. A lot of factors were considered while conducting the study, but other factors like personalized services, porting management, switching cost, etc. might impact customer loyalty considerably and hence these factors should be considered for further studies.

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FACTORS INFLUENCING DESIGN OF SERVICE APARTMENTS IN KATHMANDU WITH CASE STUDY ON CHAUDHARY GROUP

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ABSTRACT

This study helps us to know the service apartment requirements and the feasibility of the project of Chaudhary groups, the biggest conglomerate in Nepal. There is a high influx of tourists and the foreign delegates in the Ingo's and United Nations and they have a limited option of living a comfortable stay in a serviced apartment. So, service apartments in Nepal can prove to be a profitable business and help the delegates to have a home away from home. This research will analyze the factors that are essential and influence the design of service apartments. The insights gained in this study will be useful to service apartment providers to understand consumer requirements, factors influencing selection of service apartments and provide them with a comfortable stay. Hence, satisfying the customers and providing them with a home away from home

Keywords: *Service Apartments, ChaudharyGroups, Hospitality, Stay, Kathmandu*

Introduction

[16]Service apartments have gained a lot of popularity in recent years. Although this sector has grown exponentially over the last 30 years. However, service apartments in Nepal is relatively a newer concept. Hence, this study helps us to know the service apartment requirements and the feasibility of the project of Chaudhary groups, the biggest conglomerate in Nepal. There is a high influx of tourists and the foreign delegates in the Ingo‘s and United Nations and they have a limited option of living a comfortable stay in a serviced apartment. So, service apartments in Nepal can prove to be a profitable business and help the delegates to have a home away from home.

Introduction to hospitality industry: [6]The hospitality sector includes accommodation, event planning, theme parks, travel, accommodations and additional services in the tourism industry. The multi-million-dollar industry depends on the availability of leisure time and revenue. The hospitality unit such as a restaurant, hotel, or amusement park contains many groups such as institutional renovation and direct operation.

Present trend of hospitality industry: [5]After the petroleum and ammunition sector, the hospitality sector is one of the largest and most lucrative businesses. It adds 10% of the total to the global economy and is growing as the global concept has made travel easier. Online bookings have also contributed to the growth of the industry. It provides employment to over 5 million people. Nepal attracts millions of tourists each year and thus the country seeks progress in terms of facilities and quality. The hotel industry is growing at 9% year on year and contributes 3.5% to the national economy. The level of satisfaction is very high for people who want to go with the changes as part of their daily work. The number of registered hotels in Nepal has exceeded 1100 and they need skilled people.

[12] The demand for beautiful and luxurious hotels has not diminished over the past few years which is why it has become a source of attraction for foreign hotel chains to invest in Nepal. People have been successful in setting up hotels in remote areas and this has created jobs for local people and has helped them adapt to the latest developments and ultimately improve their standard of living. [7] The establishment of hotels in remote areas has helped to build infrastructure in certain areas such as connected roads in even the most remote areas, drinking water and sanitation facilities have been improved and especially internet access almost everywhere is possible which is considered a major benefit.

[11] Other sectors are also growing with the development of hotels as tourists wish to enter Nepal's famous destinations and adventure sports such as rafting, Paragliding, bungee jumps, boating, etc. The government also benefits as the revenue as taxes are very high in this sector. [8,9]Many other job opportunities come with the establishment of a hotel industry

such as ticket purchases, travel agencies, transfers etc. In this way, the Hospitality Department offers a wide range of sectors that ultimately help the country to become stronger. The work that the industry has done to improve the quality of human life through job creation is astounding.

Company Profile

[20] The Chaudhary Group (CG) is a multinational corporation that is the basis of a culture bound by a modern system as reflected in its mission. With a view to improving national, economic and social well-being, it thrives on developing new products and services and meeting the needs of society. The headquarters of the Chaudhary Group is headquartered in Sanepa, Kathmandu, with its factories located in various parts of the country. Chaudhary Group has touched all areas of life from Biotech, Cement, Education, Electronics & White goods, Energy and Infrastructure,Financial Services, FMCG, Hotels and Accommodation, Resorts to Retail. It is a leading Multinational in Nepal and contributes to the country's economic growth. The group operates 136 companies under 15 different business symbols on all five continents.

[21] CG Hotel and Resorts is Hospitality focused Holding company, which will hold all the Hospitality related projects and investments all across the world. Since it is considered as hospitality arm of CINNOVATION, which is 100% subsidiary of Chaudhary Group and its family members.CG Hotel and Resort, had started its first hotel with partnership of Taj and today it owns 1354 keys in 29 hotels across 11 countries under its various brands and manages 3626 keys in 53 hotels across 6 countries under its various management companies.

Literature review

[12]Kulkarni stated the difference between service apartments and hotels based on four parameters :[16]

Cost - accommodation for a week or more, hotels can be more expensive than service apartments because their costs are higher and additions like room service, hotel restaurants, and bars do not apply to the apartment model. Many companies will rate these savings as total accommodation costs include parking, WiFi, food, beverage etc.

The environment - a safe environment, such as home while on business trips - especially for a long time - makes the traveler relaxed, and become more productive. This is part of Corporate's Duty of Care for their employees.

Cooking - although hotel rooms are usually fitted with microwaves and coffee makers, the service apartments are often equipped with fully functional kitchens, enabling the traveler to make their own food and the company can control its food budget..

Personalization –guests can personalize the services that they want in a service apartment.

[13] Manojanalyzed the factors influencing the purchase decision of the consumers of residential apartments. The findings of the study show that of the ten factors influencing the decision of purchasing an apartment, the most significant ones are firstly the price of the apartment, secondly the security of the apartment, thirdly the location of the apartment, and so on. The least significant factor is observed to be affordability of interest rate and long term repayment of loan.

[15] Jiewaims to explore what hotel qualities influence the customer choice of hotel in Labuan. The result shows that although the price and security are important while choosing a hotel, there are other features such as product and hotel ratings, hospitality, accommodation, travel, and additional services. customer selection. Hotels should focus on these qualities to influence their customer to choose them in the future.

[14] Phadungyatpurpose of the study was to identify the most important factors influencing the selection of serviced apartments by female business travelers. The results revealed that beyond price, location was the most important factor affecting female business travelers 'choice of serviced apartments, followed by service‘, facilities‘, and brand‘.In addition, the findings showed that female business travelers tended to place an emphasis on safety and security facilities

Research Design

A. Research Gap

Service apartments is relatively a newer concept in Nepal and as there is high influx of

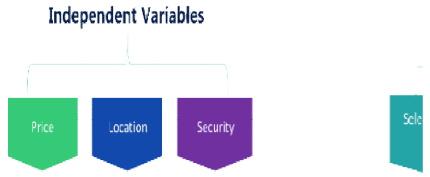
international delegates and tourists, this study will help to analyze their requirements and provide them with a comfortable living. From the literature review, it was found that there is not much work is available on customer requirements and factors influencing in demand for service apartments and especially with reference to Nepal. Hence, my research will fill this gap. There are no proper serviced apartments in Nepal which gives Chaudhary groups an edge over the competition while keeping the customers satisfied.

B. Objectives

- To find out the service apartment requirements by the consumers
- To provide comfortable living for international delegates
- To analyze the factors influencing selection of service apartments
- To analyze the feasibility and ensure that Chaudhary groups project can deliver maximum customer satisfaction

C. Conceptual Framework

In the whole study of understanding customer‘s perception, requirements and factors regarding serviced apartments, variables such as price location and security are studied along with other variable which are suitable for the study of service apartment requirements.



D. Research Questions

Q. What is the most significant factor influencing service apartments in Nepal amongst price, security, location and other factors?

Q. What are the most important services that consumers require while choosing service apartments?

E. Research Methodology

- Sample Size: A sample size of 100 companies and INGO’ chosen and spoken to the heads who handle the hospitality department.
- A thorough secondary research
- Interview with the hospitality heads and calls to INGO’s, and MNC’s:
- Customer survey, questionnaire and interview

F. Limitations

- Market research conducted to various respondents so biases such as mood, feelings act on research settings.
- The responses from the respondents could be biased which ultimately affects the results shown by marketing research.

G. Implications

The insights gained in this study will be useful to service apartment providers to understand consumer requirements, factors influencing selection of service apartments and provide them with a comfortable stay. Hence, satisfying the customers and providing them with a home away from home.

Results and analysis

Fig 4.1: facility company normally uses for accommodation

Mostly the companies are using hotels for their guest‘s accommodation.

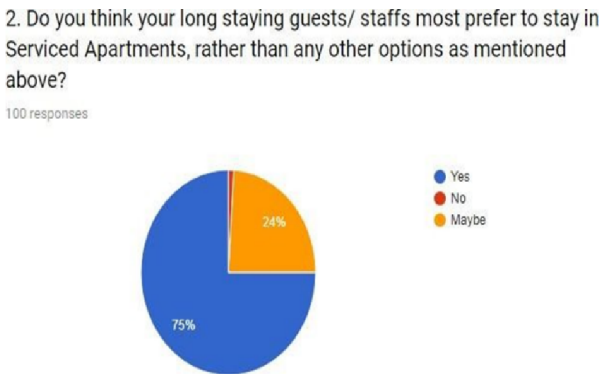


Fig 4.2: long staying guests prefer to stay in Serviced Apartments

75% companies think that the long staying guests would choose service apartment while 24% are not sure if their guests would prefer to stay in the serviced apartments. Only 1% companies feel that the long staying guests would not stay in serviced apartments.

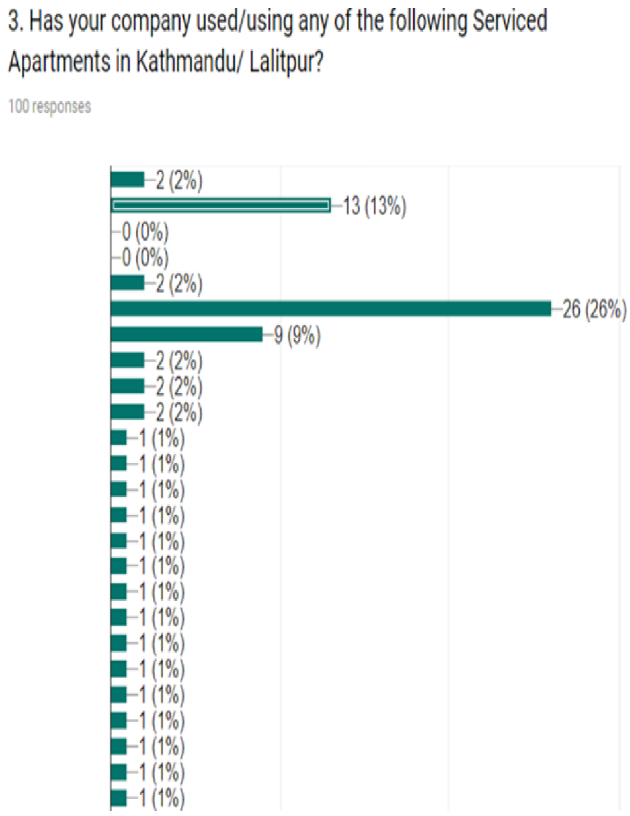


Fig 4.3: company used/using any of the Serviced Apartments in Kathmandu

26% companies used Himalayan apartments, 13% companies used sagarmatha apartment and 9% companies are using black pepper apartments.

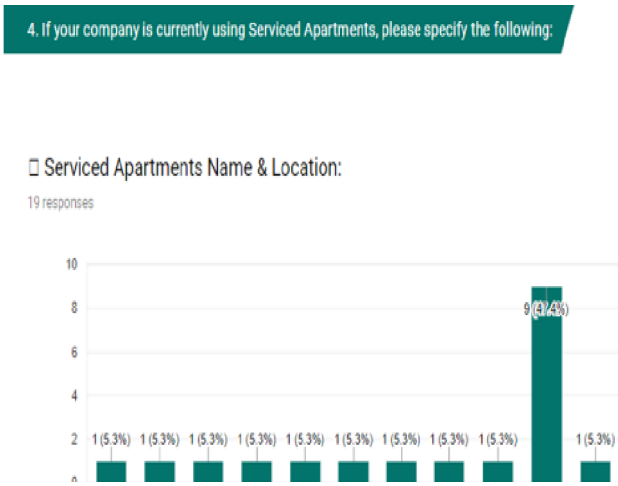
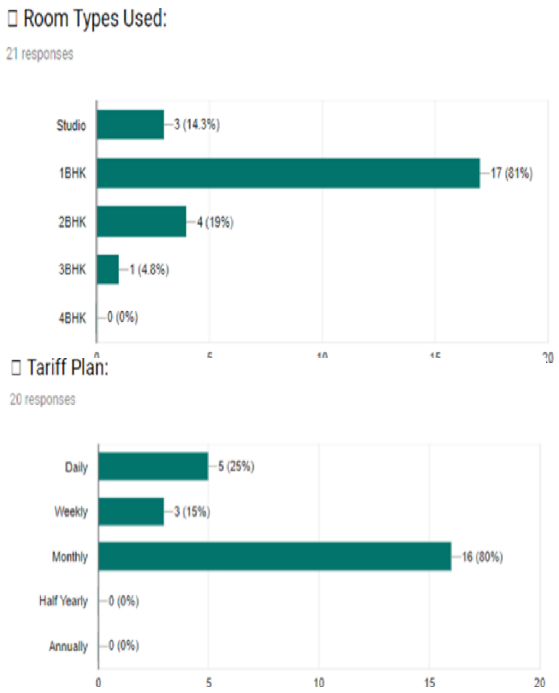


Fig 4.4: companies using service apartments and if yes tariff plan room rates and sizes



Most of the companies are currently using 1 BHK black pepper service apartment and pay them monthly

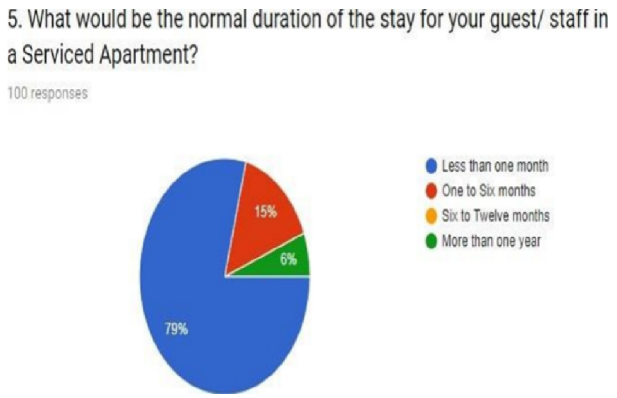


Fig 4.5: Normal duration of stay of guests/staff

Most delegates i.e 79% stay for less than one month as they go to their field projects.15% stay fora duration of one to six months and only 6% stay for more than one year

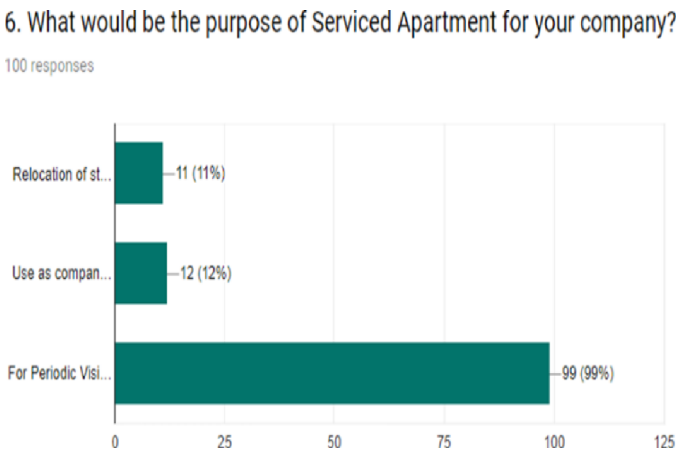


Fig 4.6: Purpose of service apartment

The companies would use serviced apartment mostly for periodic visits of delegates

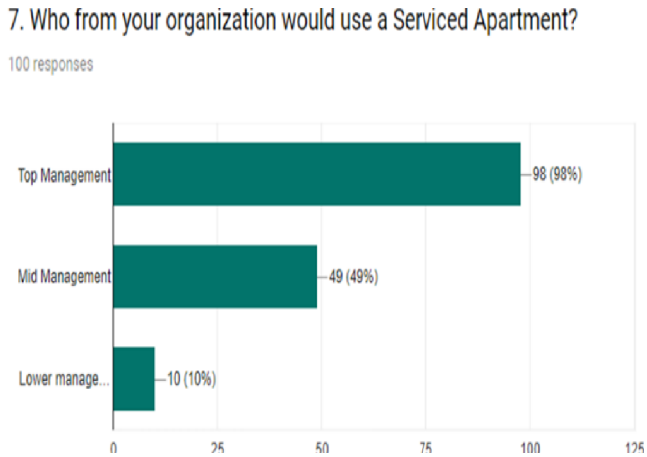


Fig 4.7: Management level using service apartment

Mostly top management delegates would use serviced apartment.

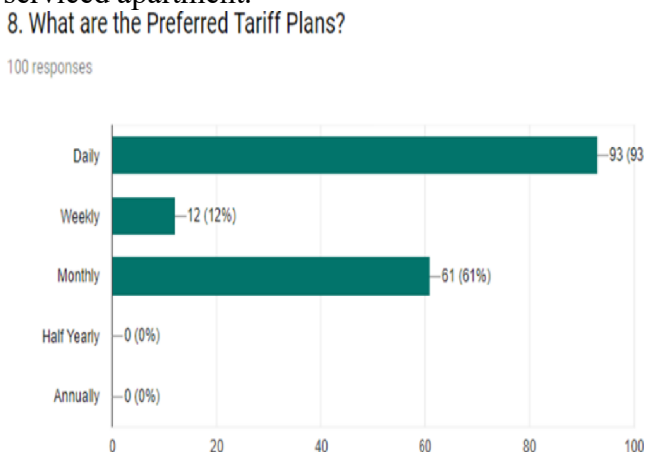


Fig 4.8: Preferred tariff plans

93% would prefer to pay on a daily basis as the delegates stay for short duration followed by 61% preferring to pay monthly. The companies would not prefer half yearly and annual tariff plans.

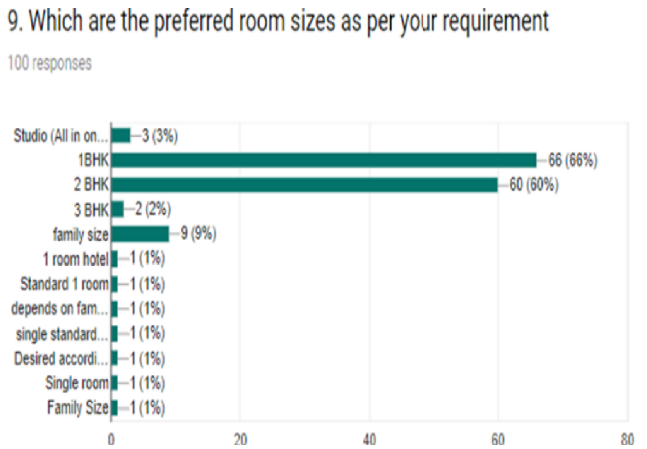


Fig 4.9: Preferred room sizes

Mostly companies prefer 1BHK and 2 BHK and the preferred room sizes would be according to the family size

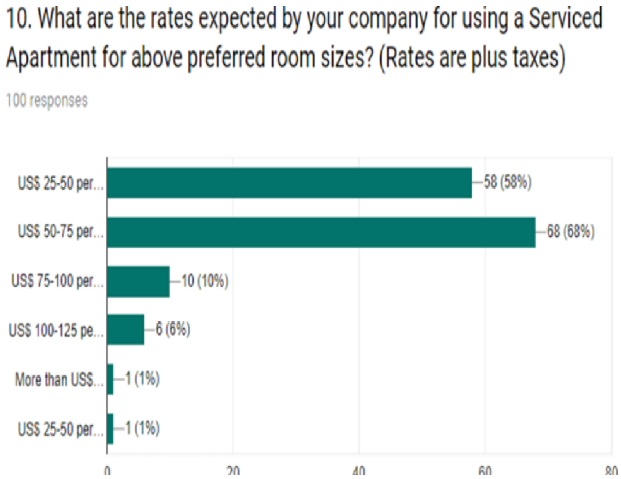


Fig 4.10: Preferred rates expected

Mostly companies expect the rates to be 25-75$ for 1 BHK. 10% companies would prefer the range from 75-125$ while only 7% would be willing to pay more than 100$.

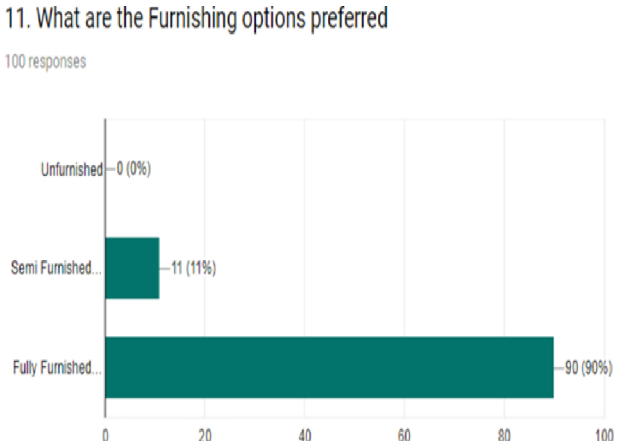


Fig 4.11: Preferred furnishing options

Companies would prefer fully furnished serviced apartment and none of them would prefer unfurnished apartment.

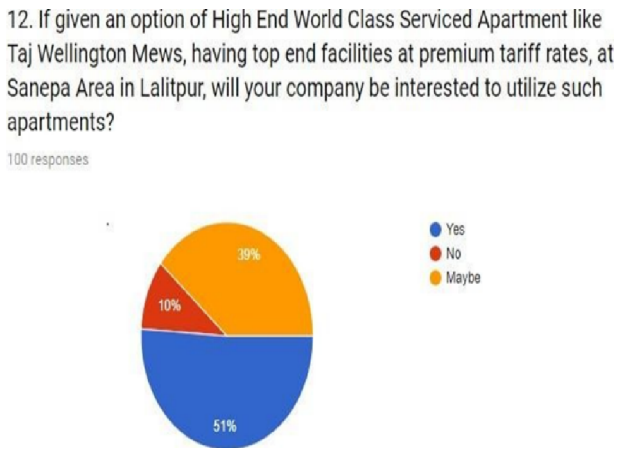
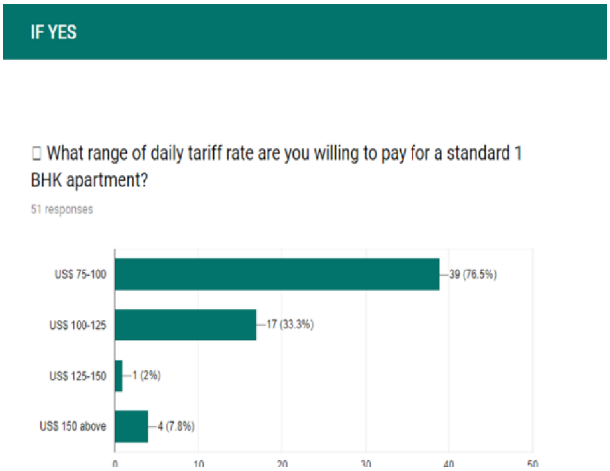
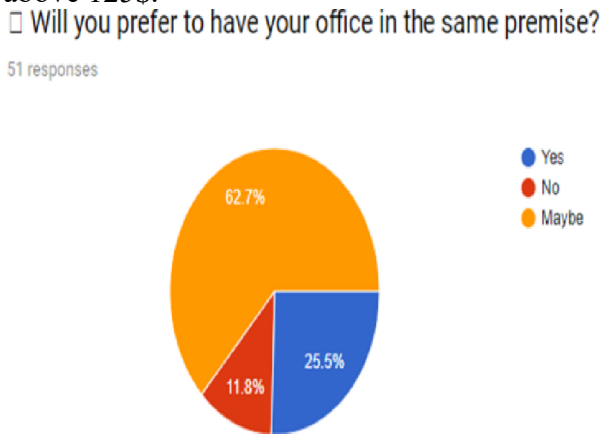


Fig 4.12: Will company utilize the legend and if yes, rates, shopping mall preference and office preference.

