

BLOCKCHAIN & ANALYTICS IN HEALTHCARE: INDIAN PERSPECTIVE**Erika Patel¹ and Gurudas Nulkar²**

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ABSTRACT

The purpose of this paper is to analyze Indian healthcare sector in order to suggest patient centric approach of blockchain. This paper talks about scope of Electronic Health Records (EHR) in India by primary and secondary research. Also check technologies adopted by Indian healthcare startups. The primary research is done by interviewing medical professionals and normal people (to be considered as patients). The secondary research is done by analyzing white papers of consulting companies, research papers published on Indian healthcare & referring to the official website of government. The research analysis will provide Indian public's perspective for the adoption of EHR and step by step guide to make adoption possible. A comparison with other countries will provide challenges for India to adopt the technologies. An overview of startups will provide the solutions and path for the adoption of blockchain. Feasibility of Electronic Health Records with analytics/blockchain can make the system more responsive and increase interoperability. A proper combination of Indian healthcare startups which are using latest technologies and healthcare providers can make the adoption of blockchain process easy and quick. By looking at the current scenario of India, India should adopt digitization, then EHR and lastly blockchain. How Indian healthcare startups can make the process fast and easy is discussed.

Keywords— Blockchain, EHR, Startups, Healthcare, Patients

INTRODUCTION**A. About Blockchain**

Blockchain has penetrated and reshaped most of the industries by its unique characteristics of decentralization, security, immutability and anonymity. Blockchain word was aired in public when it was used as public transaction ledger for cryptocurrency bitcoin. Blockchain is a secured and immutable digital ledger which records transactions of connected computers without any authority [1]. This paper first discusses about brief working of blockchain followed by the usage of blockchain in healthcare sector in detail. In a traditional centralized database, we store data in an external source of fixed storage capacity like gigabytes or terabytes which has many limitations on portable storage. But as the name suggests, blockchain is a chain of blocks and each block stores data. The blocks are connected by a hash (digitally encoded by different symbols and letters). It can be implemented in the following 3 ways:

1) *Private blockchain*: Private blockchains are permissioned blockchains, where limited access is given to some specific group of people. Example of applications includes bank services.

2) *Public blockchain*: Public blockchain provides open source to public for data access. Anyone can add and access data without any

prior permission. This blockchain is based on Proof of Work (PoW) which means that there is a consensus on the network. Some examples of application of public blockchains are Bitcoin, Ethereum, Dash.

3) *Hybrid public-private blockchain*: Hybrid blockchain is also called federated blockchain in which the transaction may or may not be public. It is a combination of public and private blockchain.

A. Blockchain in HealthCare Sector (Patient Centric Approach)

Talking about blockchain in healthcare sector, this sector has sensitive data of patients and the data size is enormous. Healthcare sector is evolving with time and focusing more on patient by adopting patient centric approach. Blockchain enables patient driven interoperability [2]. A patient centric approach of blockchain will benefit both the patients and businesses (business includes hospitals, pharma industry & insurance agencies). Below is the list of usage of blockchain in India which shows advantages of using the blockchain with respect to patients and business/provider (pwc report, 2019).

1) *Advantage*: Patient admission

a) *Patient perspective*: Patients will be given an access to share their data to relatives or any other concerned persons.

b) *Provider/Business perspective*: It is easy to communicate details related to patient admission to relatives. By using unique patient ID, past data can be easily retrieved. Internal integration activities like cross department communication, information system becomes easy. External integration activities like lab related services or insurance related services become easy.

2) *Advantage: Documentation*

a) *Patient perspective*: No need to store and carry prescription pages when patients go to clinics. It makes the process smooth for patients

b) *Provider/Business perspective*: Secured record storage and documentation helps to retrieve patient's data whenever needed to take precise decision. As the data is immutable and secured, patients can be treated by any medical professional as it is easy to check patient's history on the blockchain platform.

3) *Advantage: Clinical investigation*

a) *Patient perspective*: Patients can track their own progress report. Assume that patient is having diabetic issue then by observing his report history from blockchain platform or by observing level of sugar over years, he/she can take decisions for the better improvement.

b) *Provider/Business perspective*: Cost cutting by preventing already done test again. Real time data can be available from outsourced lab which helps to take quick decision and eventually provides quality service.

4) *Advantage: Clinical diagnosis*

a) *Patient perspective*: By perfect diagnosis of clinician, patients can get treatment fast and also it reduces stay of patients in hospital. Patients refer this diagnostic centre/hospital to relatives also.

b) *Provider/Business perspective*: By analysing available data, clinical diagnosis accuracy can be increased and that helps industry to establish its own name in the market.

5) *Advantage: Treatment & medication*

a) *Patient perspective*: Personalised medicine tracker ensures medication compliances and adherence of prescribed medicines. Also creates trust in patient's mind.

b) *Provider/Business*

perspective: Automated tracking of medicine helps to reduce drug counterfeit. Automated tracking of replacements, blood bottles, organs for transplantation.

6) *Advantage: Monitoring*

a) *Patient perspective*: Health devices or tracking devices in the daily life help patients to remember their diseases and prevent consumption of any prohibited items. It provides remote connection with the clinician whenever they need.

b) *Provider/Business perspective*: Remote monitoring is possible by using application or health devices which integrates data on the common platform and makes process easy.