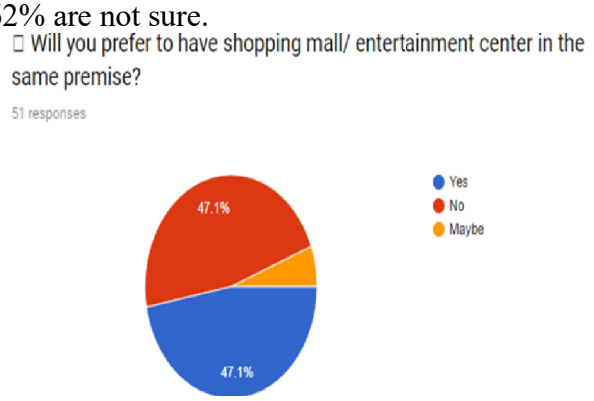
51% would use luxury serviced apartment while 10% would not use such serviced apartment and39% are not sure if their company would utilize such apartments



Out of the 51 responses 39 companies are willing to pay 75-100$ for a standard 1 BHK luxurious apartment, 17 are willing to pay 100-125$ and only 5 companies are willing to pay above 125$.



Only 25.5% would prefer to have their office in the same premises, 11.8% would not prefer to have their office in the same premises while 62% are not sure.



47.1% would prefer to have a shopping mall in the same premise, 47.1% would not prefer due to noise and safety concern and 5.8% are not sure.

The companies were asked to rate from 1 to 10 the importance of each facility in deciding a serviced apartment. The results are as follows

- Housekeeping services was rated 10 and concierge services was rated 8 by most companies.
- Restaurant dining was rated 10 and café was rated 9 by most companies
- Health club and spa were rated 8 and 7 respectively
- Swimming pool was rated 7 and onsite atm was rated 10 by most companies.
- Restaurant dining and common laundry were rated 9 by most companies.
- Recreation room and childrens play area were rated 7 by most companies.
- General stores and dedicated parking were rated 9 by most companies.
- Airport pickup and drop was rated 7 by most companies.

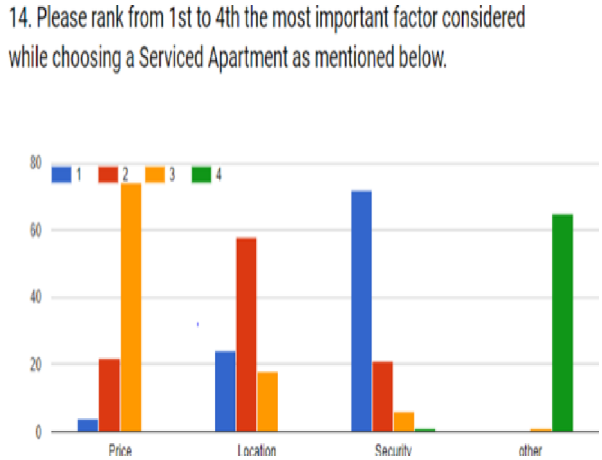


Fig 4.14: Ranking from 1st to 4th the most important factor considered while choosing a Serviced Apartment

Security is the most important factor while choosing service apartment followed by location of the service apartments. Price could be compromised to some extent considering the level of security and the location and hence ranked third.

The companies were asked to rank from 1st to 5ththe most important point considered in selecting the location of Serviced Apartment(among secure and safe location, good access to shopping and entertainment

mall, proximity to points of interest like schools, hospital etc., good availability of parking, close to work). The results are as follows:

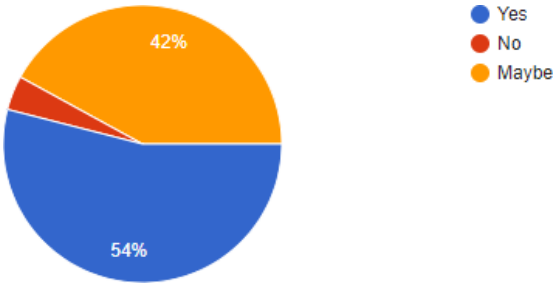
- 65% companies ranked secure and safe location as the most important factor considered in selecting the location for serviced apartment followed by 30% ranking it second
- 60% companies ranked good access to shopping and entertainment mall as the least important factor considered in selecting the location for serviced apartment followed by 28% ranking it fourth
- 61% companies ranked proximity to points of interest as the fourth important factor considered in selecting the location for serviced apartment followed by 22% ranking it last
- 70% companies ranked good availability of parking as the third most important factor considered in selecting the location for serviced apartment followed by 15% ranking it last
- 61% companies ranked close to work as the second most important factor considered in selecting the location for serviced apartment followed by 35% ranking it second

Fig 4.19: choosing CG service apartments along ring road

Since service apartments are relatively a newer concept in Nepal, it will take some time for people to become familiar with it. 42% are not sure whether they will choose service apartment located along ring road while 54% would be willing to choose the service apartments. Once Kathmandu Residency is opened with proper services and facilities, it holds a great future as CG has a very strong brand image in nepal and it can gain first mover advantage

Discussions

- It was found that companies are mostly using hotels for their guest‘s accommodation.
- Majority of companies think that long staying guests/ staffs would prefer to stay in Serviced Apartments.
- Mostly delegates stay in Kathmandu for less than one month as they go to their field projects.
- The companies would use serviced apartment mostly for periodic visits of top management delegates
- The companies would prefer to pay on a daily basis and expect the rates to be 25-75$ for 1 BHK full furnished service apartment as the delegates stay for short duration
- Companies would prefer fully furnished serviced apartment
- Companies are willing to use high end luxurious service apartments for top management delegates given that the tariff rate is under the price cap and if there is a shopping mall, it should not disturb the residence
- Housekeeping service, restaurant dining and on site atm were the most important facilities for selection of service apartment followed by general stores and dedicated parking.
- It was found that among the respondents, Security is the most important factor while choosing service apartment followed by location of the service apartments. Price could be compromised to some extent considering the level of security and the location.
- It was also found that secure and safe location is the most important factor considered in selecting the location for serviced apartment followed by close to work. Good availability of parking ranks 3rd followed by proximity to points of interest and lastly good access to



shopping and entertainment mall

Recommendations And Conclusion

- The current market analysis shows a positive result and the anticipated market potential shows that there is a prospect of Kathmandu residency and the for the future. For this reason, CG can make the plans for more detailed study as well as modify the concept according to the needs and consumer preferences.
- First of all both Kathmandu Residency and the legend should ensure high security as INGO‘s and UN are most concerned about the security of the international delegates.
- The staffs should be able to speak English as English will be the only medium the international delegates can communicate with the staff personnel.

- Quality service, courtesy and friendly staffs should be the top priority as it is a hospitality industry and cater to the needs and preferences of consumers.
- Corporate rates and long term agreement corporate agreements should be fixed with the target market
- Standard Chartered ATM should be available on site as international delegates normally use standard chartered as their banking.
- Tariff rates should be inline with the current market rates and should be made affordable.
- If Legend has a shopping mall, it should ensure that it does not disturb the residence and the office area and security is not compromised.
- To attract big INGO's like GIZ which have high number of International delegates inflows, it should cater to their criteria of Earthquake Resistance and Corporate Sustainability Handprint.
- They should also offer short term packages like daily and weekly for their service apartment and not only long term packages as the delegates stay in Kathmandu for short duration and have to go for field visits to projects assigned to them.

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EMPLOYEE EXPERIENCE – ENHANCING THE OF BOARDING EXPERIENCE OF FRESH HIRES

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ABSTRACT

The rate of attrition of campus hires is usually high in companies as the fresh hires join with a motive of having varied experiences in different roles. This paper intends to understand and analyze the on boarding process of an IT company and the resultant effect of it as on-boarding is the first interphase of interaction between the fresh hires and the company. Data would be collected by rolling out survey forms and conducting interviews within a business unit in an IT company to understand their current process of onboarding and take some feedback on it. It is to be followed by benchmarking some best practices by other companies. A streamlined onboarding module is necessary to capture the attention of the fresh hires and assigning a mentor or a buddy for the entire process ensures easy assimilation into roles and responsibilities. Streamlining an onboarding module that would address the gaps and areas of development in the existing processes. This study aims to enhance the employee experience in the pre joining, onboarding and post joining phase therefore ensuring that the employees fit well into their roles

Keywords: *Pre-joining, On-boarding, Post-joining, Assimilation, Employee Experience*

Introduction

Also known as the process of organizational socialization, On boarding refers to introducing your employees to the expectations, the skills, the knowledge and the culture to become effective organizational insiders and members of your company

This may starts as early as hiring and goes up to first few months into joining.

What an organisation and its employees seek from each other

There exists a mutual relationship between the employees and its organisation wherein the company expects their employees to understand their culture and be represent it. They look for loyalty, productivity, commitment, whereas the employees seek for passion, community connect, motivation and a career path to be looking up to. The need for a strong onboarding practice plays a role here as it would be the very first interaction of the Organisation with the employees.

A SHRM study tells us that the Organizations that engross themselves in a structured onboarding process by incorporating step by step procedure for new hires to show them what the norms of the company are what their roles are, and how exactly they are supposed to behave are wat more effective than those organizations that are not.

Moving into 2020, a lot of organizations focus mainly on strategic employee onboarding. Companies interested in improvising the onboarding experience of their employees are more inclined to see high benefits says The Human Capital Institute It could be in the form of decreased turnover, increased levels of engagement, reduced time to proficiency. Building an effective onboarding program elaborate, iterative and an ongoing process is understood only by a handful of companies.

- Productivity is improved by 70% while new hire retention is improve by 82% in organisations with a structured onboarding in place
- Highly effective onboardingsmake employees 33% more likely to be engaged at work
- Their organisation does a good job of onboarding fresh hires agrees only 12% of employees
- Half of the organizations revolve their employee onboarding on a lot of processes and bundle of paperwork
- Most of the organizations stop their process of on boarding right after the onboarding week leaving the fresh hires very confused and without required resources to be productive at work
- After the new hire onboarding experience one out of five fresh hires and not likely to

recommend an employer to a family member or friend

- The most inexpensive and less time consuming method of hiring is through employee referrals
- 87% organisations believe buddy/mentor programs enhance new hire experience

Source- Glassdoor, Gallup, HCI, Digiate

Research Objectives

- Factors that affect the on boarding experience of an individual
- Whether those factors have a positive or negative affect on employees

Literature Review

Apart from productivity gains and the cost savings, investing in activities that would increase the engagement of fresh hires has far too many benefits. It will ensure that the fresh hires deliver far better results than expected when a structured on boarding program is implemented, it also prepares them to manage future challenges.

The new hire training program can be beneficial to both the employees and the organisation. They could be listed as

Increased Employee Productivity- When an employee is intensely engaged in the orientation of a new hire, the chances to be more attentive on their work is more. It will ensure that they are putting their best foot forward and all processes and procedures are being followed properly.

Loyal Employees- To ensure relationship with the fresh hire for a long term, properly training employees and investing in them is extremely important. When your new staff member feel properly supported and trained, they are going to be more emotionally attached to the company. This does not just decrease your turnover rate but also increases employee loyalty. Usually companies that think training means equipping fresh hires with work equipment fail this initial step of having an effective on boarding program

Better Retention of Information- Fresh hires are less easily distracted when they are truly engaged in the process of training and have information stored in them for a longer duration. It's important because it reduces the requirement of re-training and when fresh hires are into their new current roles they are less expected to increase the rate of turnover. The training of the new hire does not have to be pool house of excitement, rather it should contain the unexpected, which means providing a training curriculum that persists long after on boarding week, the term onboarding is in trend these days. However, is it that the companies are really invested in incorporating the best practice onboarding methods, or is just true in theory? Increasing focus is being placed on the importance of employees within organizations and choosing the right person for the job. This it gets essential to support employees through a comprehensive introductory process for them to genuinely used the competencies recognised in every fresh hire

Getting the process of onboarding right

Onboarding can be termed as a connecting link between the attainment of actual productivity with the promise of new employee talent. The onboarding experience can widely vary across organisations. Onboarding a fresh hire can either be an inefficient and costly entry into an organization or a speedy plus well-managed path to employee contribution.

It might appears that onboarding is purely a transactional activity, but to look deeper it could also be called a strategically designed process to improves the quality of your bottom the line. The question remains, fresh hires are initially "liabilities" before they start make a positive contribution by bringing their skills and experience into use. The sooner employees get par with their responsibilities, the quicker can they begin contributing to the bottom line

Acting upon research findings

Every new worker experience an expectation to absorb information during which they perform underneath the degree of a completely profitable representative. Time required to take in information talk about the length of time fresh hires might need in new situations to give their best output, and increase the rate of moving to profitable outcomes over the span of the increase time frame. A compelling onboarding process empowers fresh hires to access information, instruments expected to

play out their worth in a lesser time frame. Profitability created by efficiently onboarding a fresh recruit sooner will have quicker, resourceful outcome on the overall organisational efficiency. The beginning phases of onboarding are significant to building up an enduring bond among workers and organization. Alice Snell, VP exploration division of ability the executives arrangement organization, Taleo, plots the techniques associations can use to amplify commitment and maintain a strategic distance from the entanglements of the onboarding procedure.

Analysing streamlined onboarding processes

Real bottom-line results can be delivered through process and technology improvements derived from benefits including:

- Reducing the effort and time required by the HR, hiring managers and others people
- The accuracy and speed of transfer of data, also collection between the payroll and the HRIS systems.
- Compliance of policies alongside consistent legalities
- Onboarding forms can reduce shipping and printing costs.
- Greater process efficiency can be ensured by the ability of tracking new metrices
- Improve the fresh hire overall experience with a self-sufficient sole information during the first few days from joining.
- Effective communication between employee and manager.

  Some additional benefits from optimizing the onboarding experience serves the attributes listed here as well:
- The time frame to come to productivity is less
- Improvement in the productivity curve and employment rate of the fresh employees. Better relationship among colleagues.
- Enhances the level of satisfaction derived from the job and job loyalty.
- Levels of engagement of an employee and rate of retention is improved.
- Improves band image of the organisation

"Enhancing onboarding experience reduces overall costs and saves the company from occurring losses from not having a strong process of onboarding in place."

1. **The business case for improved onboarding**

   Implemented improvements and current practices determine the amount of savings made by an organisation, In the following financial terms, ROI can be ensured through a strategic onboarding process reducing mailing-related costs, productivity gains, less HR administrative time processing forms, better data integrity and avoided re-keying.

   Direct processes which simplify immediate needs of a fresh hire ensure that the employee to be most productive in the shortest span of time. It also ensures that company negligence does not lead to loss of talent. Enhancing the onboarding experience ensures that the employees become productive in while being in the training period itself and the potential loss that might be incurred from a poor onboarding process can also be prevented.

Perception against reality

Mostly all organisations today are informed of the perks of having a strong on boarding process in place, but not all of them apply the knowledge in order to drive in change. From the information gathered through research on various application of the process by different companies, an ideal day one for a fresh hire would only need clarity on paper work, allocation of a workstation, clarity on short term and long term goals. Ice breaking session with the team and allotment of a "buddy" to the fresh hires to help assimilate into the new environment.

A research survey of onboarding practices by Taleo 2005 surveyed that most respondents responded an unsatisfactory and inconsistent feedback of on boarding in their own organizations:

- A lack of consistency has been reported by majority of respondents across their organization for onboarding.
- Onboarding process starts from the time offers have been rolled out in the pre-joining phase
- Only 20% of the respondents are satisfied with the onboarding process

- More than one third of the organisations don't have a formal process of onboarding in place to ensure smooth assimilation

These results indicate that most organisations are far from incorporating a strong onboarding processes that is standard across various organisations.

1. **Considerations Globally**
   Onboarding has a lot more insinuation for Global companies. Culture to impart multicultural /multilingual barriers, higher rates of recruitment, step by step processes incorporated by organisations ensures the success of the entire process of on boarding. In case of large corporations it's necessary to manage the system efficiently and to not lose this time.

Aligning the process of onboarding with different processes

Onboarding is a piece of the entire process of talent management; it's not just a linear or standalone job. If handled systematically and immersed well into the organisations system of talent management, an on boarding process is a very efficient way to ensure savings on cost
The keys to successful onboarding is an ongoing process, a field with an adjustable flow of work and a smooth match with the system of talent management. Similarly improvement of any process, coming up with process of onboarding supported by technology and best practices needs efforts to define the tastes that would be needed. Apart from which, it's also important to find the right balance between department needs and organizational consistency

Effective onboarding process in for definite steps

Post establishment of the entire process of onboarding, automation can be incorporated. The data-collected from the fresh hires and from inside the organization can be handled by technology, sometimes orientation and training, requests of service and alerts, (HRIS) transfer of the data and other such internal and external communications
Four important components for management plus design of a strategic process of onboarding:
1. Analysis of process.
2. Implementing.
3. Integrating
4. Report

1. Analysis of process

Review of the process of onboarding and impact of roles comprises of the process analysis. A lot of stakeholders closely determine the entire module of onboarding. Some key participants would be from HR department, the fresh hire, hiring manager.
According to the old practise of on boarding:

• Benefits alongside payroll. Enrolment of forms; initiating of payroll, establishing direct deposits or making deductions.
• Grounds/Building. Allocating space for parking and necessary permit
• Manager of the office .Allocation of workspace and necessary tools to be productive at work.
• Security. Ensuring seamless access to the building and information about other restricted/important areas to access
• Training. Job specific information and clarity both short and long term.
• Team members/mentors. Company orientation, hi tea session with the team, allocation of a buddy/mentor
• IT department. Allotment of computer, and other technology access that might be required at work

2. Implementing

The process of implementing includes figuring out the onboarding technology in place, for example, workflow, correspondence management, and admission portal for fresh hires and customising forms

3. Integrating

The integration phase includes the assimilation of information on fresh hires and awareness of the system existing externally.

4. Report

This phase involves monitoring the process by pushing key metrics and analytics to drive improvement continuously.

Commonly acknowledged shortcomings in the process onboarding

- People faced difficulties in the process of documentation (Instructions were unclear and the application was not responding well)
- Even after onboarding they were lacking clarity on their roles
- A single mentor was assigned to 7-8 people which kept them establishing frequent connects and clearing their doubts
- Some people did not have any mentor or buddy assigned
- The instructions on the delivery of assignment given to the campus hires during the pre-engagement phase was not communicated clearly thus they couldn't present their best work
- Lack of a career path for a person in presales (what criteria to fulfil for early promotions)
- Took them around three months to get engaged in a project
- Reallocation preference was not asked from the joiners
- A month of training post on boarding revolved around information on their respective vertical whereas they were hoping it would be more about their own roles and how they were supposed to deal with clients
- Communication gap between getting placed and getting the offer letter led to a lot of uncertainty in their minds
- Some information can be provided on the criteria/skill-set based on which the hires get allocated to their respective sub verticals so that they feel involved in the process
- Onboarding sessions and talks only covered the industry information on a larger perspective and the freshers couldn't follow up with the jargons
- No existing point of interaction arranged for all the new hires during pre engagement

Automating the practices of HR

Socialization activities that are very integral to an effective onboarding process cannot always be backed by security. But, the technology is to be used to reduce paperwork and ensure a systematic workflow to drive the process efficiently. Correspondence can be automated to fresh hires and personnel from inside the organisation can be instilled in the flow of work. Entry of data can be performed only once moving on to the necessary systems and forms. Therefore the time spent on administrative tasks by the organization is reduced and also promotes positivity and engagement to the fresh hires.

Earlier on when companies weren't invested in ensuring a good onboarding experience, new employees would have to wait weeks before their phone, workstation, computer, because of their inability to gather personal information like their date of birth and other information that might be necessary therefore making it necessary to process all this information long before the employee starts, keeping in mind the concerns that might arise from having to acquire this data during the process of on boarding. This would ensure basic requirements of

- Reducing the number of paper forms
- More quick and exact data can be added to payroll.
- Fresh hires have necessary work tools from day one of joining.

When the onboarding processes is well integrated with the talent management system of the organisation it enables them to make use of information collected in the process of recruiting and making sure that the process of on boarding is started in the pre-joining phase. Consolidated onboarding solutions ensures tracking of activities and pushing up appropriate requests, data and reminders which makes the entire process of on boarding and reduces the time taken to come to productivity

The onboarding advantage

A streamlined onboarding handbook shows clear and significant benefits. It should be well-thought and some of the process can also be automated to reduce costs, decrease time taken to come to productivity and increase the rate of retention ensuring greater levels of employee satisfaction. Streamlined onboarding increases efficiency, provides better service levels for hiring managers, creates more staffing-process consistency and reduces process variances, as a key note of the talent management strategy of the organisation, as we move to 2020, organisations aim to improve the process of

conducting business to generate real results. A genuine and exceptional cost reducing project is to optimise the onboarding process in combination with integrating the talent management strategy of the organisation

An essential element for the human resource professionals (HRPs) of their responsibilities as technical experts is to take in new employees into an organization. (Huselid et al., 2009, pp. 196-199). The perks received by recruiting talented employees are destroyed by ineffective onboarding and it also increases the possibility of the efforts put in for recruitment and selection to be wasted. (Smart, 2012). Organizations that view onboarding as an expense rather than an investment end up having a short sighted approach on strategizing an elaborative program (Stanley,2012)

The assimilation into the organizations for fresh hires is mostly new employee onboarding the competencies of these fresh hires is the predicted result of the false economy (Caldwell and Caldwell, 2016).

The motive of this paper is : to come up with reasons why fresh employees and the organization need to improve this important management of Human Resource; to describe the ethical obligations implied in the onboarding. Also for high level of management and HRPs to be provided with a module for improvising the process of that meets the expectations and the psychological needs of the fresh hires.

Brief explanation of onboarding process is where the paper begins and the kind of the psychological perceptions that subsists between in an organization structure and within employees. Constructing a model that represents 12 ethical perspectives that identify how employees infer the process and nature of onboarding , introduced by the University Of Michigan Ethics Scholar, Larue Hosmer (1995). A ten-step model for managing a top notch on boarding process, defining how each step answers to each of the ethical perceptions of the fresh hires is then introduced.

The paper ends with a summarized process idea and suggestions on how to move deeper into the research topic.

The process of onboarding

Assimilating a fresh hire into his new work environment; making him aware of all the organization's values, defining goals, laying out rules and explaining policies or processes; and mentally transitioning the employee into the culture of the organisation is the process of onboarding (Watkins, 2016). The process begins when fresh hires are already experiencing stress and anxiety as explained by Wanous and Reichers(2000). Because of the focus being on the organisations and its outcome, rather than on the needs of incoming employees , organizations struggle with the onboarding process (Bauer, 2010; Snell, 2006).

The employees are often been provided with lengths of data which is immense, unsuitable and nearly impossible to be understood by the fresh hires in such a short time frame as per the typical new employee onboarding process (Bradr and Vonnegut,2009). It was brought into notice that few organisations loaded the fresh hires with tasks and paperwork to be worked with realistically while the other organisations offered only handful of activities the properly prepare the employee to understand and get the right flavour from their process of onboarding, Srimannarayana (2016). To find the "right" balance is an important factor in successful onboarding.

Effective onboarding process as explained by Bauer (2010) includes four key aspects to improve performance, increase the level of satisfaction derived from the job and act against the rate of turnover

1. Compliance : consists of teaching the basics of policies and processes with regard to various legalities associated with the organisation. It is also the first steps towards building a solid on boarding plan
2. Clarification : mostly organisations miss out this aspect and the fresh hires are left feeling clueless and uninformed. It needs to be ensured that the they well understand the duties and responsibilities associated with their job roles.
3. Culture : insiders to the organisation assume that the assimilation into the work culture will be easy and the fresh hires will not experience any difficulty in developing connections and catching up with the existing employees hence this aspect is often overlooked
4. Connection : this aspect is important as building and maintaining relationships with

the colleagues directly affect the productivity and time taken to transition into the organisation.

Very few organisations are able to get onboarding right otherwise most of them do a very mediocre job of transitioning employees into the organisation , unluckily concluded by Acevedo and Yancey (2011, p. 349). HRm isn't given much importance when it come to incorporating strategic methods (Caldwell et al., 2011) therefore resulting in ineffective onboarding and scrutiny from decision makers of the management and people who set budgets (Caldwell and Caldwell, 2016) for the costs kept aside for these activities. HRM precisely defines importance of a strong on boarding program and calculating the cost of every turnover increasing the value of the contributing employees.