7) *Advantage: Discharge*

a) *Patient perspective*: Integrated solution helps patient for after discharge services like rehabilitation, nursing care etc. It takes shorter time to complete discharge formalities as at every stage & the data is stored on the blockchain platform

b) *Provider/Business perspective*: Helps to do speedy planning of resources required in case of similar medical problems.

8) *Advantage: Health insurance*

a) *Patient perspective*: Automated verification can be done from patient's digital profile thus saving time. It is possible to claim benefits provided by government by using a secured and automated channel

b) *Provider/Business perspective*: Automation helps to integrate process where payer is paying timely gives satisfaction and reduce cost of delivering healthcare. Fraudulent claims can be easily captured

9) *Advantage: Payment*

a) *Patient perspective*: No need to carry cash. Cashless transaction

b) *Provider/Business perspective*: Digital payment system reduces fraud and create trust under a unified payment system

From the above highlighted advantages of blockchain, it is clear that block chain is important for both patients as well as businesses. The first step to adopt block chain is to use analytics which in turn needs digitization first. Digitization is the conversion of analogue

process, service or products to digital environment [4]. There are 5 definable stages transformation. First, an analogue content which is in paper form should be presented in digital form. The second stage is about communication between sender and receiver, which is bilateral. In this stage, two or more individuals can interact with each other via any texting tools. The third stage involves analysis of data, that is done by digital processing. In the fourth stage, objects will communicate patient's information with each other, e.g. the blood pressure testing machine will check patient's information from the EHR, use the information to find out the right combination of dose for the patient and then it will transfer the information to EHR to maintain the full history. The last stage will work upon deep learning algorithms. That will get the input, process the data based on algorithms and models and gives output for the patient. This will work completely based on the different models prepared by human. If there is a new pattern for which stored algorithms can't be used, that will be considered in future process [5].

But to understand the implementation of blockchain through analytics and digitization in India, first we need to understand the Indian healthcare scenario.

B. Indian Healthcare Scenario

Indian healthcare sector is mainly divided into two parts: public sector and private sector. Public healthcare includes primary health centres (PHC) in rural areas, limited number of secondary and tertiary hospitals run by central or state government. Private healthcare sectors in India covers majority part of Indian healthcare with main focus on metros, Tier I, Tier II cities.

Indian healthcare sector mainly consists hospitals, clinical trials, health insurance, pharmaceuticals. Talking about market size of healthcare industry in India, it can increase to \$133.44 bn by 2022 [6]. The government spending has also increased to 1.4% in 2019 from 1.2% in 2014 [6]. Hospital industry accounts for 80% of total healthcare market. At present, India's expenditure on health is low and is only 1.28% of GDP. Government is planning to increase the same to 2.5% of GDP

by 2025 [6]. India's main advantage for this industry is large pool of trained medical professionals. Compared to peers in Asia and western countries, India is cost competitive. India stood at 145th rank among 190 countries in quality and accessibility of healthcare [6].

In 2017, the e-Hospital program was launched in India by the national informatics for better accessibility to healthcare and to improve the healthcare processes. This platform uses digital mode to record the medical history of the patients. That data can be utilized by doctors to take any medical decision which eliminates human error. Several e-initiatives which use data analytics are taken in India that includes mission "Indradhanush", an innovative mobile phone technology to identify areas where children are unimmunized.

As per the Indian Society for Clinical Research (ISCR), hospitals in India have started adoption of EHR. But it is not fully implemented in clinical research. This paper talks about how India can take steps in the direction of implementation of blockchain by adopting EHR.

C. Digital Mode (EHR) & Role of Startups

It is expected that 2020 would be an era of digitization for India. It has huge advantages. If that data is stored on electronic paper instead of physical paper then it will reduce time as well as cost for the business. The burden of bringing and carrying history files during critical time will be reduced for the patients as well. This process of storing data digitally is called digitization and that digital data is called Electronic Health Record. The office of National Coordinator for Health Information Technology (ONCHIT) had issued a roadmap of shared nationwide interoperability, in which critical policy and technical components are mentioned which is required for nationwide interoperability. It also includes secured network, verifiable identity and some other requirements. However, established technologies are not addressing these things clearly as they have security and privacy limitations. So, the data security is of major concern. As the data is sensitive, this is more likely to be hacked by hackers for any financial or personal purpose. In such critical cases,

blockchain technology helps by providing a solid structure which provides a barrier for healthcare data so that cannot be misused.

Though physical mode is still being used in most of the parts of India, some healthcare startups have adopted industry 4.0. Medikabazaar, Mediklik, MeraPatient, DRiefcase are the examples of startups which have digitized medical services. With the help of digitally advanced startups, Indian healthcare sector can adopt EHR and eventually blockchain.

RESEARCH METHOD

This paper includes primary and secondary research for EHR implementation in India as well as secondary research related to healthcare startups in India.

B. EHR: The Primary & Secondary Research

1) *Primary Research*: The purpose for this research is to understand whether people are aware about electronic mode for storage of medical data, to validate their perception about new technologies and at last whether they will accept blockchain if it will be implemented. The primary research is done by distributing questionnaires to medical professionals and to normal people (to be considered as patients) of different states of India. The medical professionals were selected by snowball sampling. And for selection of patients, convenience sampling is used.

a) Sample information

- *Sample size*: 150 from 13 random states of India (Gujarat, Andhra Pradesh, Telangana, Maharashtra, Karnataka, Tripura, West Bengal, Jharkhand, Pondicherry, MP, Tamil Nadu, Delhi, Bihar)
- *Medical professionals*: 44% (66) (it includes doctors, nurses working in the hospital or have their own medical clinics)
- *Patients*: 56% (84)

b) Questionnaire

The aim of questionnaire was to understand acceptance and awareness factors of Indian people. Also, how they perceive electronic mode for storage of medical records. There are different aspects measured in questionnaire: difficulties in existing physical mode of medical records, their view about electronic

mode for storage of medical records, behavior to change from paper to digital mode (ready to accept changes or not), willingness to adopt new technology for ease, awareness about blockchain usage in healthcare, name of hospitals which have already implemented this practice. These questions were asked by framing 10 different questions.

c) Data analysis

The analysis of the responses yielded the following results:

- From total 66 medical professional, 35% have heard about blockchain usage in healthcare, 65% do not know about blockchain
- From 84 patients, 48% know about blockchain usage in healthcare, 52% do not know about blockchain
- From total 150 responses, 58% do not know about blockchain technology, 12% know about blockchain technology but not in healthcare and 30% know about blockchain usage in healthcare sector.
- 93% responded yes when it was asked that whether they get medical record file/prescription whenever they visit doctors. 7% visit hospitals which have adopted electronic mode to store data.
- List of hospitals which have started using electronic mode to store patient's history: Columbia Asia hospital, Hiranandani hospital (Mumbai), Hopewell hospital (Gujarat), Shree Krishna hospital (Gujarat), Zydus hospital, Bankers heart specialist, few personal clinics
- 40% people responded that they sometimes forget to bring physical files of medical records when they visit doctors again. 6% responded that it happens frequently with them. 54% never forget to bring the files.
- 87% people feel that physical form should be replaced with electronic mode of storage
- People have fear of following major problems when they start using electronic mode:
 - What if server is down
 - Security issues
 - Not all people are tech savvy
 - It will not be useful if the hospital will be changes

- Do not want to share the medical history with other medical staff
- What if the pharmacy store which is electronically connected will face an operational issue in emergency time?
- Incorrect handling might result into wrong treatment
- What if back up will be crashed
- Geriatric patients may not be comfortable with digital system
- 65% people are ready to change from physical mode to EHR but 30% people feel that there might be security issues.5% are not ready to accept the new technology.
- If security issues will be taken care of then 90% are willing to accept the technology
- 93% are ready to accept technology if they will be given power to decide who can access their past medical history.

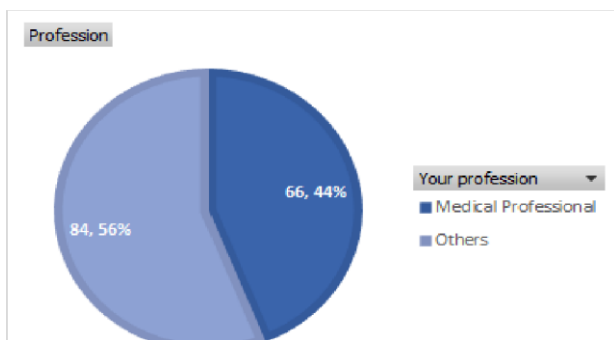


Fig. 1 A pie chart shows profession of respondents

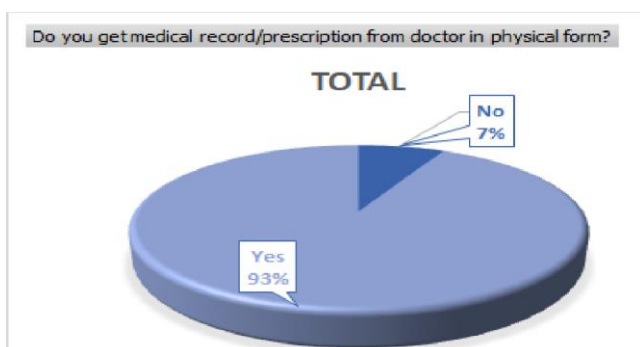


Fig. 2 A pie chart shows the summary of response when it was asked whether they get medical reports in physical form

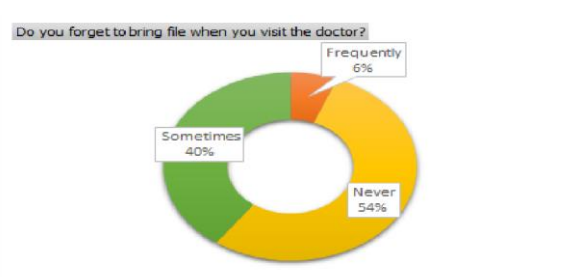


Fig. 3 A chart shows the summary of response when it was asked whether they forget to bring file while visiting doctors