Bauer (2010) noted a strong on boarding has benefits for both the new employee and the organization in the short tem as well as in the long term, stating that fresh hires smoothly transition into the organization, have stronger commitments for the organisation, increased satisfaction derived from the job, lesser time to come to productivity and increased rates of retention. On the other hand a poor program wouldn't satisfy the fresh hires one bit "(t)he most important tactic was allowing new employees to fully utilize their skills and abilities." , Holton (2001, p. 73) made notes in his study of factors related with onboarding . instead of building connections and helping employees become insiders to the organistion the companies rather invest on controlling the management (cf. Pfeffer, 1998).

The psychological contract and on boarding

Immense research on management verifies the need for organizations to invest in building employee relationships (Goleman et al., 2013; McKee et al., 2008) and the figure that employees grow along with the organisation (Schein and Schein, 2016). The relationship between the employer and employee is built keeping a lot of ethical deductions in mind (Hosmer, 1987). Which again is based on the concept wherein the employer pays the employee for the services provided by him or her (Cropanzano and Mitchell, 2005).

The psychological contract existing between the employee and organisation – a contract that is explicitly write but never considers the expectations and shortcomings that arise when we try to coordinate both the parties. (Rousseau, 1995; Robinson and Rousseau, 1994). Fresh hires are also concerned of the fact that they might not be able to rise up to the expectations of the organisation or reach the level of productivity as soon as they should have(Shea-Van Fossen and Vredenburgh, 2014)

A growing survey tells us that organisations that invest in building high quality relationships among the employees and management reach higher levels of productivity in a short span of time and also increase the level of satisfaction derived from the jobs (cf. Beer, 2009; Caldwell and Floyd, 2014) irrespective of the points that have been stated as a part of the employee employer contract specifically (Pfeffer, 1998).

Highly qualified employees that also contribute most to the organisational achievements expect be to considered and extended treatment as "owners and partners;" to be valued as "you", or as personal achievements instead of generalising it under an umbrella or group achievement , given the chance to innovate and improvise (Buber, 1996; Covey, 2004; Block, 2013). The basic goal of every organization is creation of value (Porter,1985) as it alters resources, an increase in value to the customers further adds up to the value at every step in an organization's steps of reaching production (Walters and Lancaster, 2000). To bring the performance of a fresh hire to the point from where she adds a lot of value to the existing systems and processes (cf. Caldwell and Hansen, 2010) the major part to be played by a strong onboarding process is a smooth and seamless assimilation (Lawson, 2015).

Some employees always go overboard with their duties and responsibilities to give an exceptional result irrespective of the treatment they receive by the organisation (Organ et al., 2005), the research also states that organisation that takes part in creating a career curve for the fresh hires and show interest in their personal development increase employees level of satisfaction, loyalty, and commitment towards the organisation (Pfeffer, 1998; Paine, 2003; Beer, 2009; Smith et al., 2016).

Louis (1980) stated that the past shortcomings identified in the process of on boarding were from about 35 years ago, its shocking that organisations still don't have a proper onboarding in place (Lawson, 2015, Chapter 5). Even though the perception regarding the duties and responsibilities of the hires might vary from person to person, Morrison and Robinson (1997) noted that the employees feel uncalled for and get a sense of betrayal from the breached perceptions (Zhao et al., 2007). A realistic preview of job would define the tone of relationships, expectations of performance standards, policies of work and the work environment

Hosmer (1995) explained that in examining the nature of ethical perspectives and organizational trust, ethical expectations and trust go hand in hand. Hosmer (1995) defined that ethical perspectives were typically derived from well accepted philosophical foundations was diverse. His research also talks about 12 types of ethical perspectives, each of which is unsummarised and it also explains how the new employees would perceive the duties assigned to them

Each of the perspective explains why it is best for the employer, employee and their organisations best interest (cf. Hosmer, 1995). There exists a powerful connection between the organisation and the employees thoughts on unspoken duties owed in psychological terms.

Quality onboarding - A step model defined in 10 steps

HRPs that enforce a strong on boarding address unspoken professional contract that the employees expect from the duties assigned to them (Snell, 2006) and help them to align personal goals with organisational objectives (Huselid et al., 2009; Caldwell et al., 2011). Below is a step model in 10 levels to enhance the onboarding experience of fresh hires, it starts as early as pre joining and goes way beyond the onboarding week to ensure that the fresh hires are well assimilated into their roles

1. Establish the relationship right after the offer letters have been rolled out as the hiring decision is made long before employment starts. The relationship can be established online via email, skype, google meet or Microsoft teams. There are numerous software available to facilitate a personal relationship with fresh hires-an important key aspects of effecient leadership (Kouzes and Posner, 2012, Chapter 1) and an chance to explore about the organisation better for the employee
2. Allocation a trained mentor/coach/buddy for the new hire as they are new to the organisation and might need help in every step of the way. A mentor also ensures smooth assimilation into the organisational goals and objectives and helps them draw a career path through clarity on short term and long term objectives(Ragins et al, 2000). The process of mentoring can be initiated online in the pre joining phase and it goes around three months post the onboarding week. 80% of employees agree that having a mentor or buddy has enhanced their experience of onboarding
3. Focus on establishing connects and relationship within the organisation. When employees are well connected with each other it makes team work easy and the collaborative efforts result in better delivery of duties assigned. The existing employees should be open to communication and make the fresh hires feel welcomed in the organisation by sharing the values, ethics and living up to them . it is important as the fresh hires have to be reprehensive of it and become important contributors to the organisation (Brown, 2007; Rousseau, 1990)
4. A streamlined onboarding handbook-integrating all the steps day wise or according to the tasks to be performed in chronological order to be supported with a RACI matrix, it will help the hires to get well acquainted with the organisational culture and community. An orientation book will reduce paper work and the burden on the fresh hires giving them more clarity on how to go about the process of assimilation and create value. All the critical information can be address through the handbook (Sutton and Griffin, 2004) it also signifies that the information can be easily shared with a significant other.
5. Allocation of workstation, laptops and other tools and accessories necessary to be productive at work. The laptop has to be

well equipped and functioning to ensure less time required to come to productivity for the new employees. These administrative details must be necessarily taken care of in the pre joining phase so that the onboarding week can be conducted seamlessly. This will also show the amount of dedication and efforts the organisation is ready to put in for their employees

6. Engage in transitional logistics because a major part of the workforce have to keep switching jobs (Adkins, 2016), keeping in find the fact that the new hires might have to go through relocation, buy or sell a home, arrange for child education, trying to reach out to the employees and making them feel that the organisation is keen on helping them through their personal needs and growth curve will ensure longer duration of loyalty and commitment from the employees (Dewe et al., 2010).
7. Set priorities and expectations straight : right after the fresh hire joins the organisation the employees supervisor is supposed to meet with them and explain the job duties and responsibilities to give them a jest of expectations of the organisation, explain how performance is measured, the key resources, define the role of the supervisor and understand the fresh hires concerns and personal plans for growth. This meeting with the supervisor will ensure that a trust worthy relationship is formed in between them and ensure employee commitment and readiness to invest in the organisation in the long run (Leana and Van Buren, 1999). It is also very important to mention employee role with respect to natural work group
8. Acknowledge and appraise employee achievements: employees who engage themselves and partners and owners of the organisation are more likely to add to the organisational value, productivity and success by actively engaging themselves (Adkins, 2016; Smith et al., 2016; Beer, 2009; Saks, 2006). Employee stress can be reduced by increasing employee morale, make assimilation into the organization easy, and improve performance of the employee (Peterson et al., 2011).
9. Indulge the top management as a part of the process: actively engaging team members of the top management and supervisors in the process of new employee orientation – specially in defining organizational values and factors of work culture – gives out a message that the top management personnel is driven by the values in the organisation and they practice as they preach

   Make on boarding an ongoing process : One of the major step in the process of orientation of the fresh hires is to identify the resources that might be needed by the hire to become highly productive at work, the supervisor and mentor assigned to the employee is responsible for carrying out this activity and push the fresh employees to put forward their best foot. A streamlined handbook that mentions step by step process of assimilating in the organisation will make it easy to measure productivity in a given time frame
10. The above mentioned 10 steps communicate that a new employee is important to an organisation and should be recognised as an individual rather than being addressed as a group. It shows that the organisation really values the presence of the fresh hires, attempts to understand their concerns arising from in and out of the job and trying to help them align their goals with the organisational goals. It shows that the organisation is looking forward to bringing new employees on board

In said by De Pree (2004, Chapter 1), Constructing the onboarding process around this approach and assisting employees to get successful in the honours the “covenantal” obligation of the top management to be a debtor or be of service to each employees success and wellbeing. Defining in the terms of the psychological contract, the need to be valued as a human in the organisation is a desire pf every new employee in the process of assimilation into the organisation. Not all 10 steps can be deemed practical for every situation but it has a general applicability for various organisations in a number of disciplines

Summary of the paper

Like most of HRM issues, the process of on boarding of fresh hires is a ethical process for the contract that exist between the employer and employee without having to explicitly define each one of them. This paper talks about five such five such contributions made in the fields of human resource management

1. Onboarding is considered as an opportunity to substantially improve the relationship between employee and the organisation. The responsibility of the supervisor in to ensure that both organisation and employees benefit from the process of assimilation and transition into the organisation
2. 12 explicit ethical perspectives helps in identifying the ethical nature of onboarding and part of the psychological contracts. By talking about the ethical nature of the process of assimilation this paper defines those ethical perspectives alongside the employees expectations that directly impacts their trust, commitment and willingness to work towards creating value(Beer, 2009).
3. It defines the responsible parties for optimizing value creation and the duties of the stakeholders that goes into the rightful process of onboarding and assimilation
4. It defines a 10 step process for onboarding with each step showing how every activity will strengthen the entire process and the ability of the organisation to honour the expectations of the employees and adhere to the psychological contract . it lines out some of the best practices of HRM while collating with related ethical assumptions
5. This paper bridges the gap between scholars and HRPs to work together in improving the process onboarding. It talks about the opportunity that can be leveraged by scholars and practitioners in voicing the discussion of the ethics that are put in practice. There exists a very weak link between the scholars and practitioners and scholars are mostly termed impractical (Van Buren and Greenwood, 2013; Caldwell, 2014)

Factors such as satisfaction derived from work, rate of turnover, time required to come to productivity can be used to analyse the process of onboarding. There should be a harmonious relationship built within the employees so that work is made easy and for them to thrive in a healthy work environment

Research Methodology

The research was conducted using survey forms and conducting interviews within a business unit in an IT company to understand their current process of onboarding and take some feedback on it using multiple choice questions and a 5-point Likert scale from most relevant to least relevant, for obtaining the response Areas of improvement and It was followed by benchmarking some best practices by other companies. All of the respondents were a part of the last onboarding cycle so that their experience of assimilation was fresh in memory and they could give sufficient inputs, they had been employees in the organization for about a year now. It was circulated amongst a sample of 150 employees across various roles within a business unit. The survey data was analyzed using the percentage method

Data Analysis and Discussion

Areas of improvement:

- People faced difficulties in the process of documentation (Instructions were unclear and the application was not responding well)
- Even after onboarding they were lacking clarity on their roles
- A single mentor was assigned to 7-8 people which kept them establishing frequent connects and clearing their doubts
- Some people did not have any mentor or buddy assigned
- The instructions on the delivery of assignment given to the campus hires during the pre-engagement phase was not communicated clearly thus they couldn't present their best work
- Lack of a career path for a person in presales (what criteria to fulfil for early promotions – like other BU's use TrendX to increase bands for promotion)
- Took them around three months to get engaged in a project
- Reallocation preference was not asked from the joiners
- A month of training post on boarding revolved around information on their

respective vertical whereas they were hoping it would be more about their own roles and how they were supposed to deal with clients

- Communication gap between getting placed and getting the offer letter led to a lot of uncertainty in their minds
- Some information can be provided on the criteria/skill-set based on which the hires get allocated to their respective sub verticals so that they feel involved in the process
- Onboarding sessions and talks only covered the industry information on a larger perspective and the freshers couldn't follow up with the jargons
- No existing point of interaction arranged for all the new hires during pre-engagement

Areas of strength:

- The process of documentation went smooth for some people
- Work environment
- Hygiene factors (Stay, travels)
- Ethics

Conclusion

Organisations are dependent on their employees to add value to the organisation and get creative in their productivity (Christensen, 2011; Beer, 2009), they often neglect the need to assit the employees to reach their goals (Pfeffer, 1998). Van Buren and Greenwood (2013, p. 716) having researched on "involvement of business ethics scholarship in debates about important ethical issues in employment practices." assimilation in the psychological contract that exists between fresh hires and their organizations by talking about the ethical implications of onboarding, this paper further gives suggestion how the key HRM processes can be improvised

As HRPs enhance the on boarding experience of fresh hires, they work hand in hand to represent themselves as insiders of the company and show interest in aligning personal goals to organisational goals, with all levels of management working together (Yamkovenko and Hatala, 2015). By revamping their on boarding module and having advance levels of assimilation, HRPs and management personnel adhere to the psychological contracts and ethical assumptions of employees' and work towards building an organizational culture that gives long term value in terms of productivity and success derived by the employees (Caldwell et al., 2011).

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HOLISTIC REVIEW OF LITERATURE ON RISK QUANTIFICATION IN THE LIFE-CYCLE OF INFRASTRUCTURE PROJECTS

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ABSTRACT

The motivation behind this paper spins around The requirements of the population of Dholera, An erupting smart city in Gujarat, combined with noteworthy increments in mechanical undertakings and financial improvements. This research has a chance to update the city's vision and make it progressively useful in the current scenario utilizing IoT[Internet of Things]

IoTs, are supposed to enhance the over-all view of the Smart Cities, which targets understanding the most fundamental needs of the town, to help ease of access for the organization of the town and for the residents. This paper henceforth gives a far-reaching examination of the empowering innovations, conventions, and engineering for a Rural IoT regarding Agriculture.

Moreover, the paper will introduce and examine the specialized arrangements and propose best- practice Agriculture rules for the Dholera Smart City Project

Keywords: *IoT, Smart-Cities, Agriculture, Dholera*

Introduction

The Town covers an area that amounts to roughly 1000 sq km and incorporates 20 areas of Dhandhuka district and 3 towns of Barwala district; Also, 22 towns of Ahmedabad District, that makes it the largest of the venture hubs proposed in the nearby vicinity. The site is deliberately arranged between the primary focuses of Ahmedabad, Vadodara, Surat, Rajkot and Bhavnagar. It is connected to the significant ports of Gujarat by State Highways yet so far has no immediate rail association. The closest worldwide airport is at Ahmedabad, despite the fact that there (Dr. N. Suma, 2017)is a current proposition to build up another International Airport in the town itself.

Figure 1 : Dholera Connected to DMIC [Delhi-Mumbai Industrial Corridor]

The current population of the town is just around 3000 (Census 2011), occupying little settlements. Farming is the basic occupation inside the region, despite the fact that the land is by and large of low quality and saline, particularly near the ocean, and crop yield isn't high.

The Soil in the Dholera is black cotton soil which because of its high saltiness, which makes it not advisable for development. It is therefore that farming in this town is principally taking a hit and needs reform.

The Demographics of the town are mentioned in the table below :

Table 1 : Demographics of the town

Particulars	Total	Male	Female
Total No. of Houses	576	-	-
Population	2,779	1,420	1,359
Child (0-6)	323	164	159
Schedule Caste	35	23	12
Schedule Tribe	3	2	1
Literacy	80.29 %	89.17 %	71.00 %
Total Workers	969	786	183
Main Worker	847	-	-
Marginal Worker	122	70	52

In Dholera village out of total population, 969 were engaged in work activities. 87.41 % of workers describe their work as Main Work (Employment or Earning more than 6

Months) while 12.59 % were involved in Marginal activity providing livelihood for less than 6 months. Of 969 workers engaged in Main Work, 91 were cultivators (owner or co-owner) while 306 were Agricultural labourer.

As per constitution of India and PanchyatiRaaj Act, Dholera village is administrated by Sarpanch (Head of Village) who is elected representative of village. The main source of revenue generation for the town is farming. The Agricultural land distribution of Dholera is as follows :

Table 2 : Agricultural land distribution

Agricultural Land	47.67%
Fallow land	39.97%
Crop land	7.49%

Chart 1 : Total land distribution

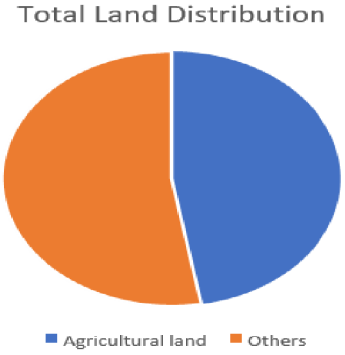
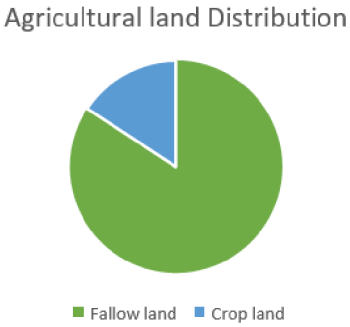


Chart 2 : Agricultural land distribution



Problem for the town currently is the execution of the irrigation canal for water system for rural land in the the town of Dholera. While the towns in and around The town of Dholera are successful in taking up the resources and water from the Vallabhipur Branch Narmada Canal of the SardarSarovar Project. The delay in building up the zone has occurred on the grounds that the advancement of the irrigation canal is proposed to be re-designed and stopped temporarily for the the town of Dholera. Construction of water-treatment and sewage treatment plant includes a long incubation period and accordingly the progress of the town is measured. Hence it becomes more important to introduce new farming techniques for the over all development of the town.

Figure 2 : Narmada Canal Near Dholera

Hence, the Profile of the town of Dholera suggests why it would be important for individuals to move over from resource farming to smart farming techniques. As rainfall decides the significant occupation types in the town, size of land holding also has a significant role in deciding the condition of financial status of families. while smaller land possessions up to 10 bigha(4 Acres) were proportionately found between 11.8 to 12.9 % in the zone, the situation was different for bigger land holders (for example > 20 Acres Land). In coastal region, the large land holders comprise about 10% of absolute families while in external zone it was about 17%. In shore towns 60 percent family units possessed just 3.4 percent of all out land, the equivalent was a little higher in internal (7.5%) and external (8.5%) zones.

1. About The Project

1.1 About the subject

What is IoT?

Simply put, The Internet of Things (IoT) refers to a system of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network without human intervention.

Figure 3 :IoT structure simplified

How will IoT help agriculture?

IoTbased Smart **Farming** improves the entire **Agriculture** system by monitoring the field in real- time. With the **help** of sensors and interconnectivity, the Internet of Things in **Agriculture** can not only save the time of the farmers but can also reduce the extravagant use of resources such as Water and Electricity.

How can it be applied to a small town such as Dholera?

Dholera as a town is mostly dependent on farming and agriculture for generating the most part of it's revenue. Since due to external factors mentioned above in the introduction, The town does not contain adequate resources for the over-all development of agricultural activities. A solution to that problem is possible if the usage of the resources deployed in the fields are carefully monitored and an organized system is manufactured that advises the usages o the same.

We can test out the IoT structure by deploying it in some parts of the town, where the current crop yield is not matching the desired crop yield.

This can be done in the following steps :

I. By selecting a specific IoT device which resonates with the requirements of the town and people of Dholera.
II. Distributing and deploying the device in selected areas to gain optimal utilization of the architecture.
III. Keeping in mind the challenges faced in the application while evaluating the over-all scenario of fields and ranches.

2.2 Need for the study

As mentioned above the majority of the population in Dholera is dependent on agricultural activities, but since the soil is not very helpful for the cultivation of crops, the town is expecting a decline in agriculture activities in the near future. According to the EIA reports, the agricultural land could easily be reduced to 12% from 47% in Dholera.

The following points entail the need for this research.

1. Small and fragmented land holdings do not generate enough harvest for the commercialization of crops
2. Unevenly distributed seeds, fertilizers and manure pose a problem for the farmers as they are not able to asses the amount to be used for every crop.
3. Lack of mechanical and digital support for farming in Dholera has rendered the town backward in terms of agricultural output.
4. Lack of awareness related to weather and soil characteristics result in the loss of yield in crops.
5. Unavailability of institutional management in terms of IoT at Dholera.

2.3 Objective and scope of study

The objective of the study is to provide the town with an IoT design guideline through analyzing different agricultural land segments and their usage and allot a specific IoT architecture to them for increased performance in terms of crop yield, Objective areas include the following :

1. Improving the quality of crop yield in the town
2. Improving accessibility to digital medium for Dholera
3. To provide an effective plan to apply for the town through better institutional arrangement
4. Reducing crop loss and wastage through effective communication mediums and IoT.

It is however true that the initial investment on planning this architecture for the town is very high and since the over-all output of the town is low as it is, this design can be used as

a sample for the solution of a bigger town where the output is more in terms of crops.
The scope of the study although is limited to the town of Dholera, since different regions might have different crop routines and issues. It would require further research to target any specific area with this kind of technology.

Methodology

Study is broadly divided into Three parts

1. Analyzing the architecture for specific locations(Three) in the town.
2. Application of the Designs on each location
3. Drafting policy directives

Study Methodology comprises of a step wise sequence of studies as mentioned below :

1. Literature study in the form of Journals and articles about IoT
2. Identification of application area in Dholera on the basis of crop types and yield.
3. Furcation of IoT models for various locations in terms of Data analysis and crop yield
4. Linking these parameters to a mobile application for the ease of access of farmers and optimum usage

Recommendations in form of draft policy to the administrative authority

Literature Review

1.2 Basic Terminology

IoT – The Internet of Things are essentially the hardware gadgets that gather an information through devices which are connected to them. The gadget is likewise associated with the web so it can transfer the information it gathers from the device to a bigger all the more impressive source of data storage facility.

ZigBeeis primarily used for two-way communication between a sensor and a control system. Like Bluetooth and Wi-Fi, it is a short-range communication and offers connectivity up to 100 meters. On the other end, Wi-Fi and Bluetooth are high data rate standards which support the transfer of media files, software, etc.

Cloud (cloud computing) – the cloud is a server. The cloud is a web associated administration that gives an enormous ability to information stockpiling just as remote accessing. This type of computing depends on sharing of various settings to accomplish better functioning and economies of scale, like an open source. In simple terms the gathered data from the IoT sensors is sent to an external server from where it can be processed for further usage.

Big data – A large number of IoT gadgets will be associated with the web, all social event bits of information from whatever sensors or occasions that the IoT gadget is checking. Because of successive and universal information gathering, huge measures of information large information) will be gathered, put away, and used to spot patterns and settle on choices for applications like prescient upkeep, prospects exchanging, and whatever else that mankind can make calculations for.Likewise, information can assist us with settling on choices that lead to more prominent profitability, effectiveness, and forecasts dependent on dark examples that the information can by one way or another uncover whenever broke down accurately. Huge information infers datasets that are huge to such an extent that they need elite, greatly equal PCs (distributed computing) to work with such huge datasets.

Data pre-processing: This is a significant advance in the information revelation process, on the grounds that the nature of information relies upon the nature of information. In reality, information will in general be messy, fragmented, and conflicting. In this way, this progression can help improve the exactness and effectiveness of the resulting mining. This progression incorporates information cleaning, information reconciliation, and information change. This work utilized the a lot of information from IoTs gadgets on temperature, dampness, and soil dampness, to anticipate yield.

Data reduction: This is a significant advance in the information revelation process, in light of the fact that the nature of information relies upon the nature of information. In reality, information will in general be messy,

inadequate, and conflicting. In this way, this progression can help improve the precision and productivity of the ensuing mining. This progression incorporates information cleaning, information reconciliation, and information change. This work utilized the a lot of information from IoTs gadgets on temperature, mugginess, and soil dampness, to foresee yield

Sensors : Essentially, a sensor is a device that can gather some changes in any environment. By itself, a sensor is useless, but when we use it in an electronic system, it plays a key role. A sensor is Is able to measure a physical phenomenon (like temperature, pressure) and transform it into an electric signal. These three features should be at the base of a good sensor:

- It should be sensitive to the phenomenon that it measures
- It should not be sensitive to other physical phenomena
- It should not modify the measured phenomenon during the measurement process

ArchitectureofIoT for Dholera: The town has basic requirements and smaller are in terms of field sizes. A rather simple structure for the town can be applied which entails the following segments and parts.

Hardware

To build an IoT solution for agriculture, you need to choose the sensors for your device (or create a custom one). Your choice will depend on the types of information you want to collect and the purpose of your solution. In any case, the quality of your sensors is crucial to the success of your product— it will depend on the accuracy of the collected data and its reliability.

The Brain

Data analytics should be at the core of every smart agriculture solution. The collected data itself will be of little help if you cannot make sense of it. Thus, you need to have powerful data analytics capabilities and apply predictive algorithms and machine learning in order to obtain actionable insights based on the collected data.

Maintenance

Maintenance of your hardware is a challenge that is of primary importance for IoT products in agriculture, as the sensors are typically used in the field and can be easily damaged. Thus, you need to make sure your hardware is durable and easy to maintain. Otherwise, you will need to replace your sensors more often than you would like.

Mobility

Smart farming applications should be tailored for use in the field. A business owner or farm manager should be able to access the information on site or remotely via a smart phone or desktop computer.

Plus, each connected device should be autonomous and have enough wireless range to communicate with the other devices and send data to the central server.

5. Infrastructure

To ensure that your smart farming application performs well (and to make sure it can handle the data load), you need a solid internal infrastructure.

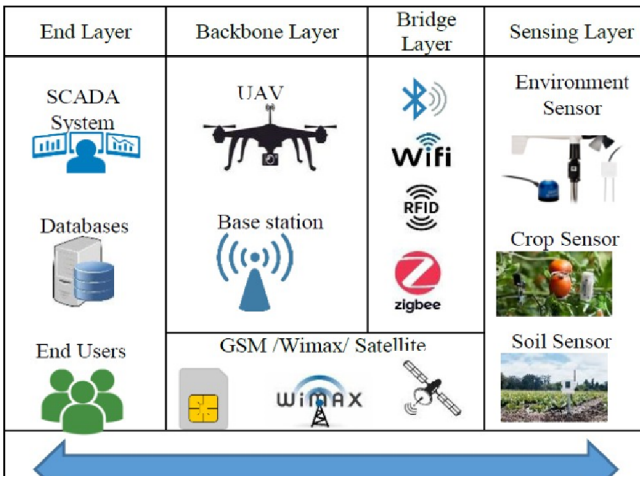
Furthermore, your internal systems must be secure. Failing to properly secure your system only increases the likeliness of someone breaking into it, stealing your data, or even taking control of your autonomous tractors.

1.3 Classification of sensors

Communication/ Data type	Possible application	Expected Data size	Power consumption
Small sized data and low power consumption	1. Measurement of atmospheric conditions 2. Measurement and analysis of soil humidity 3. Vividness of the leaves 4. Stem thickness 5. Size of the crop	Data in Bytes	< 1mA
Moderate data and power intake	1. Still Picture camera 2. Multi or hyper spectral camera 3. Sound sensors	Data in MB	> 10mA
Greater data and more power intake	Streaming services in a playing format	Data in MB & GB	50A

The application of these sensors in working can beinterpreted from the above figure :

Figure 4 : Use of sensors in Agriculture



Cellular Sensors

Cell correspondence modes from 2G to 4G can be reasonable, contingent upon the reason and transmission capacity prerequisite; be that as it may, the dependability, and even accessibility of a cell organize in country regions is a significant Problem for handling this, information projection through GPS is also an alternative, in any case, here, the expense of this correspondence type is more, and that makes it not inappropriate for little and moderate-sized ranches. The decision of correspondence mode additionally relie supon usage & necessities, forexample, a few home steads required sensors that can work with low information rate however need to work for extensive stretches consequently request long battery life. For such situations, another scope of this system is viewed as a superior answer for cell availability, as far as long battery life as well as a bigger network territory with reasonable rates. Right now, yield and field the executives are two of the main systems where IoT are profoundly appropriate, and, further thinking about its prosperity, it very well may be used in numerous other cultivating relatedemployments.

Other than WAN availability alternative, other interchanges are being utilized in work systems. For instance, a work system of sensor hubs gathers information and transmits it to the doorwhich is found some place in a similar region. The entryway further sends this information to the homestead the executives framework utilizing the WAN system. The correspondenceinnovations utilized inside the work systems shift for example Bluetooth and Zigbee can be utilized to give network to shared remotecorrespondences.

Pycno

Likely the most well known smart agriculture contraptions are climate stations, consolidating different smart farming sensors. Situated over the field, they gather different information from the earth and send it to the cloud. The gave estimations can be utilized to plan theatmosphereconditions,pickthefittingyields,andtakethenecessarymeasurestoimprovetheir capacity (for example exactness farming). This can be utilized for detecting atmosphere conditions.

Arable:OnemoretypeofIoTproductinagriculturea ndanotherelementofprecisionfarmingare crop management devices. Just like weather stations, they should be placed in the field to collect dataspecifictocropfarming;fromtemperatureandp recipitationtoleafwaterpotentialandoverall crophealth.

Bluetooth

Bluetooth is a remote correspondence standard that associates little head gadgets together over shorterseparationstypicallyparticipatinginanearn ess.Becauseofitsfavorablecircumstancesof low force necessities, simple to utilize and minimal effort, this innovation is being used in many savvycultivatingapplications.Further,Bluetoothm akingheadwaysinnumerousIoTframeworks with the arrival of Bluetooth Low Energy (BLE) or ordinarily known as Bluetooth Smart. The examination led in which tests Bluetooth and PLC (programmable rationale controller) with ICS (coordinated control methodology), clock control and soil dampness control approach for savvy water system. The objective of this investigation is to locate an ideal usage of water and vitality utilization for different nursery or field applications. A dampness and temperature sensor dependent on BLE is created in particularly concentrating on the farming situations and climate statesofharvestfields.Heretheexplanationofpickin gBLEforcorrespondencereasonforexisting is because of its intrinsic help for PDA availability. Other than short range, WiFi is used at whatever point LAN correspondences are required in keen agribusiness. Along short range availability,

WiFi is used at whatever point LAN correspondences are required in keen agribusiness. Study introduced in examines a remote observing framework utilizing WiFi, where thesensorhubsdependedonWSN802Gmodules.Thesenthubsdiscussremotelywithafocalserver, which is dependable to gather and store the observed information and further permit showing the data after required examination.

Zigbee

ZigBee is a cost- and energy-efficient wireless network standard. It employs mesh network topology, allowing it provide high reliability and a reasonable range..
One of ZigBee's defining features is the secure communications it is able to provide. This is accomplished through the use of 128-bit cryptographic keys. This system is based on symmetric keys, which means that both the recipient and originator of a transaction need to share the same key. These keys are either pre-installed, transported by a "trust center" designated within the network or established between the trust center and a device without being transported. Security in a personal area network is most crucial when ZigBee is used in corporate or manufacturing networks.

1.4 Defining Agricultural problems and solutions

Agricultural problems in Dholera are a part and parcel of people's lives in the town. The crop yield has significantly decreased due to the factors mentioned in the introduction about the city. The most pivotal of which is the delay in the extension of the Narmada Canal. But there are specific core agricultural problems in the town as well. These problems may reflect :

- Inadequate knowledge among farmers about multiple aspects of agriculture like, Temperature, Topography, Climate and soil quality.

Solution: Allotment of correct technology as per their usage

- Inadequate user options.

Solution: Introducing multiple faceted IoT designs for the town and letting the users discuss their needs accordingly

- Excessive Manual labor

Solution: Effective mechanical solutions which are cost effective so as to they do not put a lot of financial strain on the users

1.5 Evaluation framework and criteria

This section is about describing the various nuances of the project and establishing the framework of the entire system. There are certain variables that need to be considered before evaluating any data. Few topics from the same are given below.

Demand and Adequacy : This parameter is based on the area of the field and the type of crops which are supposed to come out of it. It is also dependent on factors like, Weather, Location, Humidity, Soil texture, Data transmission speed etc.
Different types of fields have different types of infrastructural demands, for example a field with a low crop yield will have less sensors and communication device attached to it.
As a result power output of that arrangement will also be low and hence a basic design/Architecture can be applied to the field.

Other factors include:

Setup Costs

The raw material for setting an IoT architecture is somewhat costly. Setting up will require a significant amount of funds. The farmers themselves cannot afford which. Hence the introduction of stakeholders for the financial aspect of it is important

Economical development Impact

Due to increase in productivity and yield there is supposed to be a significant increase in terms of the over-all development of the town. As mostly the population revolves around agriculture and farming as the staple profession.

Consumer impacts

The original stakeholders related to this sector in the town of Dholera are mainly, Farmers, Street vendors, and the owners of warehouses which will benefit directly from the scheme and the project

Design and structure

The over all scalability and size of the project depends upon the population and the awareness among the town about accepting this new type

of farming method. Since farmers as a community are very orthodox, this is an important aspect of the project to get them on board.

1.6 Impact of IoT for the town

Although the usage of this technology is for the purpose of development, there might be some ill effects of this function on the town and its agricultural sector which are as follows :

- The initial cost of investment is so high it is not financially feasible if the crop yield is also not massive in the town.
- Dholera is supposed to take a decline in terms of crop yield and production.
- The data collected and transmitted is not entirely accurate and has some room for errors.
- The process of data analysis takes a lot of time and cycles which is not suitable for crops with less yield cycle in the town.

Data Collection And Analysis

1.7 Study Area And Case Selection

The study area is confined to the limits of the Dholera town. Three cases of different fields are taken forthe application of the IoT infrastructure with different charecteristics.

Location 1

The first area of implementation is a field on the outer parts of dholera just besides the state highway road. The approximate area of the field is about 1.05 Hectare which makes it an average land size in terms of area.

The crops that are grown here due to the presence of black soil is majorly Wheat and Jowar.

Location 2

This area of implementation is well inside the town and far from the highway road. It is a marginally sized field with an approximate area of 1.2 Hectares. The crops grown here are Wheat and millet.

Location 3

This area is similar to the other two in terms of area and vegetation. Similar types of crops grow here as the other two locations like, Wheat, Jowar and millet. The area of the field is abover average and about 1.6 Hectares.

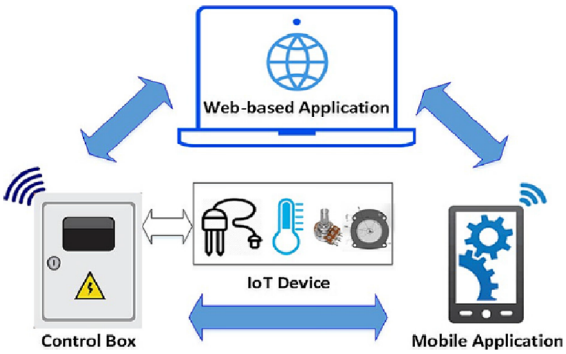
The slection of locations is clearly shown in the image for better context.

Fgure 5 : Selection of locations

1.8 Design And Overview Of The System

The main aim for this design is to co-relate all the three aspects of the IoT system to form an environment that can increase the over-all productivity of the fields that have been selected in the town of Dholera. Linking all the aspects of the system which are essentially The app, The server and the hardware is the key for this project.

Figure 6 : Design of the structure



The prior research done in this segment has shown that IoTs can be used for ensuring any kind of suitable agriculture for the farmers. The data that can be processed by an IoT system has a limit of almost 200 days. That is, the data

which has been relayed to the server can be stored upto this particular amount of time.

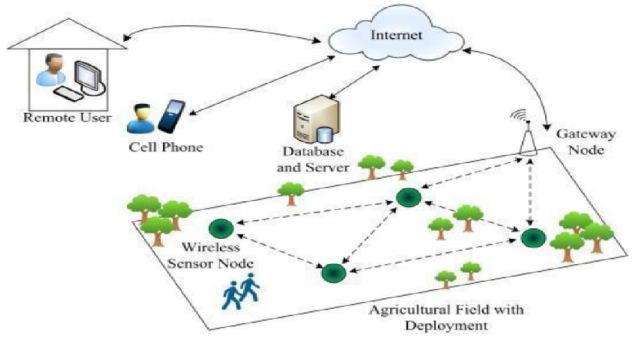
The IoT information consists of soil properties, atmospheric conditions and moisture content which is recorded almost every Fifteen minutes. Which directly affects the crop yield and productivity

1.9 Proposed system

The expected framework is to apply the idea in the agricultural sector by utilizing intelligent sensors to make this sector more smart. The main importance of the subject is to gather information from different access points and to transfer this data. The ranchers will have the option to control the tasks remotely through a remote device which gives it access to the readings through a cloud.

The inspiration which is driving the project is to make simple checking and control for the predefined land. Which we could supervise and work from any area remotely by using a cell phone. The application client can control major assignments of combination of common, ground, readiness, and water framework data; thus relate such data and channel - out invalid data from the perspective of looking over yield execution; and figure crop guesses and modified harvest proposition for a particular farm using the application.

Figure 7 : Deployment Structure



The sensor arrange is expected to get information about the climatic conditions of the homestead, for instance, Soil Moisture, Temperature, Light, and Humidity. With the help of this, system will pick the technique on the field.

A singular ranch can have different yields divided into fields. So each yield will have different limits to be controlled. This, we must have a gathering that will accumulate data autonomously. For this hubs are presented on various parts on the field dependent upon the limits.

application of IoT architecture for Dholera

The locations 1 & 2 are similar in terms of area, crop yield and type of crops. Therefore a similar solution in terms of IoT architecture can be applied to the same. The system of FMISIoT can be applied to the field in the following way :

Soil fertility is significant so as to develop vegetables and organic products. Soil arrangement (magnesium and other similar elements), salt level, and humid levels are pointers for estimating efficiency and states of the ground. The process of checking how fertile the soil is, is a result of estimating those boundaries and it is significant so as to realize at which point of time develop, cultivate and rather prepare so as to how to increase the over-all productivity. In this situation, we considered a lot of soil sensors estimating soil list (for soil organization), salt levels and humidity conditions.

Here the farmers will use Agri-IoT to know when it is a good time to cultivate with the following steps :

- There are IoT sensors placed simultaneously among the entire land of fields which receive readings from the soil.
- The sensor are placed near the roots of the plants in the soil where they acquire and relay real time data and transmit it to the server for analysis.
- The sensors are also placed externally which help collecting the data about the weather, although the weather is unpredictable, it can still analyze the trends and suggest some outputs for the same.
- To analyze this, we use the system of IoT in agricultural applications. This is the most demanding operation in the entire framework as it requires a processor with 8 Cores and large electrical supply.

Location 3 : This location is slightly bigger than the other two locations in terms of area and crop yield. The system suitable for the kind of crops is the ZIGBEE IoT system. This architecture can be applied to the field with the following steps :

- According to the area and usage of the fied, the types of sensors that are used in the ZIGBEE system are, Temperature, moisture and humidity sensor

- All these sensors will be connected to a control box which will receive the inputs from the fields

- The number of nodes connected to the field of size as big as ours must be between 300-500 (Which is suitable for a medium-to-large sized field)

- The ZIGBEE gathers the information by the sensory points of that hub. There are a number of focal points of data collectors that are set around the field. Utilizing the data analytics and Big data technology the farmer can settle on precise choices for example where the humidity is less in terms of soil and if the irrigating framework needs a different trajectory. Also as to when and how to flip the switches for the IoT and other devices for the boundaries to be kept up

Post application recommended policies and directives

The presentation of the IoT has prompted the thought of IoT-based frameworks to help the shrewd cultivating objectives. This paper meant to incorporate the IoT frameworks with the the frameworks and make extra worth that can't be accomplished if these are considered independently.

This coordination exertion prompts the upgrade of the current frameworks with new arrangements that help the shrewd cultivating tasks dependent on IoT. In the introduced approach these necessary new modules have been expressly characterized notwithstanding the customary models. The general methodology as such gives an incorporated perspective on the general framework to all the more likely help the design of IoT-based architectures

The following options can be implemented for the application of this structure:

<u>Option 1</u>

- It needs to be ensured that the selected fields get the apt amount of sensors and nodes for the data collection and stimulation
- The safety of the personnel operating and utilizing the system must be taken into consideration and necessary equipment to prevent any hazard originating from the devices must be installed
- Awareness among all the stakeholders like citizens of the city, enforcement agency, regulator, management and operation team is necessary
- This proposed system might require large amount of funds for over all implementation across the town of Dholera
- Capacity of agencies involved in the execution and operation of the project needs to be checked
- Marketing and enforcement of the scheme needs to be done efficiently

Conclusion

This paper discusses IoT based system in agriculture and its system design implementation. The importance of IoT and data analysis has been presented for effective and efficient farming practices. The nodes and their connection with the internet is described and applied for the town. The effective use of available systems in control system is also presented. This paper suggests the use of IoT services especially for database of the data from different sensors in agriculture. On software side, this paper proposes the implementation of mobile based application. This paper identifies the importance of data and its analysis for optimal operation of the farming, the importance of customer and farmer relationship to eliminate middle man and maximize the profitability for farmers. However, there are number of issues to be addressed regarding its effective implementation in a small town such as Dholera, where the whole population is dependent on agriculture. The IoT system has bright future in agriculture sector as it is perfect match for it. For better ease of integration and maximization of system usage, the authorities must upgrade their policy. The government should facilitate farmers by developing basic infrastructure of internet, availability of governmental plan and policy regarding

agriculture. The main limitation is cost and system knowledge. The government should realize importance of the information that can be generated from IoT system and hence encourage farmers for the same providing cheaper loans and ease of access to IoT devices and services. The farmers should be educated, and vocational training programs should be developed for better use of system. In developing nations, the concept of online payment and ecommerce is increasing rapidly so will benefit IoT system integration in farming. There is increased research in IoTsystem which will provide optimal IoT solutions in agriculture sector.

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IMPACT OF COVID 19 ON EV SECTOR, EV MANUFACTURERS, AND THE STRATEGIES FOR BETTER PENETRATION OF EVs IN INDIA

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ABSTRACT

COVID 19 has pushed the already distressed automobile sector into further downward spiral. The Society of Indian Automobile Manufacturers has estimated that the auto industry will incur a loss of 2,300 crores per day due to lockdown. Although its impact is much deeper in EV segment but the Indian government will continue to push to fulfil its commitment of complete transition to EVs by 2030. Due to COVID, this shift can be challenging in the coming future because of the disruption in battery imports, shortage of labourers, liquidity crunch that has led to delays in availability of models and fall in consumer demand due to change in consumer spending patterns. On the contrary, this pandemic has led to change in consumer behaviour in terms of more awareness and acceptance towards eco-friendly measures and to be dependent on private vehicles to travel shorter distances, hence these factors might have a positive impact on EV market. EV manufacturers are facing the wrath of this pandemic, there are many deferred launches due to lack of demand and liquidity crunch. There should be a systematic approach that should be followed and embraced by both government and EV manufacturers for better penetration of EVs in the Indian automobile market.

This paper explores the impact of COVID on EV market, EV manufacturers and the strategies that are required for better penetration of EVs in the automobile market. Additionally, it also provides details from consumer's perspective that is collected through in-depth surveys from 100 automobile consumers. This study helps to not dampen the spirit of India's journey towards clean fuel.

Keywords: *Electric Vehicles, EV sector, EV manufacturers, COVID impact, EV penetration, Strategies*

Introduction

COVID-19 is an unprecedented event and its effects have sent shockwaves very quickly that there is no time to sulk and sink in what is happening around. Due to this pandemic, in a blink of an eye, global dynamics have been disrupted.

The automotive companies around the world, along manufacturers in other sectors are focusing on developing plans to minimize and stabilize their business operations. India, the fourth largest market in the world is disrupted due to the ongoing pandemic. There is a huge impact on revenue because

- There is a disruption in supply chain as Indian automotive sector procures lot of components from China
- There is a threat to daily operations because of closure of assembly plants and restricted movement of migrant labourers.
- To add more to this, there is a fall in consumer demand.

Indian government has started looking out for other alternative technologies in the automobile sector because

- Reduction in oil imports alone helps the Indian government to save 20 Lakh Crores.
- It wants to resume the deteriorating climatic conditions to normalcy and oblige its commitment towards Paris climate accord.

Electric Vehicle is one such alternative technology which has lot of scope to become a part of modern transportation system. Norway is one such country which has been successful in adopting EVs and is leading in the space of eco-friendly cars. EVs consist of three major systems, i.e., energy source, electric motor and power converter. Pre-COVID, EV market is driven by FAME scheme and the fall in battery prices.

Although they can revolutionize the automobile industry but they are few deterrents such as driving range, cost and charging time which makes them less convenient to adopt in the Indian automobile market. To reduce the cost, more advanced technologies in power electronics, speed controllers, batteries and motors should be incorporated and to cover the range, high energy density batteries are required

Intensity of the impact of COVID will be much sharper in EV segment. As of now, EV business for any company will take a backseat as everyone is looking for stability. On the contrary from the automobile consumer's perspective, pollution reduction because of the lockdown imposed to fight COVID 19 has bought a lot of positive outlook towards nature among many Indians, so this might push them to take up more cautious steps to tackle pollution. One such step might be to shift towards environment friendly vehicles i.e electric vehicles. Even the Government is looking towards "ATMANIRBHAN" & cutting down on pollution. One concrete step it might be willing to take in this direction is to have more local EV manufacturing plants where it would be giving more incentives and tax relaxations.

Literature Review

A. *A qualitative comparative analysis on factors affecting the deployment of electric vehicles, (Taeseok Yong, Chankook Park, 2017)*

In this paper, the factors that have an influence on penetration of electric vehicles have been categorized into technological, environmental and policy factors. This study emphasizes that there is no one policy fits all strategy that can be applicable for any country, there are different dynamics for different countries that help them to up their EV sales.

B. *Storage technologies for electric vehicles, (Snigdha Sharma, Amrish K Panwar, M.M Tripathi,2020)*

One of the main reason that is hampering the growth of EVs in India is the lack of sufficient charging infrastructure, this review paper focusses on batteries which is a key component in making an electric vehicle to be more cost effective and accordingly design a plan in terms of charging infrastructure. Three levels of charging schemes have been discussed based on the different battery types.

C. *India two Wheelers Go Electric-Setting Stage for the E-Revolution, (S. Seethalakshmi,K. Shyamala, 2019)*

This article explores about the India's 2-wheeler market as 80% of the market share constitutes two wheelers. It focusses on the electrical transition of 2-wheelers, what are the constraints that are hindering the growth of e-2 wheelers and the decision factors from the perspective of users.

D. *A Research on Market Status and Purchasing Decision Influencing Parameters for ElectricVehicles: Indian Context, (Amrut P. Bhosale, Akash Gholap, S.A Matud, D.G Bhosale, 2019)*

This paper focuses on the market study of automobile consumers which has thrown more insights on socio-economic barriers and remedies that manufacturers should focus for better penetration of E-vehicles in India.

Research Methodology

The purpose of the study is to know about the impact of COVID on Electric vehicle manufacturers and EV segment. What are the barriers against the growth of EVs and drivers for better penetration of EVs in the automobile market of India. Further, it focuses on the initiatives that can be taken by the government and EV manufacturers to improve the EV market by meeting the customer demands.

The data was collected through secondary sources like journals, research papers, reports, articles etc. and the customer centric data has been collected through surveys. A sample size of 100 is taken for the survey and the unbiased customer data collected is restricted to Hyderabad city. Level of income, charging infrastructure, EV price, battery range and its costs, environmentalism indicator, safety and reliability have been the key factors selected in the survey work. Graphical data analysis of the concerns and deciding factors have been performed to analyse the data. These methodologies can be used to understand how Electric vehicles can be made more adaptable and sustainable in the automobile market of India.

Analysis

E. Pre COVID 19 Scenario

Fig. 1. Source – Deloitte Report

• Major automotive companies have launched new models and pledged to increase their investments in EV segment.
• To expedite the adoption of Electric vehicles, companies have formulated action plans to increase fast charging stations significantly.
• To build charging stations, Original Equipment Manufacturers (OEMs) continue to collaborate with battery manufacturers and swapping companies.
• Several start-ups have emerged in this sector with key focus on two- and three-wheelers, e-bike renting, batteries and setting up of EV infrastructure facilities.
• In the recent past, there were quite noticeable number of financial transactions by private equity as well as strategic players, both in the Electric vehicle start-ups, bike renting companies, battery swapping and mobility companies.