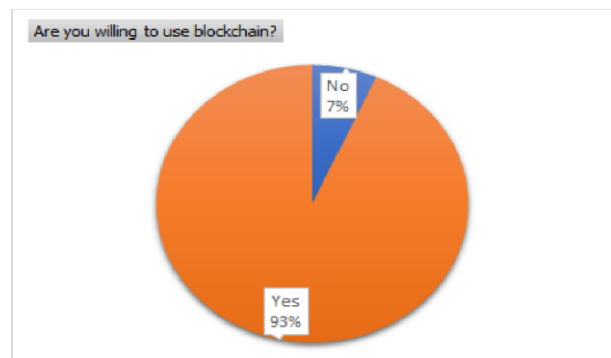


Fig. 4 A chart shows responses regarding awareness factor in healthcare

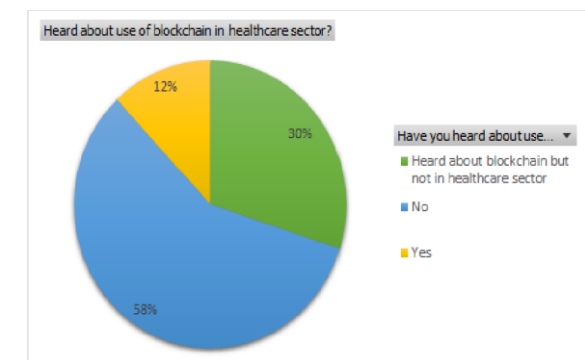


Fig. 5 A chart shows the responses for willingness to use blockchain

EHR has been implemented in few private entities in India. They are implementing the same in seven different stages. Max Healthcare has achieved Stage 6 level of EMR adoption model. Saket in New Delhi, Apollo group of hospitals in Chennai, SankaraNethralaya, Fortis etc. have also implemented EHRs. Though private sector hospitals have adopted EHRs system, but the data is not being exchanged between hospitals.

2) *Secondary Research:* The secondary research involves white paper reviews on blockchain usage in healthcare sector by well-known consulting companies IBM, pwc & Deloitte. As per pwc India report [3]& article of Deloitte [7], key challenges related to data while adopting electronic mode are listed below:

a) *Identification of patients:* For recording the entire journey of a patient, one unique identification number is required. In India, different care providers use different combinations of patient identifications. National health policy 2017 recommends investigating the utilization of Aadhaar for unique ID for essential health services in the country. But in India recognizing a patient with a Universal Health ID (UHID) number is a tough task.

b) *Scattered and disconnected data:* Relevant data should have two parts: Patient's recognition proof (captured from demography) and health information. These are scattered across different departments and so it is difficult to analyse collectively.

c) *Data possession and duplication:* At this stage, patients don't have any hold of their medical data. The care providers have control on patient's data and they don't send that data to any other provider. So, there might be chances of duplication of data when the patient changes his care provider.

d) *Reliance on third party for insurance and claims:* Reliance and involvement of third-party intermediaries for health insurance claim leads to complexity and high costing of healthcare

e) *Data security and privacy breaches:* Localised control of data from provider side leads to many security breaches. E.g. Ransomware attack in 2018 which has locked down users and they were not able to access data.

f) *Data exchange:* Lack of unified standards for healthcare and data exchange platforms for healthcare makes it hard and tough for health policy makers to collect, check, analyze, and exchange useful health information in a secured and effortless way.

Other countries were analyzed which are already using EHR. By analyzing national survey reports of other countries like USA and Estonia, following results were obtained:

- A complete and accurate history of patients provides an edge to healthcare providers to deliver better qualitative services to customers (The Office of the National Coordinator for Health Information Technology). From the

national survey of doctors in USA [8], it was found that more than 75% providers feel that EHR gives clinical benefits, delivers care and makes information of past history easily available when it is required. EHRs are able to prevent errors in the diagnosis hence improves quality of services. It lowers down the risk and improves risk management. From the patient's side, it was found that 92% patients were happy with e prescription [9]. As it has increased quality of care screenings for breast & colorectal cancer, diabetes, blood pressure control for patients.

- The healthcare sector of Estonia country has been updated by e-solutions. Not only patients but hospitals, clinics, government, administration are getting advantage from the quick access that e-services are delivering. In Estonia, every citizen who visits medical clinics has an online e-Health record. This healthcare data is kept totally secure and simultaneously available to authorized people. They have 99% of health data digitized, 99% of prescriptions are digital & 100% electronic billing.
- In Malaysia, Lifetime Health Records (LHR) service was initiated by government. Under this service, medical record of each patient is recorded electronically and maintained throughout his lifetime. It starts with his/her first medical check-up with the medical service provider until he/she visits the service provider. By this way, a uniformity will be maintained throughout the process. And as patient's history is visible to the doctor, quick judgements can be taken.

Thus, above mentioned surveys are meant to understand the importance of digital mode to keep records of patients instead of physical forms. The benefits are clearly stated in numbers as per different surveys.