F. Impact Due To COVID 19

Although EV market has been facing few challenges because of high EV costs, inadequate charging infrastructure and lack of export competent local manufacturing hubs, and the economic slowdown, COVID 19 has added more to this. There is huge impact in the supply areas due to production shutdown, disruption in supply chain and low labor. Today, most companies that manufacture electric vehicles rely on imports from China, South Korea and Japan for many components such as drivetrains and batteries. Another important aspect is the new import duty rules, which have been implemented from 1st April 2020 pose a challenge to import from other countries, but at the same time, were made to boost the manufacturing ecosystem within India. So, the consequences of this outbreak will have a negative impact on EV manufacturers, consumer's spending patterns and the government's ambitious target to have only Electric vehicles by 2030.

EV Companies

The EV auto companies including startups which have been investing huge amounts of money in this sector will find it difficult to justify their investments, thereby, resulting in delayed launch of new products. Over 15% of the dealers can go out of business. For EV manufacturers who have battery stocks in their warehouses might face a risk of battery discharging due to the prolonged lockdowns, if the period extends more batteries might get sulphated, leading to financial loss.

For EV bus manufacturers, market will be purely driven by the government's financial capability and willingness to spend in different states of the country, but as of now State Transport Undertaking (STUs) may not have sufficient funds to buy them. Additionally, factors like fall in diesel prices and unavailability of funds will further impact the demand for EV buses and this may encourage STUs to buy ICE (diesel) buses.

Automobile Consumers

Owing to the pandemic, owning an EV will increase the strain on consumer's pockets as roll out of many EVs have been deferred by the auto giants, so there will be few choices for the consumers. Hence customers might be looking out to lease or rent personal vehicles, this sector will see a substantial growth as shared Mobility services will now take the backseat until the new normal way of life is adapted. At present, the consumer mind-set is more inclined towards self-sustainability and to safeguard themselves from the pandemic and at the end it will be the consumer who decides whether he wants to choose a cleaner mode of transport or continue with a traditional one.

In the coming quarters of 2020 EV's will see a decline but then will see a continuous growth from the year 2021 as in the long run owning an EV is cheaper than the conventional vehicle but because of the price, and the global economic crisis; the consumer mind-set may show more

inclination towards opting for capex light models though still wanting to preserve the environment. So, while the entire automotive industry will be impacted including EVs, the impact on EVs may be slightly lower than ICE. This might instigate policymakers to come up with more incentives to further encourage Electric vehicles

G. *Short term, Mid term and Long term Effects*

TABLE I. Short term to mid term effects

Unfavourable	**Favourable**
It will be challenging to raise funds for start-ups which are working on mobility, EV segment and battery components.	Compliance with BS-VI regulations will become a costly affair for petrol and diesel vehicles, thereby making Electric vehicles more attractive.
Fall in fuel prices could make petrol/diesel cars more lucrative than Electric vehicles for customers.	Shift in consumer demand choices from the usage of public transport and shared mobility services to personalised vehicles results in surge in demand of two-wheelers including Electric vehicles. Apart from own vehicles, there can be rental/subscription models.
As part of sustenance and cost cutting strategies, corporates will cut down on R&D spending and might delay/defer EV plans.	
Companies would be focussing more on sustaining the business by reviving current operations on petrol and diesel models.	
If government imposes prolonged lock-down, this will have an impact on vehicle sales because of loss of consumer demand.	

TABLE II. long term effects

Unfavourable	**Favourable**
Due to lack of funds, development of EV infrastructure might be delayed	Due to nature's healing because of lockdown, there will be a shift in Customer's mind-set towards eco-friendly vehicle models.
Alternative fuel technologies, such as hydrocarbon might pick up.	Shift of dynamics in sourcing materials from imports to localization i.e Decentralisation of supply chain to have suppliers closer to manufacturing plants
India being a cost sensitive consumer market, may not warm up to Electric vehicles until upfront costs are further reduced.	

H. *Possible Post COVID 19 Scenario*

Due to this pandemic, focus of the nation is drifting towards 'Atmanirbhar' (self-reliance), so large-scale import substitution in the EV space can pick up if there is enough local demand to justify localisation. Investment scenario in the EV segment

- For a short term, it is difficult to raise funds for start-ups which are operating in the space of mobility and battery compound segment. However, as time passes, gradually fund raising activities are likely to pick up as these start-ups are going to play a crucial for development of EV sector. To add more to this, in fact the role and valuation of EV start-ups would be more in Post COVID than Pre-COVID.

- In context of Pre-COVID, major auto players have already announced increased spending on the Electric vehicles but due to the pandemic, there will be a short to mid-term impact on both lending capabilities of financial institutions as wells as the borrowing capabilities of the companies. Since companies have already had strategic tie ups, so to keep up with the pre-set goals, they will look out for all possible feasible ways to borrow money.
- To cut down on India's dependency on other countries for batteries, raw materials, power electronics etc. Auto firms will set up local manufacturing facilities which further leads to the requirement of more funds and creation employment opportunities.
- India could be the next preferred option for multinational automotive players who have manufacturing and assembling units in China as all the global giants are angry on China and feel betrayed for hiding the information about COVID during the initial stages from the rest of the world.

E-2 Wheeler Market

Post COVID, E-2 wheeler market is going to pick up.

The Indian Automobile market is dominated by two wheelers, they account for nearly 80% of the total market share of all vehicles in India. Around 20 million 2-wheelers are sold annually in India.

E-2 wheelers were introduced in 2015, since then there has been a steady growth in sales

EV SALES IN INDIA	2015-16 (Nos.)	2016-17(Nos.)	2017-18(Nos.)
E 2 WHEELERS	20,000	23,000	54,800

Fig. 2. Source – Economic Times Article

As companies have started operating their workforce on rotational basis to implement the social distancing norms, E-2 wheeler manufacturers are optimistic to an extent about this market as there is fair chance of people opting for personal vehicles due to the fear factor involved in travelling through public transport services or shared cab services. So, sales of electric two-wheelers might pick up in this cost-conscious consumer spending market.

Factors that help to drive E-2 wheeler market: -

- Less operational costs when compared to ICE
- E-2Wheelers with slow recharge and home plug-in facility are priced economically between 25,000/- to 60,000/-, and are designed to serve small distance commuters. So, this price range will attract more consumers who are price conscious to buy E-2 wheelers.
- Enhanced Electric scooters and power bikes that are designed to outshine ICE vehicles in terms of acceleration, distance per charge, speed and rapid recharge are priced in the range of 1,00,000 to 3,00,000. Consumers who don't mind shedding out the extra bucks to have these enhanced facilities will buy them.

TABLE III. factors that influence consumers to buy e-2 wheelers

Economy factors	Social factors
Price	Safety & Mileage
Maintenance	Weight of the Vehicle
Refill facility	Look and feel

so EV or green energy revolution will begin and this sector will be driven by 2-wheeler automotive market. Hence in India, the future of Electric vehicles lies in this sector.

I. EV Penetration in India

Major factors influencing the EV adoption in India

Economic and Technology Factors

Factors such as high purchasing prices, petrol/diesel fuel prices, price of electricity, limited driving range and prolonged charging time are the prominent obstacles for the EV adoption in India. Automobile market in India is price sensitive with majority of the customers belonging to middle class, so high price of Electric vehicles is acting as deterrent and making them not so desirable among the customers. Additionally, other technology factors that act as barriers for consumer

adoption are battery life, trunk space and top speed.

Social and Environmental factors

Factors of consumers such as gender status, income and education levels, awareness and willing to adapt and make changes that act in favour of environment and reduce pollution also affect the buying decisions. These factors affect EV adoption indirectly and are not in direct control of EV manufacturers.

Policy factors

EV market is still at an early stage of development in comparison with ICEVs. With the help of government's active policy support, initial market has been created for Electric vehicles and from their it took off with more companies coming forward to enter the space of Electric vehicles. So, India should provide more support in terms of policies and subsidies such as tax reduction, tax exemption subsidies on purchasing cost and expenditures incurred for maintenance purposes, free charging, and parking permissions to promote electric vehicles. Among these subsidies, preferential tax, free parking, and driving privileges have more positive effect on the consumers' adoption of Electric vehicles, so they are very crucial and prominent factors. EV market and financial economic incentives are positively correlated, tax exemption policy can increase the share of energy efficient vehicles substantially.

Apart from these factors, the one prominent factor that drives the market of Electric vehicles is charging infrastructure. Due to limited driving range consumers are not willing to buy Electric vehicles.

TABLE IV. FACTORS IMPACTING EV PENETRATION

Theme	**Factor 1**	**Factor 2**	**Factor 3**
More Purchases of EVs if it has	Improved technology	Reduced vehicle prices	Extensively marketed.
Major concerns about EVs are	Battery range	EV cost	Charging infrastructure, reliability and safety
Fiscal Benefits should be coupled with	Hassle free experience in availing subsidies	Reduced Value Added Tax and Registration tax.	High circulation tax differences between EV and their counterparts ICEVs
Adoption of EVs by different states will happen when	Charging infrastructure is adequate	CO2 emission regulations are strictly adhered	User purchase decisions are high Policy implementations are stricter and adhered by all.
As charging consumes time, so EV routing is important. Routing problems for EVs can be resolved if	Route rationalization for Electric vehicles is done	Route plans are redesigned by incorporating Green Vehicle routing.	
Individual subsidies should be provided such as	Inspection Exemption	Fleet credit	Easy High Occupancy Vehicle lane access

What government has done and is planning to do in the wake of COVID to push for EVs

What it has done?

Fall in crude oil prices is one of the important factor which derails the growth EV market in India but all thanks to government's efforts of raising the VAT and excise duty. So, if customers plan to move from public transport

to private transport due to COVID, Electric vehicles are more affordable than petrol/diesel powered ICE vehicles.

What it is planning to do

The NitiAayog and MNRE together, are working on battery manufacturing policy, that offers better fiscal subsidies to local lithium battery manufacturers and other components such as power trains manufacturers but government's steps alone to incentivise suppliers is not going to address the problems, the bigger elephant that needs to be addressed is demand generation. However, import dependency will continue for minerals such as lithium and other rare earths.

The Ministry of Power's idea of clean energy grid to charge Electric vehicles is a step forward in making EVs truly clean.

It is planning to direct e-commerce, courier businesses etc. to switch to electric vehicles for logistics purposes in a phased manner.

Swachh Bharat campaigns will include clean air and Electric vehicles promotional campaigns to spread awareness to masses about clean air.

And, public sector banks are to be advised to undertake priority lending for the lower-income group customers who are planning to buy Electric vehicles

J. *Survey Results*

Looking at the Fund allocation and utilization under the FAME scheme, there is a huge potential for Electric vehicles. A survey has been carried out, nearly 100 car vehicle users have been surveyed, to know about their awareness about Electric vehicles. Also, what are their key deciding factors and concerns to buy Electric vehicles post COVID.

It helps us to understand the public awareness about Electric vehicles, key influencing factors that are affecting their purchasing decisions, their concerns for not opting to buy EVs and what features are desirable to them in EV models.

Respondent's demographic profile

Gender:

61% of them are Males and 39% of them are Females

Age Distribution:

Majority of the survey respondents (i.e 42%) fall in 40-50years age group category.

Monthly Income Distribution:

Majority of the survey respondents (i.e 42%) earn between Rs.1,00,000-2,00,000 per month

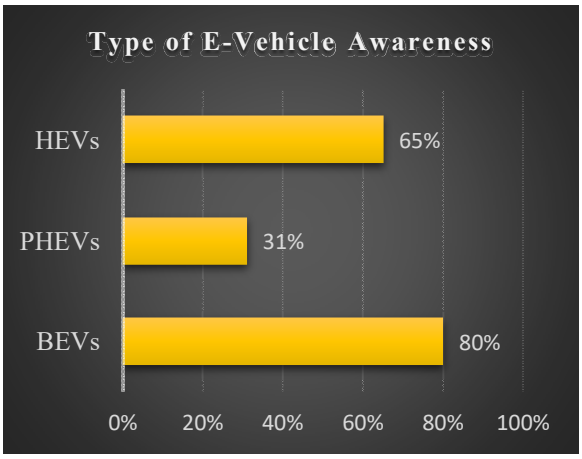

Fig. 3. Awareness about Electric Vehicles

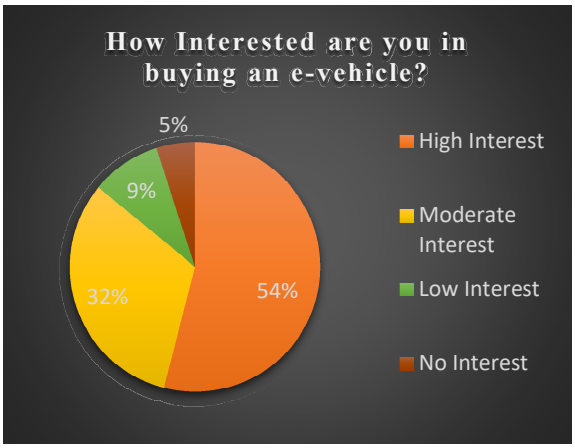

Fig. 4. Intensity of Interest to buy Electric Vehicles.

Majority of the survey respondents are aware about BEVs and HEVs. Moreover, all the survey respondents (42%) who earn between Rs.1,00,000-2,00,000 per month have showed high interest in buying Electric vehicles. More people who fall under the medium income range have either moderate or low or no interest at all, only 37.5% of them have showed high interest to buy Electric vehicles. Interestingly 46.1% of low income group have showed moderate interest to buy and the rest have showed either low interest or no interest at all.

Major Concerns that influence purchasing decisions of Electric vehicles

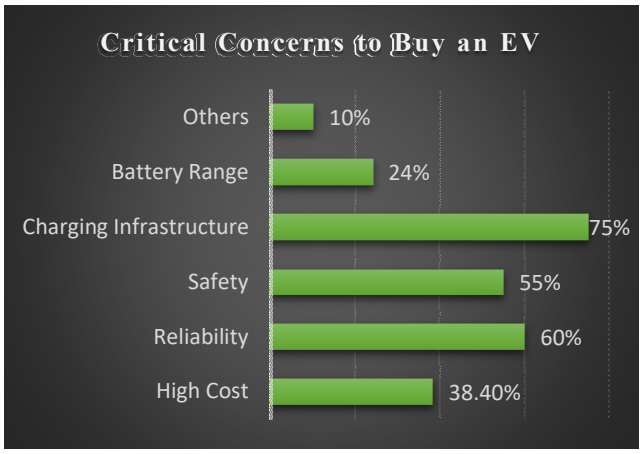

Fig. 5. Major Concerns that influence the Purchasing Decisions of EVs

The survey showed that the major concerns about Electric vehicles are: Inadequate availability of charging infrastructure, safety, capital intensive, battery range, safety and high cost. Lack of charging infrastructure is a major challenge as the current ratio of total number of petrol pumps to that of community charging stations across India is 208:1. Moreover battery range of BEVs is 110-130 Kms which might be reliable to travel 100Kms, so cannot travel more than that. For eg: If someone wants to travel from Mumbai to Pune which is 160 Kilometres, there should be a charging point at Lonavala (83kms) which is in the middle of 160kms stretch. Hence, there is a huge dilemma about charging infrastructure and battery ranges and which should be given priority and developed first.

The third aspect according to the survey is the high cost of Electric vehicles which is a summation of initial purchase cost, taxes, insurance and battery replacement after a certain time. To compare the cost factor between ICEVs and Electric vehicles, consider an example: - approximate cost of high end Maruti Alto 800(VXI) is 3.80 Lakh whereas the cost of comparable competent electric vehicle, Mahindra e2O Plus which is a base model is 6.77 Lakh. High cost of Electric vehicles is due to its battery costs, also these batteries needs to be replaced every 5 years approximately, which further increases the cost of E-vehicles. For better adaption of Electric vehicles, either the battery cost needs to come down or some new battery technology must be available that has affordable metals used for chemical purposes.

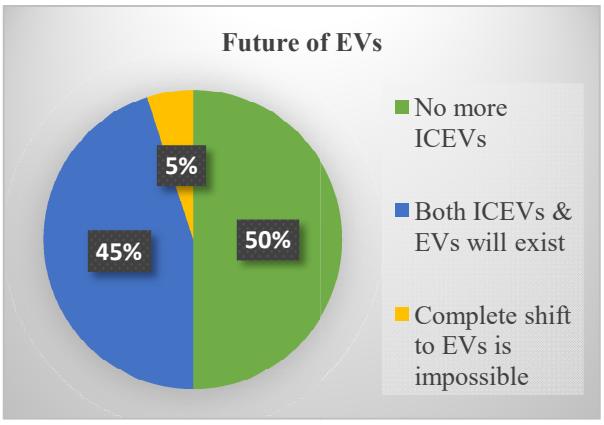

Fig. 6. Future of Electric Vehicles.

Although the majority (50%) of the survey respondents think that E-vehicles will completely replace ICEVs but most of the automobile manufacturers believe that at least till the EV technology completely matures, price parity reduces in comparison with ICEVs and required infrastructure evolves, ICEVs will dominate the transport sector. Around 45% of them think that ICEVs will not be completely ousted and both Electric vehicles and ICEVs exist in the transport sector.

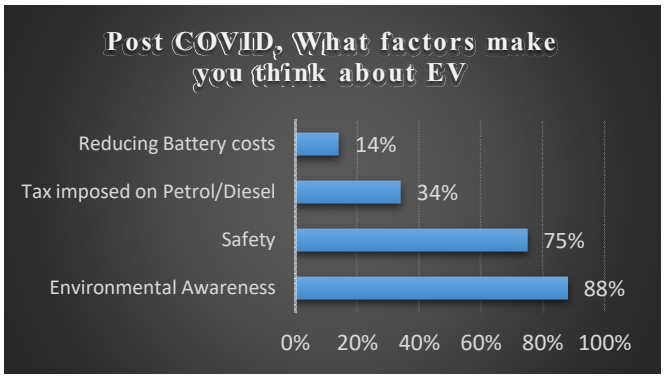

Fig. 7. What Factors Influence Customers to buy EVs Post-COVID

COVID has one positive impact among Indian citizens, people are more willing to make choices that help to conserve environment and reduce pollution. Survey also reflects this, among the key factors that influence survey respondents to buy EVs, only 14% of them voted for the reduction of battery costs and majority of them responded that in point of view of environmental impact, they are more inclined. Safety is also another important factor that influences them to buy Electric vehicles. They are also motivated by government's initiatives such as imposing taxes on

Petrol/Diesel engine vehicles to counterfeit the fall in crude oil prices.

Recommendations For Better Penetration Of Evs

K. *For Government*

1. Now India can buckle up and start focusing on the low-cost local manufacturing of EV component industries. So, government should give incentives for companies who are trying to explore this space. To state the obvious, if localization takes place steps then the value chain of EV is expected to reach a whopping $4.8 by 2025 in India.
2. Majority of the customers are convinced to buy PHEVs, so government should focus more on e-mobility infrastructure and build infrastructure that supports last mile connectivity.
3. Unplanned load from EV charging will significantly impact the grid. In order to mitigate unscheduled interruptions, decentralised renewable energy supply from solar or wind shall be installed. Additionally, Electrical infrastructure capacity must be increased where this investment on capacity building will give energy as revenue.
4. To promote and popularise smart micro-grids energy management system (EMS) to have more reliable charging infrastructure.
5. Indian customers are extremely price sensitive. Due to high cost of Li-batteries, it adds up-to 30% of cost of the vehicle. Since most of the automobile consumers in India are two-wheelers, so it would be better to reallocate part of the already existing funds under FAME-II to provide incentives/subsidies for low-speed E two-wheelers.
6. Look after the other possible emerging battery technologies that act as substitutes for Lithium. Government should encourage battery manufacturers and start-ups operating in that space by providing funds for their R&D and incentivise them. Hence India can reduce its dependency on imports.
7. Demand generation will automatically create interest in the EV component sector business, so more manufacturing plants will come up if the EV sales go up. Hence government should work around creating the demand. On that note, government as well as EV manufacturers can promote clean air marketing campaigns in high Occupancy Vehicle (HOV) lanes where the traffic density is high to increase the consumer demand.
8. Moreover, government should impose stricter air quality policies and penalties for vehicles that release more hazardous pollutants and new taxation policies should be drafted based on the type of fuels used in vehicles
9. India should follow a path like Norway by having integrated electricity and transportation system that enables electric vehicles to discharge electricity to the grid. Thereby, reducing the burden on electricity distribution system network.
10. Government can set up Swappable battery stations and launch an App for them. Their locations can be tracked by accessing the App. At these stations, drained batteries can be swapped for charged ones at a certain affordable cost.
11. GOI must facilitate R&D in recycling and reusing the used Li-ion batteries to reduce the import dependency for such minerals.
12. GOI controlled exploration/mining organizations like, Mineral Exploration Cor- portion, Central Mine Planning and Design Institute, Geological Survey of India and National Mineral Development Corporation must be directed to come up with strategies for optimal recovery of cobalt, lithium and nickel and implement them.
13. It should also provide indirect benefits such as parking spots and reserved lanes exclusively for EV customers.
14. GOI must provide more broadened incentive packages as GST rate of 12% on Electric vehicles and FAME scheme incentives are not sufficient.
15. GOI and its agencies use close to around 500,000 vehicles, so it should frame a policy making it mandatory to change these

vehicles to Electric vehicles by either procuring new ones or by remodelling their vehicles to Electric vehicles.

16. GOI must amend Electricity Act and Rules, and remove all barriers that are posing challenge in setting up of charging infrastructure facilities by private players.
17. Ease of transportation registration and wave of its fees for all the EV consumers.
18. Should provide financial packages to clear BS-IV inventories for Automobile manufacturers who are exploring the space of EVs.
19. Charging infrastructure should be within 15 minutes.
20. More local EV battery manufacturing units should be set up on a scale like that of Tesla's GIGA factory.
21. Tax credits should be provided for consumers who are looking out to buy EVs
22. STU's (State Transmission Utilities) should explore financial models for purchase and lease strategy of EV buses.
23. STUS's of all major pollution TIER-I cities should mandatorily deploy EV buses in profit making routes.
24. Fast charging stations need to be set up under PPP model at high traffic zones.
25. Financial incentives should be provided for the private players who are trying to set up charging infrastructure and carrying out R&D activities in alternative battery technologies which can substitute Lithium-ion
26. Incentives such as dedicated free parking for e-cabs and discounted charges for charging at public places should be provided.

L. *For Companies*

1. Companies need to reorganize their supplier network and should assess whether to go for "MAKE" option by manufacturing components on their own or to go for "BUY" option by finding other alternative indigenous suppliers.
2. As there will be liquidity crunch, so OEMs need to be more cautious on R&D spending and should cut down on contract labours by opting for higher automation to save cash for future purposes.
3. They should focus on providing feasible solutions in setting up of EV infrastructure networks
4. Companies should do more R&D on wireless charging technologies and incorporate them in their Electric vehicles to reduce the reliability on charging infrastructure.
5. They can set up battery swapping stations that helps the customers to have hassle free experience to charge
6. Post COVID crisis, sale of Electric vehicles: As per the government norms of social distancing, daily commuters will prefer personal vehicles over mass/shared mobility services. Since India has more number of two-wheelers, so companies can benefit from E-2 wheeler sales, if they shift their focus to this market.
7. Priority should be given to setting up of residential charging stations as most of the consumers feel it is convenient to charge overnight and travel at day time. So, companies can come up with combined plans of setting up of infrastructure along with selling the EVs. This will incentivise more people to come forward and buy.
8. Virtual Sales Platform for purchasing and providing after sale service
9. Dealers and Company showrooms need to focus on Digital marketing and virtual reality showrooms.
10. Due to fear of COVID, retail and service stores will have low footfalls of customers. Offer more personal customer- dealership experience by offering virtual tours, online negotiations with discounts and financing options through digital retailing. This will help in luring customers by giving them their ownership experience.
11. As the crisis will take a few months to subside, OEMs should step towards

restructuring their supply chain by bringing more localized production.