B. A Secondary Survey to Check Technological Advancement in Indian Healthcare Startups

As a result of technological advancement in terms of digitalization, artificial intelligence

(AI) and internet of things (IOT), many healthcare startups are working in the direction of providing speedy, efficient and need based healthcare services in India. As per The State of Startup Ecosystem Report 2018, there are total of 4892 startups in healthcare sector. These healthcare startups can be classified under different categories based on the work they are doing. Indian healthcare startups mainly working for telemedicine, online pharmacy, personal health management, fitness, home healthcare, diagnostics, biotech research & development, medical instruments, genomics, healthcare IT, biopharma. In India, startups are working in any of these verticals with technologies like AI, ML, IOT to provide quality, fast and efficient services. List of different Indian startups information in each vertical along with positive impact on Indian healthcare sector is given below:

1) *Vertical: Telemedicine*

a) *Purpose:* Helps patients to get virtual doctor consultations through web-based videos or application, chat etc. Solves problems related to lack of specialized doctors in tier 2 and tier 3 Indian cities

b) *Startup examples:* Practo, mfine, Lybratye, Docsapp

c) *Positive effect on healthcare:* As per McKinsey Report, 2019, India can save up to \$10 Bn by 2025 using telemedicine instead of personal consultations

2) *Vertical: Online pharmacy*

a) *Purpose:* They are ecommerce for medicine business. They provide medicines to customers by using online platform

b) *Startup examples:* 1MG, Netmeds, Pharmeasy, MyraMed, SastaSr

c) *Positive effect on healthcare:* As per 2018 Research and market report, India's current 850K independent pharmacy retail stores are able to meet only 60% of demand. This untapped opportunity should be well used

3) *Vertical: Personal health management*

a) *Purpose:* As Indian people are becoming more health conscious day by day, the use of health advisory content aggregators and personal health tracking apps

b) *Startup examples:* myUpchar, CureJoy, Pregbuddy, Maya

c) *Positive effect on healthcare:* Millions active users can detect early signs of diabetes, heart diseases and other critical conditions

4) *Vertical: Fitness & wellness*

a) *Purpose:* They provide fitness, nutrition knowledge along with mental health improvement

b) *Startup examples:* Fitternity, Cure.fit, Healthify Me, GoQii, HealthKart, Yourdost, InnerHour

c) *Positive effect on healthcare:* As per WHO estimates, India's mental health problems are massive at the moment. For every 1 Lakh people, the organization found 2400 disability adjusted life years

5) *Vertical: Home healthcare*

a) *Purpose:* Provides healthcare services by bringing that to home which includes oncology or cancer support, pathological test sample collection, physiotherapy sessions

b) *Startup examples:* Healthians, CallHealth, Portera Medical

c) *Positive effect on healthcare:* India is said to have second largest geriatric population (above 60 years age) and busy lifestyle in urban cities has increased the need for this

6) *Vertical: Diagnostics*

a) *Purpose:* Early detection of chronic diseases is most important to reduce death rate. The focus is mainly to develop medical devices and software by using AI, ML technology to assist in disease discovery

b) *Startup examples:* Qure.ai, SigTuple, NIRMANI Health Analytics

c) *Positive effect on healthcare:* AI can remove India's burden of having lower doctor to patient ratio

7) *Vertical: Biotech R&D*

a) *Purpose:* It helps individuals e.g. Helps doctors to choose best combination of drug, works for regenerative medicines

b) *Startup examples:* MitraBiotech, Panorum Technologies

c) *Positive effect on healthcare:* Personalized organs for humans like kidney, liver can be made

8) *Vertical: Medical devices*

a) *Purpose:* It helps to repair medical health by using technology of self-diagnosis

which includes BP measurement, blood sample analyzers, digital imaging devices

b) *Startup examples:* UE Lifesciences, Forus Health, Beat O, vTitans, Therapeutics

c) *Positive effect on healthcare:* Portable devices which are easy to carry and use are being developed

9) *Vertical:* Healthcare IT

a) *Purpose:* By using IT, data of patients can be sourced from different sources, structured and prepared models

b) *Startup examples:* Innovacer, HealthPlix, Pharmarack, Attune, CareStack, Live Health, Practo

c) *Positive effect on healthcare:* Data driven prediction can be done if data is collected and model is structured

10) *Vertical:* Biopharma

a) *Purpose:* It deals with manufacturing drugs from biological process, from living organism like bacteria, yeast

b) *Startup examples:* Vyome Therapeutics, Bugworks Research, PlasmaGen Biosciences

c) *Positive effect on healthcare:* Drug are produced by biological process instead of chemical processes

11) *Vertical:* Genomics

a) *Purpose:* It is associated with innovation in genome research, DNA, gene editing

b) *Startup examples:* Mapmygenome, Genebox, MedGenome

c) *Positive effect on healthcare:* Genetic testing helps to detect disease, diagnosis & non-invasive therapy

Based on secondary research on Indian startups, it was found that Indian healthcare startups are doing excellent in term of adopting technologies. Though they are digital startups, blockchain is not adopted yet in any of those startups [10].

DISCUSSION

A. Adoption of EHR

From the analysis of primary survey, it was found that improvement should be needed in following areas:

People are not aware about new technologies and electronic mode of storage. That awareness can be spread among public by government efforts, by including new

technologies in the education curriculum, by publishing them through social media, through NGOs, by adopting the system in government hospitals. It was found that people are ready to adopt the same but they feel that it might create the security issues. The proper use of social media can spread correct news in the public and increase awareness among public.

To adopt EHR in India, examples of other countries who have successfully adopted EHR are analyzed by initiating required steps. By analyzing different countries based on level of successful implementation of EHR, it was found that activities of 4 different dimensions are required to be initiated first. That includes infrastructure for information & communication technology (ICT), policy & regulations, standards & interoperability and education [11].

India has number of hospitals run by Central Government & State Government and private entities. Though the use of ICT is low compared to other countries. The government of India should invest in creation of ICT infrastructure in healthcare facilities and also provide financial benefits when medical providers start EHR. In USA, public healthcare started the use of VISTA EHR system, which is free alternative to expensive EHR software. This type of free open source can be used in India as cost is main concern for implementation of ICT. In Indian village, broadband services will be provided by implementing National Optical Fiber Network. And once we have connections, cloud-based healthcare services can be provided to rural areas as well.

Policy & regulations is second dimension. Different counties have formulated national health IT policies to make adoption of EHR easy. That provides shield to sensible information and data by laws and policies. India should focus on establishment of agency for health IT standards. In today's scenario, healthcare providers share information related to prescriptions and discharge summaries. Laws are required in this case to ensure that health providers share information electronically with the permission of patients.

Standards & operability is third dimension. As each country has different infrastructure and different operating process, each country

should have standards to make system more operable. The open EHR consortium has detailed specification EHR available which is open. Many countries are using the same. That is useful for exchange of messages, representation, storage and transmission of medical images.

Last dimension is R&D & education. Government should invest in R&D work for health IT. In India, government spends less than 1% in medical research (OECD data on healthcare spending). That is major concern for India as other countries spend 4-5% in R&D. Schemes should be initiated to impart education and training for health IT to increase skilled manpower.

B. Indian Startups Partnership/Merger/Acquisition

In the secondary research of Indian healthcare startups, it was found that Indian startups are doing appreciable work in terms of accepting and practicing new technologies. In healthcare sector, each company is trying to develop its own new strategies, new technologies to digitize the services being provided by it.

Startups should be used as an inspiration to implement EHR and new technologies. That should only possible when healthcare enterprises start viewing digital healthcare startups [5] as an opportunity to look after their own digital transformation/ technological innovation – by partnership or by merger or by an acquisition [5]. Though the verticals are different for startups, they all have clear vision of innovation. In the upcoming centuries, patients will be digitally proficient, active, independent so the services provided by healthcare providers should be of the same level.

Another prime advantage of healthcare startups is that they are not limited to any B2B or B2C model. As Elton O’Riordan quoted, three different kind of healthcare providers are there: First are digital companies which enter into healthcare sector. They use B2C model, second are healthcare providers who adopt digital space and their focus is B2B model, third is digital startups. Those are not limited to any model.

Healthcare startups in India are using different models to monetize the services provided by them. The first problem that startups face is “who will pay”. Some startups like Onco.com are monetizing their services by patients. Other startups like Practo, Lybrate are charging healthcare providers and doctors. The second problem is “How will they pay”. These startups are using various revenue models like subscription, pay per service, licensing etc. BeatO startup is using pay per service model. NanoHealth and HealthPlix are using subscription model with patients and doctors respectively. Startups like Karma Healthcare is following licensing model. They out-license their technology to hospitals or NGOs who are into providing services to remote patients [5].

These problems can be overcome if the startups will be funded by healthcare providers. Merger, acquisition and partnership can make big difference. When the business is done by using technology, it impacts the most.

RECOMMENDATIONS

In India, to implement EHR, first digitization should happen. Digitization involves replacement of paper form by electronic/digital form. To enable digitization in Indian healthcare system, healthcare sector itself should showcase a basic openness to innovative & technological solutions. This is not enough, there is a need to protect human rights with laws for data security and data privacy in healthcare system. Also, country wise unified legislation should be formed to get more transparency in these data related issues. EHR should be implemented in main 3 different stages which are mentioned below (World Health Organization Manual, 2017):

- *Early adoption and experimentation:* Planning should be in the direction of enabling an environment. This can be done by taking small eHealth initiatives, by introducing IT services, by making infrastructure more active. For all these things to happen, funding must be provided by agencies, doctors or donors.
- *Development and building up:* Planning should be done in legal, policies and standard aspects. Development in the direction of large eHealth initiatives. Modern and cost-effective technologies

should be used and relevant IT services should be implemented.

- *Scaling up and going mainstream:* Here focus is on users, monitoring and evaluation. It involves high investment, commercial IT market with large international and local vendors.

These stages can be further sub divided into different groups for better identification.

- *Basic IT system:* This stage includes minimal infrastructure changes like billing procedure
- *Basic EHR:* It improves administration services and incorporates clinical documents.
- *Communication for Care:* The real time data is being captured and communicated among departments.
- *Advanced way to document records:* Analytics is used here for management of data.
- *External ancillary services integration:* In this stage, the facilities will be synchronized and it increases resident safety.
- *Information exchange:* In this stage, a complete report is being given to practitioner to make the decision process easy and quick.
- *Health information exchange-connected care:* This stage is associated with providing an entire report to care team where focus is given to improve care.

This step wise solution along with the focus on main four areas: infrastructure for information & communication technology (ICT), policy & regulations, standards & interoperability and R&D & education will help to achieve EHR successfully. Once that is being done, blockchain can be implemented. Customer should be given unique ID number and that will remain same from the first visit to health practitioners until he visits the last time.