Criteria	Level 1	Level 2	Level 3
Voltage	Needs 120 V-AC, so suitable for installing at residential places.	Charging power is five-time higher than that of Level 1.	High charging power, so no need of on-board chargers. High power DC is directly fed to the charging inlet on the vehicle.
Charging Time	Vehicles need to be charged for 12hrs i.e overnight. So EVs that are charging from level-1 type of charging scheme need to have on-board charger	Vehicles need to be charged for 3 hrs. Here also we need to have on-board chargers	Vehicles need to be charged for 30 min.
Output	4 miles of travel per hour.	80 miles of travel per hour.	85-105 miles of travel within 25-30 min

12. EV dealers or manufacturers should come up with flexible financing options such as feasible down payment, low EMI, Tax benefit and insurance coverage options.
13. Companies should come up with innovative upgrade options upon purchasing EVs and package plans for buy-back and maintenance options across varied tenure period of two, three and four years to retain customers.
14. Promote new online marketing channels and convert the leads to customers via active engagement with potential customers.
15. Need to deploy Pay per use model for certain type of EVs
16. Typically, the average daily run of consumers in all TIER-I cities is 200kms. So, the manufacturers need to reduce the gap between the available and required range of e-cars i.e in terms of range of distance available for charge.

TABLE V. charging schemes at 3 levels

M. Innovationsthatcan be Incorporatedfor Better Penetration Of EVs

Wireless Power Transmission

Since Electric scooters are popular in the Indian markets, Resonant inductive wireless power transmission technology should be adopted in E-2 wheeler market because

- Size of battery packs will be reduced, thereby cost of the whole vehicle will be reduced.
- Need of charging infrastructure will be reduced.
- Can be charged quickly, so the waiting time is reduced and can easily travel medium distances.

EV Battery

The aim is to develop a high-energy density battery for EV to increase the driving range as the charging infrastructure is still at a nascent stage in India. So, increasing the driving range of EVs would substitute the necessity of having more charging stations. Charging and discharging process is crucial for a battery as it helps to determine its performance, durability and safety. Three types of battery ranges should be designed and accordingly charging schemes need to be planned and set up. These batteries distinguish themselves from each other in terms of voltage, current, power and charging time.

These charging schemes should be set up in all major TIER-I cities where the traffic density is more. Both on-board as well as off-board chargers should be adopted depending upon the scheme level. The former type of charger is required for low power applications and should be installed within the vehicle whereas the latter type ones should be set up at the parking stations of malls, hotels, public parks etc.

CONCLUSION

COVID has bought negative impact on EV segment but all the stakeholders should be more rigid and agile to make India's journey towards clean fuel possible. Adopting electric vehicles will provide benefits such as improvement in the health of Indian citizens, reduction in fossil fuel consumption and dependency on other countries for fuels. India spends huge amounts of money for importing vehicular fuels, so reducing ICEVs can significantly reduce India's import bills. This pandemic impact might turn into positive because of the environmental awareness and realisation that this lockdown has bought up. So, across all major cities, there can be a demand once the economy resumes to normalcy. Government is also doing its best by providing financial incentives and tax exemption under FAME-II scheme but only financial subsidies are not sufficient for the Electric vehicle market to take off in India. Norway was successful in adapting Electric vehicles as its penetration rate is 28.8% which is higher than any other country. This success is achieved by adequate charging infrastructure, low electricity cost due to significant renewable energy mix from hydro and efficient tax credit system. Moreover, there are other policies such as permission to enter bus-only lanes and free use of public parking spaces. All these factors have played a prominent role in adapting Electric vehicles. Replicating the success of Norway in India cannot be attained due to it large land area and economic status. However, despite the economic performance of India, disruptive policy efforts can maximise EV penetration. From this, we can conclude that effective policy measures, such as tax exemption and purchase subsidies should be combined with infrastructure facilities by drafting more policies and schemes that help them to build them. Only then there can be better EV penetration in India.

Survey results also showing that in-spite of people having awareness about Electric vehicles and having interest in buying them, there is no corresponding demand for EVs in the automobile market. This is due to few concerns such as inadequate charging infrastructure, high costs of electric vehicles and safety concerns as the chemicals used in EV batteries are hazardous. So, to propel EV penetration in the automobile sector of India, all the stakeholders like Government, Electric vehicle manufacturers and customers must come together and discuss strategies that works in favour of every stakeholder, thereby, creating a win-win scenario for everyone. If this happens, India can completely shift to Electric vehicles by 2030 as per the plan of the government.

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CHANGES IN MODEL CONCESSION AGREEMENT OF HIGHWAY PPP IN INDIA

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ABSTRACT

The PPP (Public Private Partnership) in India lacks standard framework which bought in the requirement of introduction of MCA (Model Concession Agreement) for development of Highways in early 1990s. The MCA is the legal contract agreement which states the policies, regulatory framework and addresses the critical issues for executing projects on PPP basis. MORTH (Ministry of Road Transport and Highways) has made changes in the MCA from time to time based on feedback from private investors, banks, and other stakeholders in highway development programme. In this study, major changes in the MCA have been examined by reviewing MCAs and its amendments from 2001 to 2020, along with related literature. The main aim is to evaluate important clauses of MCA like change in scope, obligations of concessionaire, obligations of Authority, effect of variation in traffic growth, change in law, FM (Force Majeure) and Termination to observe the changes in the clauses and analyse reasons for the changes. It concludes with which type of PPP mode is most preferred, what are its advantages over the others and explains the positive changes in the MCAs are over the period.

Keywords: *MCA (Model Concession Agreement), BOT (Build Operate Transfer), PPP (Public Private Partnership), Highways*

Introduction

Traditionally, the principal provider of highway infrastructure in India has been the government, in terms of both financing and constructing. The launch of the NHDP (National Highway Development Programme) in 1997 gave a high priority to highway development in India. This policy change aimed to achieve faster road development and reduction of debts. Since then the government has been experimenting with inviting private sector firms into contractual agreements which require the firms to finance, construct and/or operate the highway infrastructure. This type of an arrangement between the government and private sector is termed as PPP. By harnessing technology, skills and efficiency in operations of the private sector at a larger scale innovations have been eased by other than just reducing the strain on the public or government pockets, the funding within the PPP arrangement.

An MCA is a document which summarizes regulations and policies for execution of a PPP project and acts as a basis of PPP in India. MCA also provides solutions for issues like allocation of returns, risk mitigation and obligations between parties entering into the agreement. It clearly lays down the definition of roles and responsibilities of the two parties - the private party and GOI (Government of India). Details of the process control during construction to the finished project quality and performance indicators during the operation are also provided in the MCA. MCA for Highway projects based on PPP was introduced with a core idea to maintain a balance between risk allocations in the mid-nineties to make the bid appealing to the bidders.

The response that was anticipated was not received by the PPP for highway projects in India in the mid-nineties and the main reason was that the standard framework lacked for the project execution under the PPP model. As a result, the publication of the first draft of MCA for BOT projects in Highway sector in India was in 2000 by Haldea which was published for the use of PC (Planning Commission), GOI [1]. The NHAI (National Highways Authority of India) also took efforts in the development of two different MCAs, first for projects with less than Rs. 100 Crore of TPC (Total Project Cost) and the other for projects with more than Rs. 100 Crore of TPC. A project for testing the MCA prepared by NHAI was implemented on a section of the Jaipur-Kishangarh highway (NH-8). This project was rebidded and after multiple iterations in MCA prepared by NHAI, in 2002, it was finally awarded. Since then MCAs have been developed and amended for various PPP models in a way that it is more attractive for the

private investors to participate in the process of National Highway (NH) development in India.

In the process of revival of the BOT (Toll) mode NHAI has proposed amendments in MCA which are in synchronization with the objective. The proposal of the amendments has been done after thorough discussions with MoRTH (Ministry of Road Transport and Highways), Ministry of Finance, Department of Economic Affairs, and Niti Aayog. The modifications proposed in the MCA are majorly about the capping of obligations and liabilities throughout the sustenance of the agreement, change in dispute settlement mechanism and making the conditions precedent before declaration of Appointed Date more stringent. There also is a plan to integrate recent policy initiatives of the MoRTH through settlement of stuck National Highway projects, launch of an idea of mutual foreclosure of this agreement, Harmonious Substitution of the Concessionaire, etc., by making the modifications.

This research highlights changes from the updates in MCAs in all modes of PPP implementation used in India since its inception such as Hybrid Annuity Mode (HAM), Engineering, Procurement, and Construction (EPC), BOT (Annuity), etc. This will ensure that the development of highways through PPP mode is functionally balanced by including the proposed changes in the MCAs. It includes the study of evolution of PPP models in India for the highway sector and suggests recommendations to be included for success in the revised model.

Literature Review

A study by Nallathiga, Ramakrishna [2] suggests that much of the private sector participation in road development has been seen to come forth under the BOT model in India with the variants of

a. EPC (Engineering, Procurement and Construction) model
b. BOT – Toll model
c. BOT – Annuity model
d. BOT (Hybrid Annuity Model)
e. Contracts

In a study conducted by Ajit Patwardhan [3], he suggests that organisation of the risk sharing in BOT model is done with a significant duty on the Contractor, which includes duties to manage the financing risk, risks on revenue and as well as O&M (Operations and Maintenance) risks other than usual risk in construction. The duty of the government (NHAI) is to manage ROW (Right of Way) and granting rights to collect toll to the Concessionaire. In HAM the risk sharing has been realigned in a dramatic manner. While HAM introduced risk sharing which is aligned in a way which is very different. In this new way the public party (NHAI) is taking risk in collection of revenue (toll) with some (40%) risk sharing of financial risk. It only expects the concessionaire to continue to manage the execution and O&M risks. This risk sharing realignment is done so that a better balance is stricken in comparison to the older allocation of risk. Thus, changes are made in the PPP type to improve it and attract private investors.

A brief understanding of risk allocated in various types of PPP for highway development is explained in table 1.

TABLE I. Risk sharing in different types of PPP models

Model type	**O & M Risk**	**Financing Risk**	**Revenue Risk or Toll collection Risk**
HAM Model	Concessionaire	Authority & Concessionaire	Authority
BOT–VGF Model	Concessionaire	Authority & Concessionaire	Concessionaire
EPC Model	Authority	Authority	Authority
Annuity Model	Concessionaire	Concessionaire	Authority
BOT Model	Concessionaire	Concessionaire	Concessionaire

Bramhankar [4] in his study emphasises that the road sector in India plays a very important role in the development and infrastructure services in the country. Multiple steps have been taken by the government in India to make the state of national highways better. There are many types of models of PPP used in road development

sector, but the ones which are used very commonly are BOT. There are a few challenges that are faced in using this model and to overcome those HAM was launched in 2015 and it has proved to be widely acceptable by both private and public sectors. The difference in models used in PPP projects is majorly due to the differences in risk sharing and responsibilities taken between both the sectors.

In a research conducted by Barad, Mahesh [5], he has been explained the initiative taken by the Indian government to attract private players to participate and to attract more Foreign Direct Investment (FDI). These incentives form a part of the MCA and are as follows:

- The government will be responsible to pay the cost for - i) Project feasibility reports ii) land which is required for the ROW and the amenities on the sides iii) shifting of the utilities iv) getting environmental clearance, afforestation, removal of trees, etc.
- Up to 100% FDI (Foreign Direct Investment) in road development
- Subsidy of up to 40% of the total project cost to be provided to make project economically viable
- 100% exemption of tax for 10 years counted consecutively out of the 20 years after the commissioning of the project
- Free of duty import of construction equipment which are high capacity and modern.
- Declaring the sector of roads as an industry.
- Easing the norms for external commercial borrowing.
- Retaining right of the toll; further revision of toll rates can be done based on wholesale price index.

In a discussion [6] held in the International Transport Forum, it emphasizes the need of the MCA document as a comprehensive document as a pre-requisite for PPP as it helps balance the need of the users and the investors. It helps the government to provide efficient and cost effective services to the users.

Zhang [7], in his research mentions the critical success factors for the PPP process in road sector. These success factors have helped in this research to identify the major clauses which have been further analysed.

As per the research done by Daulatabadi, Parvez [8], the National Highways Act 1956 was amended in 1992 and it allowed the GoI to impose user fee through implication of toll for the use of the part of National Highway which is developed. The idea behind such an amendment was to get the private players in the process of road development and maintenance in India. The GOI took initiatives to attract private parties in 1994-1995 by declaring the road sector as an 'Industry', this made the process of borrowing easy, the restrictive trade practices were eased and custom duties were reduced on construction equipment. The MoST (Ministry of State Transport) (now, MoRTH) and other groups did some estimation and concluded that it will be insufficient for the road development to have only budgetary provisions and PPP was thus bought in the implementation of the highway projects. However, this initiative was not a successful one as it lacked the standards for proper framework of PPP or BOT mode.

Ramakrishnan T. S. [1] studied the evolution of MCA and has identified that to attract the private parties to participate in the highway development the government offered them relaxations in terms of custom duties on construction equipment, facilitated easy borrowing and permission for floating of bonds. In 1995, the National Highways Act of 1956 was amended to give power to the government to enter in an agreement with anyone who is related with development and maintenance of NHs and entitle that person to collect fees for the development of the whole or part of that highway. To make this process easier and to carry out the highway development plans, NHAI was established under National Highway Authority Act in February 1995. Later in 1996, a draft on 'Development of National Highways and other related issues' was prepared by consulting with heads of MoF (Ministry of Finance), MoST and DEA (Department of Economic Affairs). In the period from 1996-97, few more initiatives were taken to facilitate Land Acquisition (LA), ease in obtaining environmental clearances, compensation to the concessionaire for unforeseen events, etc. In 2000, Haldea published the draft MCA for BOT based project. In 2002, an improvised version of the MCA was developed for project costing

more than 100 crore which was majorly drawn from Haldea's draft MCA.

Nallathiga [2], in his study explains that in order to avoid the duplicity of making contracts for every project, which may be cumbersome and complex in some of the projects, MCA is designed which acts as a document which can be referred to implement the road projects. The MCA has evolved over several iterations and is now used as a standardized contract. Both, the concessionaire and authority share risks that are explicitly explained in the MCA. Standardized agreement in the form of MCA increases the speed of finalizing the contract and therefore the execution of project. Even when a PPP framework was prepared in 1997, but the implication started after 2001.

Research Methodology

NHAI has proposed changes in the BOT model to attract private investors [9] and this research analyses many such changes made by the authorities over the period of 20 years from 2001 to 2020. The data used for the research is predominantly secondary data collected from various research papers written by experts in the roads sector and various documents from different government websites. The methodology involves the study of the MCAs of highway PPP projects in India from the year 2001 to 2020. The span of 20 years is considered as MCAs are not amended frequently and the study of 20 years helps to understand the changes elaborately.

It was necessary to identify the major clauses and study the changes made in them over this time frame. Thus, a few important clauses have been summarised in this paper with the evolution it has undergone in this period and the plausible reason behind it. These clauses have been chosen based on the major parameters based on which the MCA is prepared. These parameters are chosen based on the critical success factors defined by various researchers in their study. The study concludes with analysing how has the MCA evolved over the period of 20 years and what peculiar changes have been made to make it more attractive to the private players. It also explains how the importance of MCA has increased as it has helped make the PPP process easier. It also adds some suggestions which can be included in the next amendments.

Analysis

MCAs have been amended with an effort to attract more private investors in the process of road development. Some of the major clauses in the MCA for highway PPP projects which lays down the analysis of how the clauses have evolved over the period of 20 years have been explained further which are – Change in Scope, Obligations of Concessionaire, Obligations of NHAI (Authority), Effect of Variation in Traffic Growth, Change in Law and Force Majeure (FM) and Termination. The clauses have been studied for each year to identify the changes in them and the identification of the probable reason for the change and its impact on the highway development through PPP is done.

A. Change of Scope

The 2001 MCA states that any change in the project which does not have additional capital expenditure which would be more than 175 million rupees. In 2002 it was revised to a change with additional expenditure not more than 5% of the TPC which keeps the COD unaffected from adverse impact. In 2006 it was revised to 10% of the TPC which keeps the COD to be affected in an adverse manner. In 2009, it was revised to consider any extra services and works which are not a part of the project's scope to be considered as a 'Change in Scope' and this definition hasn't been redefined since then.

The process followed for the Change of Scope in 2001 needed the authorities to notify the concessionaire about the change at least 90 days in advance to the PCD (Project Completion Date). After the notice, the private party shall give details to the independent engineer about the impact of Change of Scope on construction and/or Operations and maintenance requirements, estimated extra cost and extra time required to complete the project within 15 days. The independent engineer approves the changes and then forwards the budgeted estimate to NHAI and the NHAI shall within 15 days issue the Change of Scope Order. NHAI is bound to reimburse the concessionaire for preparation of the estimates if they do not send the order in 15 days. If they do send the order,

they should notify the concessionaire about the mode of reimbursement which can either be a lump sum amount or in not exceeding 4 equal half yearly instalments with interest at SBI PLR + 2% which shall be paid within 30 days of completion of the works. In 2005, the period of 90 days to notify the concessionaire hasn't been mentioned [10]. In 2017, a procedure was set for the Change of Scope if it is deemed to be necessary by the concessionaire.

B. *Obligations of the Concessionaire*

In 2001, Performance Security, Financial Arrangement, Drawings, Project Implementation, Insurance and O&M were all sub clauses under the Concessionaire's obligation clause and it was completely changed in the revision of 2002. In 2002, a long list of the obligations of the concessionaire at its own expense was laid down which included obligations like informing the authority about the project agreements, making necessary applications to all the Governmental agencies, following all applicable laws and working in accordance with the permits, appointing or monitoring activities of contractors, being responsible for safety, maintaining good industrial relations, not claiming possession or control of any roads which are not a section of the highway project, fulfilling requirements under the laws relating to the environment and regularly update the authority while the construction is ongoing and the period of operations. The private party must at its costs and expenses undertake functions of designing, engineering, procuring, constructing, financing, operating and maintaining of the NH. Before starting the construction of the NH, the private party must submit the Project Completion Schedule to NHAI, finalize the designs, designate a PM (Project Manager) to supervise the project and undertake acts to complete construction in accordance to the agreement. In regards to the drawings of the highway project, the private party shall finish and submit it with adherence to the Schedule of the project and the private party shall be solely responsible for any delays in Completion of the project. It shall also within 90 days of the COD, the concessionaire should provide the authority with 'as built' drawings which indicate the actual design of the highway. In 2005, a few more obligations were added to the list which included liaising with the respective state government regarding the rehabilitation and resettlement plan and carry out compensatory afforestation.

In 2009, the clause was revised so as to include sub clauses which were not addressed previously. Sub clauses 'Obligations of Concessionaire' and 'Obligations relating to Project Agreement' cover all the obligations stated in the previous versions of MCA. 'Obligations relating to Change in Ownership' states that the private party shouldn't permit or make any Ownership changes if there is no prior approval from the Authority. The sub clause 'Employment of Foreign Nationals' states that if the concessionaire agrees or wants to undertake employment of any foreign personnel, it will be obliged to take necessary permissions and approvals and the inability to obtain the permits will not be considered as a FM event which implies that the concessionaire will not be excused from performing its obligations. 'Employment of Trained Personnel' makes sure that the proper training of all the employed personnel for their respective functions is the responsibility of the concessionaire. 'Sole purpose of the Concessionaire' is a sub clause which states that the concessionaire is not allowed to engage directly or indirectly with any business other than envisaged in the concession agreement without NHAI's consent. 'Branding of the Project Highway' forbids the concessionaire to use its own name to advertise, reflect or brand on the NH or any part of it. 'Facilities for Physically Challenged and Elderly Persons' makes it compulsory for the concessionaire to provide an environment which is free of barrier for the visually or physically impaired and for elderly people who use the NH so that it conforms with the guidelines which were laid down by the Ministry of Social Justice and Empowerment. All these clauses from 2009 have been retained in the draft 2020 MCA.

C. *Obligations of the Authority*

In 2001 the clause had 2 sub clauses – 'Specific Obligations' sub clause obligates the authority to execute and procure SSA (State Support Agreement) in 90 days after the agreement is finalized, to subscribe to the Agreement of Substitution in 30 days after the informing about of the financial close by the private party

and to grant all the approvals and permissions in a timely manner. 'General Obligations' sub clause obligates the NHAI to provide important assistance which is required by the private party to get the permits which are applicable, to ensure that use of the project site by the private party is peaceful and without any obstacles from any government body, to assist the concessionaire wherever needed and comply with all the obligations in the agreement. In 2002, there was a single sub clause with a list of the NHAI's obligations which include all the obligations stated in 2001 MCA along with an obligation for O&M the highway under development with its own expenses in a way such that the LOS (Level of Service) is not inferior. In 2005 and 2006, a few more points were added regarding obligation of the authority to assist the concessionaire with Land Acquisition (LA), to bear all expenses for all the clearances, rehabilitation, resettlement, utilities shifting, etc., to maintain law and order during encroachment removal, etc.

In 2009, 3 sub clauses were introduced – 'Obligations of the Authority' which covers all the obligations regarding the permissions and assistance to the concessionaire. Another was 'Maintenance obligations prior to Appointed Date' which obligates authority to maintain traffic worthiness and safety which should not be inferior to what it was 7 days before the last date of submission of bid. 'Obligations relating to Competing Roads' restricts the authority and any government authority to build or cause to build any competing road any time before 10 year jubilee of the date of appointment of the current project unless average traffic is more than 90 % of design capacity of the highway. In 2017, 'Obligations relating to Refinancing' a sub clause under which the authority can enable the concessionaire to get refinancing for the project with the approval of the authority.

D. *Effect of Variation in Traffic Growth*

Since 2002, the Traffic Sampling clause has been included in the MCA with a purpose to determine and/or verify the actual traffic on highway. It only explains the method of traffic sampling but it does not consider its impact on the finances of the project or on the concessionaire and government. In 2009, a new clause was introduced in the MCA 'Effect of Variation in Traffic Growth', which included the modifications in the period of concession in an event that the AAT (Actual Average Traffic) should be lesser or more than that of the TT (Target Traffic) by more than 2.5%. In the case where AAT is lesser than the TT, then for every 1% short with comparison to the TT, the period of concession shall be elongated by 1.5% which required to pay a concession fee, only if, such an increase in period of concession shall not in any case exceed 20%. In the case where AAT shall have exceeded the TT, then for every 1% more as compared to the TT, the period of concession shall be decreased by 0.75% only if, such reduction in period of concession shall not in any case exceed 10%. If in any accounting year, the average of daily traffic in PCUs (Passenger Car Units) exceeds the design capacity of the highway and if it continues to be excess for 3 accounting years, it will be considered that an Indirect Political Event has occurred and thus the authority can terminate the agreement by giving a notice of termination or by paying an amount for termination. The Authority is obliged to inform the concessionaire that it intends to issue a notice for termination and should give them a period of 180 days to represent themselves. If the period expires, they can issue the Termination Notice. To avoid any doubt both the the parties came to an agreement that an average daily traffic of 60000 PCUs will be considered to be the capacity as per design for a 4 lane NH project. (NHAI, 2009).

E. *Change in Law –*

It is a possibility that the law changes or the interpretation of the law changes or a new law is enacted after the proposal due date of the project which may affect the rates or the taxes of the project. In this case the clause 'Change in Law' is referred. In 2001, as a relief to the concessionaire, the government participated with 100% share for the amount more than the cap of 60 million in capital expenditure and 10 million in increase in taxes (NHAI, 2001). In 2002, the government proposed amendments which can help the Concessionaire retain their financial position in a way such that there had been no Change in Law (NHAI, 2002). A period of 30 days was given so that both the parties can conduct a meeting to discuss the

agreement to implement the foregoing. Also the cap was revised to 10 million for both, capital expenditure and increased tax rates. In 2009, the cap was revised to 10 million and in any accounting year 0.5% of the realisable fee. Along with the meeting period of 30 days, a period of 90 days was introduced for coming to an agreement. If no agreement was reached in these 90 days, the government is bound to pay the private party an amount which will put the concessionaire in a financial space which it would be in if the law remained unchanged, and the government shall compensate the private player with the amount which is specified within 15 days of such notice (NHAI, 2009). In 2017, a period of 45 days was introduced for the private party to notify the authorities of the applicability of the change in law on the project (NHAI, 2017).