Along with that, if startups will be acquired or partnered, the latest technologies can be explored in a better way. The combination of EHR and new technologies can put India on top in healthcare sector.

Once the EHR will be adopted, blockchain can be adopted in the later stage.

CONCLUSION

Blockchain provides various applications for the healthcare sector. But it can't be adopted directly in India but needs step wise adaptation. After primary and secondary research, it is clear that India should start with digitization first. Though EHR is implemented in India by some of the hospitals but still they have not reached to the last stage of implementation. The combined efforts of Central government, state government, health providers can help to move in the direction of successful implementation of EHR.

The government of India will require the support of block chain technology and big data analysis to make the process smooth and streamlined. The difficulties related to model establishment can be reduced by eliminating security issues, by proving accessibility and by making the system accountable. For that main areas should be focused: infrastructure for information & communication technology (ICT), policy & regulations, standards & interoperability and R&D & education. Along with this, training should be given to healthcare providers to use data in appropriate manner. Ultimately, nationwide adoption of technologies will improve the quality of healthcare services throughout India.

Indian healthcare startups are doing extremely good in terms of adopting different technologies. The main problem for the startups is funding. Though they are using different revenue models for the same, the partnership with the private or public sector can make huge difference in healthcare sector.

II. LIMITATIONS

This research paper has following limitations:

- The primary research was done by floating questionnaires online. Though the questions were formed in a simple language, it might be possible that the respondents might not have understood the questions rightly. So personal interaction suits well in this as it helps to find other aspects also.
- The sample consists of medical professionals. They are from different states of India. As snowball sampling is used here, there are high chances that they

are of same age ranging from 27 to 35. Age factor is not considered in collecting data of medical professionals.

- In the secondary research related to startups data, literatures were used and official websites of startups were referred.

There was not any personal interaction with the startups. So primary research related to startups can provide good insights and actual problems being faced by them.

REFERENCES

1. Angraal, S., Krumholz, H. M., & Schulz, W. L. (2017). Blockchain technology: applications in health care. *Circulation: Cardiovascular quality and outcomes*, 10(9), e003800.
2. Gordon, W. J., & Catalini, C. (2018). Blockchain technology for healthcare: facilitating the transition to patient-driven interoperability. *Computational and structural biotechnology journal*, 16, 224-230.
3. PwC "Reimagining health information exchange in India using blockchain" report, 2019
4. Frick, N. R., Möllmann, H. L., Mirbabaie, M., & Stieglitz, S. (2021). Driving Digital Transformation During a Pandemic: Case Study of Virtual Collaboration in a German Hospital. *JMIR Medical Informatics*, 9(2), e25183.
5. Rinsche, F. (2017). The role of digital health care startups (Vol. 84, pp. 185-195). PCO..
6. IBEF official sitelink: "https://www.ibef.org/industry/healthcare-india.aspx"
7. Deloitte analysis link: "https://www2.deloitte.com/us/en/pages/public-sector/articles/blockchain-opportunities-for-health-care.html"
8. Jamoom, E., Patel, V., King, J., & Furukawa, M. (2012, August). National perceptions of EHR adoption: Barriers, impacts, and federal policies. In *National conference on health statistics*.
9. Prasath, S., & Nirmala, K. Adaptive Boosting Classifier Based Attack Detection for Secured Communication in Vanet. *International Journal of Advanced Science and Technology* (ISSN: 2005-4238), 28(17), 168-177.
10. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.
11. Srivastava, S. K. (2016). Adoption of electronic health records: a roadmap for India. *Healthcare informatics research*, 22(4), 261-269.

ROLE OF ENTERPRISE ARCHITECTURE IN HELPING ORGANIZATIONS NAVIGATE THROUGH COVID-19 UNCERTAINTY

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“The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty and we must rise with the occasion. As our case is new, we must think anew and act anew....” Abraham Lincoln, 1862

ABSTRACT

Since its start in China, the COVID-19 epidemic's unbridled surge continues ravaging the world health systems and driving global economy into its worst downturn. With more than ever raised fears of a prolonged recession, companies across the globe are facing one-of-a-kind-in-history business uncertainty. What started out as an IT management discipline with a focus on managing growing IT complexity supported by visual representations and guiding principles & policies, Enterprise Architecture (EA) has evolved to bridge silos between information, business and technology in organizations and become a key enabler for business agility and innovation. There is significant literature available on potential benefits of EA, but not many insights are available on what benefits can be realized using EA during and after global business ecosystem disruption of large scale. This research paper aims to analyze the available literature and suggest the value additions and role Enterprise Architecture can play in helping businesses navigate through these uncertain times. This theoretical research study reviewed various research articles and papers on the Enterprise Architecture discipline and is based on secondary data collected from published materials from various publications. The study reveals that any organization's enterprise architecture capability is a contributing factor to its business resilience and agility and has a tremendous positive impact on the ability of the business to deal with challenges and uncertainty caused by the COVID-19 pandemic. The maturity of enterprise architecture practice (Low, Medium, High) within an organization determines the benefits experienced. This study will help businesses unlock the potential of enterprise architecture capability while realigning business strategies, operating models in the wake of changed competitive business environment due to COVID-19. This is the first study conducted to analyze the role enterprise architecture can play in helping business deal with uncertainty in the aftermath of the pandemic. It also provides guidelines on strategic actions at various enterprise architecture capability maturity levels as organizations React, Recover & Re – Imagine business and processes after COVID-19 disruption.