To get the relief from the authorities for the increase in cost there are obligations to be fulfilled by the concessionaire. In 2001, the obligation was to notify the government and the independent engineer about the impact and its nature, detail of estimated additional cost incurred, measures taken to mitigate impact and minimising the additional cost. After receiving the notice, NHAI and concessionaire along with the independent engineer will hold review meets and take all the required steps included in certificate by independent engineer and independent auditor of the extra price to be borne and paid by NHAI. NHAI within 30 days form determination of volume of the extra price was obligated to provide relief to the concessionaire by lump-sum reimbursement of the additional cost to the concessionaire or by reimbursement of the additional cost to the concessionaire in not exceeding half 4 yearly instalments subject to payment of interest at SBI PLR (State Bank of India Prime Lending Rate) + 2% on the amount of payment which is deferred. In 2002, if no agreement is reached in 90 days, NHAI will be required to pay the concessionaire with an amount which will put the concessionaire in a financial space which it would have been in if there was no such Change in Law. The NHAI should make this payment of compensation in 15 days after receiving the notice or with an interest at SBI PLR if the payment is not made in the 15 days.

Since 2002, obligations have been included if the Concessionaire is enjoying any increase in net after tax return or cost reduction or any other financial benefit where the actual financial effect is exceeding 10 million rupees in any one year of accounting. The NHAI can inform the private party by notification and send proposal to amend the agreement. After this notification, both the parties should hold a meeting in 30 days to decide the amendments or alternative arrangements for the implementation of the project. In 2002, a period of 90 days to was included after which the Authority can send a notice to the concessionaire to ask them to send them an amount which will place the private party in a financial space which it would have been in if there was no law changed, and in 15 days after the notice, the Concessionaire should return the amount specified therein to the Authority or with interest at SBI PLR when the payment is not given in 15 days.

Since 2002, a sub clause has been included which states that if the increased costs due change in law can be recovered from the users of the highway or if the aggregate effect on the financials is less than or equal to 10 million rupees in any accounting year, the private party will not be reimbursed by the NHAI. In 2009, change was made that no amount will be reimbursed to the concessionaire due to law change if it can be recovered from the users.

In 2009, changes were made to establish NPV (Net Present Value) of the net cash flow in the financial model and to make important adjustments in revenues, costs, compensation or other relevant parameters.

F. *Force Majeure*

Force Majeure defines which events qualifies as force majeure events such as events which are out of control and is not caused due to any fault of the affected party or a situation when the party which is affected is not able to overcome any act even after careful examination or care and skill or has any materially quantifiable adverse impact on the project. It gives a brief about the political, non-political or an indirect political event, etc. In 2001, in addition to the definitions of different force majeure events, it lays down the obligations of the private party to notify the authority in 7 days of the occurrence of such an event and mentions a period of 5

days for the parties to meet and take decisions to move forward with the project. It also lays down the performance obligations of the concessionaire and excuses the concessionaire from the obligations which it is unable to perform due to force majeure events.

In 2002, sub clause on 'Effect of FM event before Financial Close' was added which states that there will be an extension in the date of the financial close which will be equal to the period of the subsistence of the FM event and will require both the involved parties to bear their own costs respectively and will exempt both the parties to pay one another any amount which arises due to such a FM event. Another sub clause was 'Effect of FM event after Financial Close' which states that if such an event happens before the Commercial Operations Date (COD), then there will be an extension in the period of concession which will be similar to the period of subsistence of such a FM event and if it occurs after the COD, then there will be an extension in the period of concession which will be equal to the period for which fee collection will be shelved due to the FM event only if it is not possible for the concessionaire to collect fees after all reasonable efforts. Costs which arise due to the FM events will be the responsibility of the respective parties if the FM event is non-political. In the case of an indirect political event, the bearing of the costs will be the responsibility of the concessionaire to the extent which will be covered by Insurance Claims and if the costs due to the event exceed the claim, half of the excess will be reimbursed by NHAI after certification from the statutory auditors. The reimbursement will be made in one of the two ways – lump sum or 3 equal annual instalments having interest of SBI PLR + 2%. In case of a political event, it will be the responsibility of the NHAI to reimburse the concessionaire in any of the two modes – lump sum or 3 equal instalments having interest of SBI PLR + 2%. In 2009, the sub clauses which explained the effect of FM after or before financial close were replaced by a sub clause 'Effect of FM on Concession' which included everything in the previous sub clauses with a few additions. It states that if any FM event occurs prior to the date of appointment, the period assigned to complete the achievement of the financial closing should be elongated by a period similar to the duration of the FM event. It also adds that if the concession period is being extended due to the occurrence of event after the COD, the extension will be in proportion to the losses in collection. It gives clarification on what can be included in FM costs such as O&M expenses, interest payments on debt, any increase in the cost of construction works because of inflation and all the other costs which are due to the FM event, but exclude the loss of revenues from user fees or obligations of debt repayment.

'Termination due to FM event' is an important sub clause which has been included since 2001 and it states that if it is a non-political event and goes on for a period beyond 120 days, the parties may mutually decide to terminate or revise the terms of the contract. If an agreement is not reached, they have the right to end the contract. If the event is a political event and subsists for more than 365 days, both the parties will be given the right to end the contract. If either party decides to terminate the contract, a notice has to be given and the termination date cannot be earlier than 60 days from the notice date. If there is any payment for termination to be made by NHAI to the private party due to a political or other FM event, it has to be made on the termination date. In 2002, the eligible period for termination was revised to 180 days within a period of 365 days counted incessantly and the notification period was revised to 30 days. It revised clauses for termination payment as per table 2.

TABLE II. Termination Payment in 2002

Type of FM event	Termination During Construction Period	Termination During Operations Period
Political Event	Termination Payment of an amount equivalent to the amount of Debt Due plus 100% of the Equity which is subscribed and paid in cash plus interest on Equity subscribed and paid in cash at SBI PLR + 3% till termination date.	Payment for termination of an amount equal to Debt Due plus 100% of net present value of future cashflows to Equity computed at 17.95% on the date of Termination less due cash balance on the date of Termination. However, total Termination

		Payments as calculated above shall not exceed 1.5 times of the amount arrived at by removing the NHAI Grant from the TPC.
Indirect Political Event	Termination Payment of an amount equivalent to the amount of Debt Due plus 100% of Equity subscribed and paid in cash less due insurance claims, if any. If all or any of the insurance claims are not admitted and paid, then 80% of such unpaid claims shall qualify for being included.	Payment for termination of an amount equal to Debt Due plus 75% of NPV of future cashflows to Equity computed at 17.95% on the date of Termination less due cash balance on the date of Termination and due insurance claims. Further, if the entire insurance claim or a part is not admitted and paid, then a part of such unpaid claims will qualify to be included which will be equal to 80%. However, total Termination Payments as calculated above shall not exceed 75% of 1.5 times of the amount arrived at by subtracting the NHAI Grant from the Total Project Cost.
Non-Political Event	Termination Payment of an amount equivalent to 90% amount of the Debt Due less due insurance claims, if there are any. Provided that in an event some insurance claim is not admitted and paid, then 90% of such claims shall qualify for being considered.	Payment for termination of amount which is equal to 90% of the Debt Due less due insurance claims, if there are any. Considered that in the event some insurance claim is not admitted and paid, then 90% of such claims should qualify to be included.

The termination payment sub clause has been revised in 2005, 2006, 2009, 2017 and 2020. The 2020 MCA states that if termination is due to a non-political FM event, the Authority will be obliged to make a payment for termination which will be an amount equivalent to 90% of the debt due less insurance cover. If the contract cancellation is due to an indirect political FM event, the authority will be obliged to pay for termination an amount which will be equivalent to debt due less insurance cover, if any insurance claim forming part of the concessionaire's insurance cover is not admitted and paid, then a percentage equal to 80 of claims which are not paid will be included in computing debt due and 110% of adjusted equity. If termination is due to a political FM event, the authority should make a Payment for termination of an amount equivalent to debt due and 150% of the Adjusted Equity (NHAI, 2020).

Findings

The analysis done for the selected clauses explain how they have evolved over the time period for which the MCAs were studied due to various reasons. The major finding of this research suggests that changes in the clauses have been made to create a positive impression on the private players to improve their participation in the process. Efforts have also been made in the direction to make the concession agreements friendlier for the private players by making amendments in the document.

Conclusion

It can be observed that there has been a shift towards BOT Toll based PPP projects in the past 20 years. This is because of the thorough revised development of the Concession Agreement for the same. The major benefit of BOT Toll mode is that it has increased the interest of private parties in the highway development process. It also is an economically fair option as the users pay for the infrastructure and not the tax payers. Such developed MCAs have promoted aggressive bidding in roads and highway development. As it is observed, the changes made in the MCA have been in a direction to make it a fair process for the concessionaire and the government to participate in the highway development. The MCAs from 2001 to 2008 did not include the minimum number of days required for the parties to come to an agreement over any dispute. In the 2009 amendment, a proper dispute resolution procedure has been

implemented with an opportunity to claim reimbursement for the private players if both the parties do not come to an agreement. Standards like traffic volume, design capacity, etc., have been included so as to avoid doubts and disputes between the parties. As observed in the FM clause, the authorities are not liable to pay anything to the concessionaire if it is a non-political FM event. It can be modified where they can share such losses which will put both the parties in same financial position due to the occurrence of such an event. The termination payments have been revised in such a fashion that the risk is equally shared with the government and thus the private players don't back off from participating in highway PPP projects. Over the period, NHAI has enjoyed every opportunity to make changes in the project but this has changed with the 2017 amendment where the concessionaire has been given equal opportunities to make changes in the project's scope.

Limitations

This research is limited only to the analysis of the concession agreements of highway sector in India. Also, it lacks the critical review of each clause which is due to constraint of time. This suggests that there is further scope to continue this research in highway sector or in any other sector of infrastructure like airports, ports, etc., which use PPP for its development.

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STUDY ON INFRASTRUCTURE COMPONENTS OF PRIVATE AND PUBLIC SECTOR FOR ELECTRIC VEHICLES

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ABSTRACT

Purpose: To understand the need for the public and private sector integration to support e-vehicle manufacturers and contribute to production ramp up.Design/Methodology/Approach: For the purpose of this study, the following methodology has been adopted:Secondary Research – Electric vehicle manufacturer websites, articles, government websitePractical Implication: To enhance the economy generating jobs and a faster approach for adoption of electric mobility in the automotive segment at an economical price point which would increase overall revenue generation.Originality/value The research paper focuses on the integration between government and private entities from an infrastructure stand point and to grow exponentially to cater top production ramp up based on industrial buying behavior.Article Classification: Research Paper.

Keywords: *Electric Vehicles, Private Sector, Public Sector, EV component, revenue generation, industrial buying behavior*

Introduction

The research paper dwells on the correlation between the government entities and private sector companies to ensure that the eco-friendly approach is taken, the country's economy booms, employment is generated, less reliance on imports and more stress on made within the country such as Made in India initiatives. Since many prior papers, focus on the aspects of supply chain integration with regard to both Vertical and Horizontal Integration along with analysing the trends in the industry to cater to the production requirement and update in technology. The paper would cover various aspects from understanding product recovery behaviour to up-scaling production to profit generation keeping in mind eco-friendly methods and sourcing components. It walks through the life of the daily use of an electric vehicle and forward planning, for which 6 companies have been reviewed. The paper goes on to describe the impact of the EPR Norms, the expenditure from an enlarged perspective of the finances required to sustain an electric vehicle. Though research under limitations cannot focus on an in-depth analysis of what type of battery should be considered from an engineering stand point of view in this paper. There are research papers that talk about the governments of certain countries and their work towards implementing electric vehicles.

Literature review

This research paper begins by traversing the precarious market of product recovery and the important role it plays in characterizing the impact on business. In terms of impact, the industry can expect a threefold process producing the product and then as part of product recovery, the manufacturer is able to reuse the materials from the final good back to manufacture more. This would help reduce waste and assist in the recycling policies of the government.

Product Recovery Market:

A higher level of product recovery is found in products that are highly valued industrial products. (Rogers and Tibben-Lembke, 2001)With reference to the current research, the paper will focus on vehicle engines. Logistical activities these days are mainly concerned with the supply chain that starts from sourcing of components, moves to the manufacture of the parts and then movement of the part to the destination whether it be the distributor or reseller. The roles would now need to be reversed to handover the final good from the consumer to the manufacturer. In case of OEM's, it is expected that reverse logistics is made possible via various channels of communication which in many cases could even be outsourced. (Inderfurth, 2005)

From the profitability point of view in this sector, the remanufacturing business is the key

driving factor that engages profitability (Guide, 2000). This statement is especially true for countries that have their environmental norms as priority and any further development in any sector must follow as per the strict guidelines / extended producer responsibility norms. Organizations should note that re-integrating the final goods would mean adding the manufactured product back into the supply chain process after the product has been consumed / used. Profitability of the service and revenues generated will have a direct bearing on costs of production as the primary point and as a secondary point the recovery process through which the product is brought back into the supply chain will also have to be scrutinized. With profits being a relative term and markets bearing demand uncertainties, it would depend on current market prices, especially in forward logistics.

Focusing on the fact that the market is unpredictable, taking into consideration the concept of reverse logistics, manufacturers are forced to deal with a share of uncertainty in the market. The situation can be influenced by any of the following factors: firstly could be timing, secondly quantity and quality of the returned product must be considered. Moreover, taking the case of manufacturers having multiple product lines among its product mix there is a potential uncertainty with regard to the variety of products / final goods that would be recovered eventually.

Due to the manufacturing involving itself across the 3 steps and back that is production, manufacturing and disposal, there lies a potential for the costs to increase. Beyond this, a further increase can be expected as the product waits in inventory due to which holding costs would rise and because of this the lack of sending or receiving new products for which the company would not be able to meet the demand.

A deterministic approach alone would not suffice to understand the economics of remanufacturing, that is the entire process from start to finish and getting the product back and to add to this the impact for the recovery behavior. (Ferrer and Whybark, 2003)

Production Enhancement

Moving to the feasibility if increasing the / scaling up the production to a global level and at the same time ensuring a smooth integration both at a vertical and horizontal level. This concept would provide an idea for manufacturers to calculate the time it has taken from the start of production all the way to the time it is withdrawn (Wlazlak, Säfsten and Hilletofth, 2018). Shorter lifecycles of products within the product mix combined with fierce global competition, especially in terms of pricing will drive organizations to enhance the operating procedures and not lose out any amount in transaction costs (Glock and Grosse, 2015). However, from the perspective of New Product Development, the inter dependence between decisions must be noted according to research. These decisions are generally taken in the board room before the Product Development stages begin and before the idea of enhancing the supply chain to cater to the increased production is conceived. Furthermore, only a handful of articles consider treating possible issues in the supply chains from the supplier's side.

From the most recent research, it is notable that ramp-up at the OEM is treated as an engineering problem that develops various quantitative models. Therefore, there is an evident need for more studies that would consider managerial issues as well as the integration between OEM and suppliers which takes place prior to the production ramp-up.

The key to a successful increase / ramp up in the production line is highly dependent on the level of integration of the OEM supplier, especially during the phase that lies before the production is increased. Some of the key points to be kept in mind are noted below:

1. The pre-production stages that the OEMs must consider in case of New Product Development.
2. Integrating the perspectives of OEMs and the supplier to ensure that the challenges are met and that both parties are proceeding harmoniously.
3. Holding a board meeting to get a management perspective
4. Acknowledging the importance of suppliers in the integrating process along with ensuring

that all the changes to be made are carried out before the production process begins

Considering the requirement of connecting suppliers within the supply chain for technology based manufacturers, integrating companies for electric vehicles is almost mandatory. Depending on the company's budget and spending ability, they can either decide to vertically or horizontally integrate whether it be buying share in another company or take over or joint ventures. According to research conducted under New Product Development, manufacturers prefer to invest time, money and energy on engineering than to focus on supplier integration as the end result may not be viable. If supplier integration is optimized, the delivery process will be scheduled and transaction costs can be reduced to a minimum.

Barriers to environment friendly innovation:

This brings me to how we can overcome barriers that exist in adopting environmentally friendly innovations through design and strategy. I will begin with analyzing the practical and social implications. The research paper looks at the domain from a practical standpoint, the research papers aims to ensure that despite turbulent markets forced on by an unpredictable market and furthermore by an ever evolving technological environment (Naor, S. Bernardes, T. Druehl and Shiftan, 2014). The framework that was built on the crux of sourcing components to build an electric vehicle can measure the change in trend of the emergence of electric vehicles into fleets and hence forth would be the ideal tool used in the electric vehicles ever-changing market.

To understand the social implications of such a change, the research paper delves into the impact of the social city idea in incorporating servicing spaces / stations dedicated to electric vehicles and furthermore, to enhance the production by increasing the skill set involved along with a direct increase in its production capacity. This would in turn increase the jobs provided to local city populations thus boosting the production by the manufactures and further developing the appropriate skills required. This direction is necessary, to ensure the sustainable production capacity along with a ready guideline to scale up any existing operational model.

The estimate for the number of connected cars targeted towards global markets has come to approximately 249 million over next eight years (Gissler, 2015). An estimation was also provided by one of the leaders amongst the top consulting firms in the industry, taking into consideration modern business models, the industry over the next 10 year period would grow exponentially to an approximate net worth of $1.4 trillion.

With evolving technology bringing IoT to the forefront and in the same context enhancing big data to forecast more accurately trends in the industry, which would eventually generate opportunities for start-ups to make a name in the industry (Müller and Jensen, 2017). One of the biggest examples of such a trait was brought about by Tesla, a new entrant which utilized the strategy of having the first mover advantage by offering services that the competitors had not yet been able to cater to. Elon Musk in this case relied on innovation also attracting funding.

Component Sourcing

Immense focus over previous research papers has been given onto understanding the market, whilst little focus has been provided to the sourcing of components and the impact it would have on the entire value chain. From an operational standpoint, there are 4 features that would be key to catering to an emerging market which would require a boost in the production lineup (Graham, Burns, Hennelly and Meriton, 2018):

1. For suppliers that are locally producing goods, for its target customers would have the ability to take advantage of the capability. Sourcing hyper locally can help to ensure better quality goods being put into trade and being delivered in the least possible time.
2. The method through which the suppliers can be integrated amongst themselves.
3. Managing the sourcing of components amongst suppliers.
4. The capacity of the firm to carry forward the roles of marketing in sync with technological changes in the IT domain to ensure the enhancement of the sourcing process.

The sudden and immediately effected market changes mixed with the fast pace of technological innovation have been a deciding factor in shaping the future of electric vehicles (Zhan et. al., 2017). From innovation brewing in the domain of servicing to the latest trends followed amongst owners of electric vehicles combined with addition of the latest technologies the industry has to offer would have major emphasis towards transaction costs to keep the loses minimum and furthermore increase the operational capability. The traits presented above would bring to the forefront 2 main points of effectiveness which when combined with efficiency is very powerful.

New market entrants which are in most cases smaller companies that are able to adapt to the trends in the industry in a much quicker way have had the competitive advantage as compared to existing Stallworth's in the industry. Countries like China, United States, parts of Asia and the rest of the world have also initiated multiple strategies to encourage such growth in the sector. Taking into consideration, examples of countries in Europe, where the countries themselves through the funding from the public via taxes is able to invest into the research and better development of the Electric vehicle technology. This in turn provides companies the opportunity to become market leaders and eventually increase their share especially considering the electric sports vehicle domain.

Taking into account of the most important factors that would form a basis to the organization would be the sourcing of new components into the company along with the decisions taken on procurement of the resources to cater to the production line. In this case, the organization would effectively have to optimize its decision making process and define accordingly the areas that would add value in case the firm decides to either complete jobs internally or externally and furthermore acquire companies vertically in the chain or horizontally keeping profit margins in mind.

As per project Editha, results have shown through analysis that in the field of electric vehicles on the key traits would be sustainability. The project was aimed to prove that daily use and operational costs would come to a minimum (Wagenhaus , 2015). In this regard, the project reviewed the efficiency and the low cost of electricity combined with maintenance.

Through the first iteration that was created in the form of a prototype, research suggests that on a base level in most of the organizations existing vehicles are being used to convert into electric mobility cars which would be sustainable for the usage on a daily basis.

Keeping in mind the battery capacity of the electric vehicle, the weight of the electric vehicle would bear a huge role in terms of the types of components chosen in sourcing for manufacture of the car. In line with this ideology, as part of the research, light weight parts were chosen with regard to the DC Motor which would assist in the generation of power to the wheels through the battery and the planetary gearbox to ensure that mileage is maintained, making the end product more viable and economical to the user. These decisions would in turn increase the driving capabilities of the vehicle.

The paradigm shift from internal combustion engines to electric vehicles that are based of electricity generated through batteries, upon research has proved to be highly efficient and cost effective.

Due the multiple recharges of the battery and low operational costs which include cost of electricity and maintenance, the life cycle has increased multifold which also yields a profit, making the concept viable. The user group plays a huge role in testing, due to the manner of usage of the product. Electric vehicles in general are more delicate as compared to internal combustion engines, which are highly rugged.

Governments of various countries have put out tenders and even implemented laws in place to encourage the growth of the transport industry moving towards the electric mobility domain. Public and private sector joint ventures have become the new norm to ensure mass production can be implemented as easily as possible (Szyja , 2015). Here enclosed are a few pointers that would assist the process:

Firstly, the primary goal would be to ensure an increase in the amount of renewable energy used resources used, as compared to non-renewable sources. Transport, contributes towards one of the main sources and has a huge

potential. Public transport would be the first step in this direction in line with government initiatives which would even prove beneficial to the environment. The standard of living would also change amongst various societies.

With better networking of roads and more modern forms of transport coming into the industry moving towards electric mobility, the dependence on private transport can be heavily reduced and in this approach, the expenditure on transport in itself would be made much more cost effective and efficient. Electric railways in the form of metros can also be promoted in this regard.

Lastly, every country has its own environmental policy and a development plan to move forward in an ecological approach giving priority to the environment.

Transactional Integration

Integration from the demand side is an important perspective to be kept in mind especially during production to eliminate or reduce transaction costs. Programs have been initiated in organizations with the main goal of increasing efficiency looking from the perspective of demand side help in limiting or controlling the amount of power used thus saving costs (Schmidt, Lauven, Ihle and Kolbe, 2015). To optimize the entire process from an operational standpoint of view, load shifting plays a huge factor along with peak clipping to ensure that there are no peaks and troughs in the demand cycle and the machines as part of the operating cycle are effectively used.

To ensure high electric mobility, the supporting infrastructure would have to be of a high level too. With the same concept of mass production and, if electric vehicles are parked together the entire parking lot can be charged at the same time which would be highly efficient in terms of cost, capacity and many more factors. Economies of scale would be applied in this case with mass charging of electric cars.

Viewing usage of an electric vehicle from an operational point of view, charging electric batteries through usage of a grid-system would be highly effective and efficient. The trend to forecast energy usage can be achieved by gathering the data from the confirmations of customer orders, the due dates promised by the companies to deliver the vehicle and eventually the arrival time of the new stock into the lot.

Through a pricing lens, two options are generally available to electric vehicle manufactures at the moment: one would be that the manufacturer provides consistent pricing and discounts throughout the year, to avoid majority of sales clustered under a certain set of months while the rest of the years is close to null and the second point is that sales are put up regularly, this strategy works well especially in price sensitive markets. As discussed in the above 2 paragraphs, with research the core strategies that proved to work efficiently and effectively whilst remaining economical would be firstly smart charging, where chargers are placed every certain amount of distance, a trait especially followed on highways and secondly, vehicle to grid charging, which can be followed in cities where mass vehicles come together whether it be work places or even shopping malls.

In an operational sense, the organization would be able to boost profitability and minimize transaction costs through demand side integration, thus even reducing electricity bills and yet catering the customer's requirement.

The research paper would now revolve around the standpoint of day by day use of electric vehicles in the structure of a vitality the executive's framework (Melo, Trovão, Antunes, Pereirinha and Jorge, 2015).

Various activities, concentrated on EV, HEV and PHEV, which incorporates transports, vehicles and even vans, created more than quite a long while, have brought about cleaner, monetary and less loud vehicles, not many of which are monetarily accessible. Advancements that are intensely founded on request touchy evaluating techniques have end up being essentially viable in adjusting the examples of day by day power use. Moreover, request touchy estimating procedures are required to turn into a standard of valuing component which contributes in keeping up the electric framework security and its unwavering quality at an essentially decreased expense.

In conclusion, EB can conceivably decrease vitality costs by around 35 percent for a similar versatility designs. In addition to the fact that this is sparing huge, however it adds up over 2,6 euros as far as total worth.

The Energy Management Perspective

The research paper, now focus on the outlook of daily usage of electric vehicles in the framework of an energy management system.

Taking into consideration 6 companies that have been reviewed that have given priority to the role that forward planning plays in their organization to suit and fall in line with passenger car trends. The organizations selected for this research are typically chosen by their robustness among production of passenger cars.

Ford over time has excelled at targeting the domain of cost-effectiveness of fuel from different aspects. To ramp up production, the company would have to turn the tide with modern technology which would eventually earn themselves access into budding markets that suit their target segment across the globe. From the perspective of growth and Ford's focus on increasing the size of its electric vehicle fleet, the company has entered into the domain of hybrid cars, due to which it has also seen a rise in sales to a multiplier of 1.5x. In the US alone, Ford has successfully doubled its market share in 2013 bringing its share to an excess of 15%. Over time the company has reviewed multiple joint venture options both public and private sector, to carry forward its business in the manufacture and research of batteries to be more specific that of Lithium. Ford as a company is known to commit themselves to industry and in that regard are known to have spent over $130 million to fund research into the development, production and maintenance of the major components of the current hybrid vehicles in production.

General Motors in the aspect of electric vehicles has been pushed to adapt, in a way due to guidelines set by the environmental commission. Committing to a migration from its current production line to a modern line for the production of Electric Vehicles would not necessarily mean that the move is financially viable. The company is in a precarious situation as it battles the unknown on 2 fronts: one is revised costing of its product line for which the target customer will have to pay and the second point and more importantly the response of the customer to the changes. General Motors have had a keen eye on the costs that are associated with the battery, at the moment the company is conducting research to enhance the efficiency of the battery and hence would plan to sell the product based on total cost of ownership and better return on investment. Thus the perception that GM was looking to build of is brand in the market is a vehicle which is cost-effective and delivers unique value, concentrated mainly in the US. The organization also feels, that incentives in the form of subsidies would be critical in assisting the organization with the move, especially in select markets such as that of China.

Toyota has stuck to Kaizen or Continuous Improvement, whereby the organization has moved with customer trends from IC Engines to a mid-point of Hybrid Vehicles and now slowly moving towards electric vehicles. The company has not made it profitable to be producing ecofriendly cars at a global scale and in the process have been able to cater to lower price points and even price sensitive markets. Toyota Motor Corporation through the company's production outlet in China has taken up multiple joint ventures to research in depth on the framework of the chassis. Due to the gradual shift of the company's product line to suit market trends both froma customer and environmentally friendly perspective, TMC has been able to spend more efforts and time on bettering their hybrid vehicles, leading the industry as the pendulum swings towards complete production of electric vehicles.

Honda in its drive to produce eco-friendly vehicles have entered the segment through the concept of compressed natural gas, hybrid vehicles and battery powered vehicles. The company has effected this strategy through its product ranges to notice the trend and furthermore, to avoid loss of market share by catering to any requirement. Honda have started a company that focuses on how they could reduce the impact on the environment from a vehicle and yet enhance the experience of their customers. Constant research on the weight and structure of the vehicle, paves the way for long distance travel at better fuel efficiencies. General Motors and Honda have even teamed up to survey alternate sources of power generation for the battery, with their primary focus on hydrogen.

Volkswagen, the German auto car manufactures, were late adopters to the process

and to safeguard sales along with uncertainties of when the shift to electric vehicles would take place, have decided to move into hybrid (petro – electric) vehicles. The manufacture boasts of the charge efficiencies, lower cycles to higher range and will be moving this technology onto the electric fleet too.

Renault was the last company researched on. The main reason the automobile manufacturer was picked was due to the record breaking sales in the Electric vehicle domain in 2012 within Europe. Upon feedback, the customers were highly satisfied and from an environmental friendly perspective, Renault had successfully launched zero emission cars and were profitable.

Secondary Research

India is currently designing the recycling policy keeping in mind tax deductions for the recycling companies, of Lithium batteries which are being used primarily for electric vehicles. The government encourages this, but yet ensures that onus is on the producers to abide by the Extended Producer Responsibility (EPR) guidelines. Batteries for electric vehicles are being made from different components such as aluminum, cobalt, nickel and lithium. From an Indian market perspective, these components are imported from countries such as Chile, China, Argentina and Australia who are the leading producers, costs India a huge sum of money in imports to the tune of $1.2+ Billion between the years 2018 and 2019, which in turn increase the cost of the final good sold to Indian consumers. Under the National Electric Mobility Mission Plan 2020, India estimates to be running an excess of 5.9 million electric vehicles, an amount which would cater to approximately 31% of India's motor vehicles. Research has estimated that the compounded annual growth would be in an excess of 16%. There exists a wide scope, for companies to invest in the industry of recycling of existing products which has a potential of crossing $290 Billion in just the Indian Markets over the next 10 years.

A 50+ Billion Rupee initiative, known as FAME (Faster Adoption and Manufacturing of Electric and Hybrid Vehicles) commenced with the ideology of driving electric mobility across cities. For the production line to use the technology of the battery and cater to the extensive requirement, Lithium batteries are costlier and comparatively are much heavier. Combined with its finite life and the shortage of raw materials has given rise for the onset of usage of materials such as Graphite & Aluminum. On average a Lithium battery is claimed to produce an approximate of 600 charge cycles. Multiple India based startups have come to the forefront of innovation by developing non-lithium batteries that can charge all the way up to its maximum capacity in the half the time or less, but has longer life reducing the Total Cost of Ownership and bettering the Return on Investment, at the same time following in line of environmental norms. In terms of pricing, the battery makes up an excess of 35% of the vehicles total cost, considering these initiatives would help India fulfil the idea of transitioning into the electric mobility industry by 2026. Market entrants such as Gegadyne, view this segment as a potential $4 billion by FY2022. Battery component manufacturers would foresee an extensive segment as the product can be implemented across industries from telecom to electric vehicles and so forth.

The office of Indian Prime Minister conceptualized a plan in 2019, which was provided with a budget in an excess of $1 Billion to safeguard the interests of Indian manufacturers and increase Made in India. The country is poised to take the spot as the fourth largest market in terms of sale of electric vehicles by 2040. Multiple joint ventures have already been setup to manufacture batteries locally and to procure lithium and other materials required from mines across the globe, with Australia being one of the countries that India has tied up with. From the passenger car industry, over 2.9 million petrol & diesel power vehicles would require to be replaced, top car manufacturers such as Tata Motors, Mahindra & Mahindra and Ashok Leyland aim to convert almost 1/3rd of their fleet into EVs over the next 10 years. To assist this process, the Indian Government also plans on reducing the tax that GST bears from 12% TO 5% on the purchase of an electric vehicle and from 18% to 5% on recharges for daily operation of the vehicle. The government would also require to spend an approximate of 13,500 Crores to build charging

stations, apart from those built by companies in the private sector, providing subsidy on the rates would be required for mass adoption. Enhancing connectivity between multiple locations, noting the high rate of connectivity in Norway, would reduce the government transport required and hence the associated investment. Furthermore, this could lead to increased dependence on public transport than private sector. The electric mobility sector attracts Foreign Direct Investment into the country, taking cue from Great Wall Motors of China who look towards expanding their investment past $1 Billion in Andhra Pradesh, generating employment for over 2800 professionals.

Taking into account the budget of 2020-21, due to high dependence cost on the battery of electric vehicles, automakers expect the 5% current charged as customs duty to be removed. On the back of even lower sales even for the upcoming BS-VI engines, the concept of electric vehicles has become much more prominent. The cost per kilometer for petrol vehicles would be in an excess of 6 Rupees, for diesel vehicles would be approximately 4 Rupees, for CNG vehicles would be around 3.2 Rupees whilst electric car owners would have to spend a little over Rs. 1.4/km.

Inference

The paper covers the viewpoint of Manufacturers in the Private sector and stakeholders from the Public Sector on the onset of electric vehicles and what the relationship is between the two entities. In some countries, the government due to environmental pollution has voted to reduce cars on the road and hence advocates for public transport which such as electric railways and buses or cycling. While, developing countries do not have that option and hence are the perfect target market for passenger car manufacturers. Due to a complete shift in trend, from IC Engines to Electric Vehicles and in between to hybrid vehicles, for existing manufacturers gradually change was the key. Yet, in certain cases such as that of General Motors, it would not be financially viable and hence alternatives would need to be tested, also government incentives and subsidies would be of huge importance to proliferate the domain of electric mobility. The literature review has reviewed the conditions globally, while the secondary research has focused on the facts and issues of that of India.

Limitations

Considering the fact that most research papers address supply chain complications and how they could be solved by horizontal or vertical integration. There also exists the field of performing an in-depth analysis of what type of battery should be considered from an engineering stand point of view. There are research papers that talk about the governments of certain countries and their work towards implementing electric vehicles. This research paper focus on the correlation between the government and private sector companies especially keeping developing economies in mind, hence the above limitations have been touched on, but focus is given to integration and how the work of either parties would benefit each other.

Conclusion

Upon traversing through various research papers, the governments of countries should open the economy to auto manufacturers to produce and sell electric vehicles by supporting them through funding, initiatives and subsidies which would further help in market development. In countries such as Sweden with a relatively smaller population, proceeding with emphasis on government transport is possible, but considering developing economies where a lot of jobs are to be also provided, ensuring a strong integration between the public & private sector is very important. In the previous papers, research focuses on how the problem of supply chain of electric vehicles can be dealt with through vertical or horizontal integration of the company or what the market requirement is with regard to the trends and needs of the industry. This paper focuses on the niche segment of the correlation between the government entities and private sector to ensure that the eco-friendly approach is taken, the country's economy booms, employment is generated, less reliance on imports and more stress on made within the country such as Made in India initiatives.

Initially, the research paper covers 2 important aspects that is remanufacturing which covers the entire process from manufacturing, to selling the product, to disposal and then to be used again for manufacturing. The second point is a cost effective approach which would further encourage startups to take up the cause or even existing manufacturers to proceed with the entire cycle. Taking cue from battery manufacturers who view India as a potential $3.9+ Billion industry for batteries. Graphene, a material made from carbon dioxide can be recycled and used once again for producing more batteries. Also looking at each component market, they are very vast. Batteries alone are used in almost every electrical appliance in our daily lives, since most of them use fuel cells. The research paper then touches on the process of integration and how manufacturers would require to ramp up production. Since the market is fast pace we also noticed the different ways companies have tackled these growing requirements with companies like Tesla being new entrants and coming in with ground breaking ideas that revolutionize the segment as opposed Toyota which would take time to adapt, but with the principal of kaizan, continuous improvement, it stays ahead of the segment in hybrids as it gradually shifts into electric vehicles. This is also in line with the industry trends as governments and multiple entities in the private sector are busy setting up charging stations to handle the requirements. At this juncture, the paper also discusses the point of cost-effective cars where Total Cost of Ownership has to reduce. This means that countries such as India who import materials such as Lithium increase the cost of manufacture of the battery which makes up almost half of the vehicle cost would need to be minimized, to increase the range per charge more research is required to ensure the framework of the car is as light as possible also from the governments side, they would be expected to increase / better connectivity between various locations to ensure minimal charging points need to be put up and maximum ground can be covered. From the public sector perspective models like FAME used in India have dedicated budgets in excess of 9,900 crore rupees for setting up charging stations as tenders for private sector firms to also invest. In view of countries that fall under the developing category Foreign Direct Investment should be opened up to ensure that the country would boom.

Touching on the idea of sourcing of components for electric sports cars and the impact it has on the domain, transaction costs need to be minimized and firms should forecast well to better their operational capability. The Editha project served as the perfect basis for most of the private sector giants that already exist in the industry and how they would require to change their production line to cater to change in trends despite the uncertainties of the segment. Demand Side Integration can be implemented in either of 2 ways: one is through smart charging and the other is through the Vehicle to Grid concept. Once again, unless there is a direct integration between the public and private sector the projects will not be able to be executed to perfection and due to excessive transaction costs, projects will not be able to take place and the drive towards eco-efficiency and effectiveness would take a much longer time.

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STATUS OF WOMEN DURING THE PERIOD OF SANGAM AGE

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ABSTRACT

Women constitute half the nation's population and their status in the society is an index of its civilization. Women's contribution to the development of the country depends on their active involvement and participation in development efforts. The status of women is a barometer of the democracy of any state, an indicator of how human rights are respected in it. Hence the status of women has become an important issue in national endeavours. All efforts should be made to recognise and benefit from the significant role women can play in the upliftraent of the society

Keywords: *Women, Education, Society, Opportunities, Status*

Introduction

The Sangam Age, is regarded as the "Golden Age" in the history of Tamil literature. The age of the Sangam is the age to which the Sangam literature belongs. Different scholars have expressed different views about the period of the Sangam Age. From the data culled out so far, the period of the Sangam Age is computed as second century. The literature of the Sangam Age are Tolkappiyam, Ettuthogai and Pathuppattu, and the twin epics, Silappathikaram and Manimegalai belong to the succeeding period, namely, the 'Post-Sangam' period.

Education

The Sangam literature extols the women of Tamil Nadu, for distinguishing themselves by their cultural attainments and virtuous living. A study of the literature of those days proves amply that women enjoyed a good deal of esteem and respect in the family and community circles. Describing the rights of women during the
Sangam Age that men and women had the same kind of freedom to get educated.
Thus women belonging to different social states and communities had received education.
The well known women poets of the Sangam Age were: Avvaiyar, Adiraandiyar, Vellividiyar, Kakkaippadiniyar, Nachchellaiyar, Kuraraakal Ilaveyini, Veripadiya Kamakkanniyar, Okkur Masathiyar, Kavarpendu, Ponmudiyar, Nakkannaiyar, Nanmullaiyar, Pukanuthiraiyar ,Bhudappandiyan Devi, Perunkoppendu and Pari Makalir. These women poets were of high calibre, although there were differences in individual capacities and inherent talents. Some even belonged to royal families.
In the Sangam Age,men and women poets and masters of learning trained their disciples in literature and communication. For example, Marokkathu Nappasalaiyar makes a respectful mention of her revered teacher, Kapilar , who himself had received sound training under a distinguished master. Thus from the earliest period, Tamil society has had eminent women poets. Much of their poetry is available even now.
Avvaiyar was one of the outstanding poetesses of the Sangam Age. The poetesses in Sangam Age were familiar with the arts and history of their times. For example, Vennikuyathiar explained the history of the war between Karikalvalavan and Cheraraan-Peruncheralathar in the following verse.

Kali iyal yanaik karikalvalavaI • •
Cenru, amark katanta nin arral tonra
Venroyl ninninum nallan anre
Kali kol yanar vennip parantalai, • • • • •
Mikap pukal ulakara eyti,
Purap pun nani, vatakkiruntone? • • • •
(Puram 66)

Art

In the Sangam Age music and dance were integral and inseparable parts of education of women. Art in any country, reflects the culture and civilisation of its people. Art is a field of human activity used to communicate to fellow beings, the meaning of experiences through which the artists had lived. Special mention needs to be made of Mutatthamakkanni who sang Porunararruppadai in praise of king Karikalan, Kakkai Padiniyar Nac-Cellaiyar

sang ten verses on prince Adukotpattu Cheralathan who in turn, presented her with nine weights of gold for making trinkets, besides 1,00,000 gold coins. From time immemorial, dance has been an art, in which participants express emotions which surge through the hearts by physical signs. A dancer who knows the art of expressing her emotions was called,'Virali*. The Viralies were dancing rhythmically, with full exressions depicting the meaning of the poems and made the people happy. The Sangam literature has ample evidence for the fact that many women had distinguished themselves in the art of music.

Women, by nature, were tender with sweet voices. Even the beasts of the forests were charmed by the music of women. Kurinchi was the hilly and mountainous region where hunting was the main occupation of the people. 'Kodichi' was the name for the woman of Kurinchi region. She was also called 'Kurathi'. A Kurava girl sang the "Kurinci-P-Pan", a melody native to the Kurinchi track, so sweetly, that an elephant which came to forage the ripened ears of Tinai corn, was fascinated by the music and fell into slumber.

Regardless of the region, girls who were engaged in plucking flowers, used to sing songs. Ainkurunuru describes

Venkai Koyyunar Panchuram vilippinum
Ar itaic celvor aru nani verrum

(Ain 311)

When pounding rice and millet corn the women resorted to a particular variety of songs, namely, Vallaippattu to forget the fatigue, during the course of their strenuous work.

In Malaipadukadam,

Tinai kuru makalir icai patu vallaiyum, • • • • «
(Malai, 342)

The dance mentioned in Sangam literature is Thunangai. This dance,Thunangai was the special feature of the rural festivals, and was often associated with the numerous mock fights that were under taken by sturdy warriors during the festival occasions.

A National Committee on Women's Education was appointed by the

Government of India in 1958 to go into the difficulties that hindered the progress of girl's education and to make recommendations in order to bring girls' education at par with that of boys. In essence, the measures this Committee suggested were top priority for the expansion of girls' education at the elementary stage; campaign against the traditional prejudices against girls' education; appointment of women teachers; on demand separate schools for girls at higher secondary stage; incentives; special central assistance to all stages till 80 per cent of girls in the age group 6-11 are enrolled, earmarking special fund by UGC for higher education of women; and establishment of a National Council for Women's Education.

To expedite education among the girls of the Scheduled Castes and Scheduled Tribes, additional facilities will continue to be provided under the "Development of Backward Classes" sector. Girls above the matriculation stage will get higher scholarships/stipends than boy students. Financial assistance is envisaged for construction of hostel buildings for girls at the district level and for purchase of equipment, furniture, utensils, books and periodicals in these hostels.

Between 1951 and 1981 the percentage of literacy among women had improved from 7.93 per cent to 24.82 per cent

Occupation

Women in the Sangam Age, engaged themselves in many occupations, earned their living and thereby improved the economic standards of their families. In the hill regions, women helped to guard the 'Tinai corn' and harvested, the sweet potato. In the pastoral regions, women prepared curds and ghee and sold them. In the coastal regions, women dried fish and marketed them. They drove away the birds from the fish which were spread out for sun drying. They were experts also in selling salt. While the common occupation for women in the Sangam Age was home making, combined often with agriculture and animal husbandry. The duties of the housewives included running the home, cooking and other chores, spinning, weaving and bearing and rearing children. Some women with special talents and inclinations, became dancers, songstresses and players on the harp. A majority employed themselves In less rewarding occupations such as mat-weaving using palmyra leaves; washing and laundering clothes and as care takers for children, namely,

governess and nannies. The part of the country fit for agricultural operations was called 'Marudam'. Agriculturists were the 'Uzhavar* and their women were the 'Uzhatthiyar'. Several poets of the Sangam Age have sung in praise of the nobility of Agriculture as profession. Another important participation of women in the Sangara period, particularly, by those belonging to the Yadava Community was to carry prepared milk products like curds, butter and ghee, on their heads to different places for sale. They were the vendors of milk and milk products. Women in the coastal regions of Neytal, engaged themselves in salt making, drying and selling the salt.

Weaving was a prominent occupation for women next to Agriculture and cattle breeding. A remarkable measure of skill had been developed in the Sangam Age in the art of weaving cotton and silk cloths. Dresses of different colours were made in Tamilaham as evident from the classics, Purananuru, Pattinappalai and Madurai Kanchi . Embroidery work was employed often to embelish the clothing. In Porunararruppadai a reference has been made to the fine dress made of silk. Well designed borders were provided for the silk sarees. Spinning of cotton yarn was undertaken with care. Women, particularly widows, were engaged in spinning on a large scale. women were expert in grinding the sandal paste and other fragrant pastes. Some women were engaged in preparing, filtering and selling toddy and wine. They were called "Ariyar Pendir". Women were engaged in fine arts such as music and dance. They earned their living by singing and dancing at public places and at times in the royal courts. By singing songs, the Padiniar received gifts from the kings and chieftains.

Women in the Sangam Age were reputed to have fostered lofty ideals of military valour and heroism. Young women from the Mullai tract preferred to marry only those heroes who came out successfully in the bull fighting game. Girls with long beautiful tresses could be won only by heroes who had mastered the bull.

Patriotism

In the Sangam Age, women were brave and patriotic. For example, a brave woman had the misfortune of losing her elder brother and husband in battle. Her elder brother was killed by an elephant and her husband died fighting yesterday's battle; she had only a young male child left in the family. She dressed him in white, arranged his tuft, put a lance in his hand and directed him towards the battle field. Women in Tamil Nadu, who once had such a glorious position in the Sangam era, lost it gradually degrading into deplorable poverty and ignorance because of the ravages of the times.' Invasions and alien rule had deprived them of their status and freedom.

Ponmudiar, the women poetess, referring to the warrior child said, "It is ray prime duty to bear and bring him up, it is his father's duty to make him a virtuous man, it is the duty of the black smith to provide him with a lance; it is the duty of the King to teach him how to conduct himself (in war). It is the son's duty to destroy the elephants and win the battle of the shining swords and return victoriously. This is a fair apportionment of duties, quite in keeping with the military traditions. When Pari died, his daughters sang a song which showed their immense patriotism.

Arrait tinkal av ven nilavin, • • • •
Entaiyum utaiyera; em kunrura pirar kolar; • • •
Irrait tinkal iv ven nilavin,
Venru eri muracin ventar em" • • —
Kunrum kontar ; yam entaiyum ilame!
(Puram, 112)

Political Participation

There are many references in Sangam literature about Avvaiyar who went as an Ambassador to Thondaiman. Avvaiyar went to the Chieftain Thondaiman, who showed her, the room where he kept the array articles. After seeing the display of arras, Avvaiyar told him that the articles were so sharp and new, while her king Athiyaraan's were blunted and broken. This meant that the articles were not in use in Thondaiman's palace, but her Chieftain Athiyaman used them for war which showed his bravery and valour. By her shrewd and intelligent arguments, she was able to avoid a war between these two kings.

As the first step in involving women in the national struggle, Mahatma Gandhi encouraged his wife to participate in the political activities in South Africa. Along with her, a host of

women participated in the struggle, were arrested and sentenced to three imprisonment. Mahatma Gandhi sought the cooperation of women in his non violent struggle for the freedom of the country.

The Civil Disobedience Movement came as a golden opportunity for the women of India, who were waiting for the call to join the Dandi march. Gandhi nominated Sarojini Naidu to lead the raid on the Darshana Sat Field, she was followed by Kamala Devi Chattopadhyay, Hansa Mehta and many others. At Allahabad, Swarup

Rani Nehru, mother of Jawaharlal Nehru received a severe lathi blow from the hands of the police.

The Government of India set up in 1986 a Standing Committee at the national level to make recommendations to the government on various policies and programmes required for supporting women entrepreneurs and tapping their talents for the growth of the economy. At the state level, the 'Tamil Nadu Corporation for Development of Women (TNCDW)' was set up in 1983 with the main objective of promoting employment opportunities for women and to take steps for improving the educational status of women. The State's Social Welfare Department also implements various new welfare programmes such as: Aid for widow remarriage, Aid for widow's daughter's marriage, Free school uniform, Helping financially backward women to get loan from nationalised banks, Muthulakshmi Reddi maternity finance assistance scheme, Free education for poor girls and Reservation of 30 per cent of jobs for women.

A notable characteristic of Tamil Nadu is the high rate of female work

participation, particularly, in the unorganised sector. The factors responsible for the female work participation are poverty and socio-cultural reasons in conjunction with the divisions of labour within the house hold for domestic work and child care. Today, earning is a primary necessity for millions of women. Under the compulsion of economic conditions, women have even bypassed all the traditional and familial antogonisms towards work. Participation of women in economic development and social progress, is indispensable for the eradication of poverty and the management of resources in the farms, homes and factories.

Conclusion

The most significant event in the movement for women's political rights in India was the demand of equal political rights made by a delegation of distinguished women led by Sarojini Naidu to the British Parliament in 1917. The ’Self-Respect Movement' started by Periyar, E.V.R. Naicke in Madras created an intellectual awakening in the society, which favoured the uplift of women among other salutory efforts. Periyar policies for women are being faithfully followed by successive governments

Despite all the limitations that a working woman faces, every woman wants to be a worker, contributing to the society in a large or small measure. Women have to prepare themselves psychologically to be more effective members of the society. 'Every woman who has the privilege of education must be willing to rough it out, if necessary to share with man, the task of shaping the society. This alone will remove the stigma of dependency attached to women and ensure respect and dignity and ultimately enhance the 'Status of women'

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