Keywords: Enterprise Architecture, Capability, Maturity, Business Strategy, Business Operating Model

Introduction

Since its start in China, COVID-19 epidemic's unbridled surge continues ravaging the world health systems and driving global economy into its worst downturn. [1] With more than ever raised fears of a prolonged recession, companies across the globe are facing one-of-a-kind-in-history business uncertainty [2][3] [4]. The COVID-19 pandemic has created operational disruptions and challenges for a broad spectrum of economic sectors. Healthcare was the first industry which faced pandemic impact followed by other industries such as Travel, Hospitality & Leisure, Agriculture, Oil & Petroleum and Manufacturing. [5][6]. An analysis by [7], lists Airlines, Casino & Betting, Vacation Facilities, Automobile spares & Tools, Oil & Gas Boring as the top 5 businesses worst impacted by the

COVID pandemic from probability of default perspective. Even seemingly least impacted industries such as IT, Banking & Finance, Insurance are also not totally insulated from the contagion effect of COVID-19 [8].

No one knows how long the crisis will last, but business analysts agree that the “new normal” will not be same as the “old normal” for the majority of businesses [9]. Even when COVID restrictions being to ease, businesses will have to adjust to the “new normal” caused by broken supply chains, workforce disruptions, weakening consumer sentiment indexes, increased economic interventions by governments and more burden on IT/automated systems [1][4] [9]. These are some of the parameters amongst many unknowns which will test business resilience during & post-COVID.

“Just 12 percent of organizations are highly prepared for the impact of Coronavirus”

– Gartner Business Continuity Survey, March 2020[10]

The ability to change mind set, organizational procedure, decision-making processes and command structure are essential in dealing with mass casualty or disaster situations [11]. The general Business Continuity Planning (BCP) practices have generally favored IT side of BCP[12]. These might have been sufficient for “what to do now” scenarios for some industries & organizations (such as IT), but such practices may not be sufficient for business recovery and sustenance in a contracting economy & reduced business activity caused by COVID-19[4] [13][14]. Traditional scenario based and impact based business continuity plans cannot handle the unique challenges faced by existing business models such as long duration of pandemic, mass employee sickness, unavailability of critical resources, decline in demand, shifting customer touch points, surge in digital volumes, operations & supply chain disruptions, economic downturn etc.[15][16]. Researchers suggest increasing the scope of business continuity to include business model contingencies and recommended need to reconsider and rethink the business operating models in such disruptive situations [17].

This research aims to identify operational, tactical and strategic focus areas where Enterprise Architecture can assist and provide value to organizations for formulating & implementing response strategies in dealing with disruption and re-adjusting in post COVID normal.

Literature Review

A. COVID – 19 Business Impact
International Monetary Fund (IMF) recognizes the pandemic induced health crisis having a drastic impact on economy and estimates -3 percent contraction in the global economy in 2020 as a result. This is worse than the economic downturn due to 2008-09 financial crisis [4]. Industry analysts have established a significant impact on number of industries due to supply chain interruptions, business closures & suspension, travel and movement restrictions, workforce disturbance [7].

Researchers indicate both demand side and supply side shocks due to the pandemic. On demand side, sharp drop in consumer confidence as direct impact and slowdown in the real economy through anxious financial markets as indirect impact are identified. Supply side shocks will result from (a) demand side shocks (b) production shutdown, supply chain gaps [2].

B. Business Continuity

Business continuity planning (BCP) or management (BCM) is an important corporate function involved in the management of risk. [18] define BCP/BCM as a set of practices that are focused on guiding the decisions and actions required for prevention, mitigation, preparation for, response to, resumption, recovery, restoration and transition from a crisis event. Risk management and capacity development during and after disasters are key decisive factors for the survival of businesses [19]. Academia has discussed and attempted to establish BCP/BCM as a strategic organizational technique [20]; [17], which enables the organization to safeguard its business values and superior market position. Majority of business continuity practice focuses on addressing unforeseen exigencies that intimidate the strategic objectives of organizations [21] [22]. This, however, seems counter-productive in the aftermath of COVID-19 pandemic as the very business model which BCP/BCM aims to protect may no longer be viable with re-aligned strategic goals [4]. A recent survey of 500 US companies found critical gaps in BCP for mission critical functions with only 60% of the respondents having a plan in place, and merely 30% of the respondents are confident of keeping the business running for 2-3 weeks with the existing plans [23]. The results are indicative of the need to explore options other than traditional BCP for business resilience while dealing with pandemic disruption. [24]Argued that traditional BCP approaches focus only on continuity of resources and processes for accomplishing the existing business model, but omit the business model itself from the scope of considerations, thereby increasing strategic risk to corporate endurance. [17]All argue that traditional business continuity practice leaves the business model out of consideration while

solely focusing on the challenging and restorative forces for the continuity of the very business model. They propose focusing not only on the value preservation but also the value creation part of risk management by discovering the threats to the existing operating model and transforming it through innovation for organizational resilience.

C. *Organizational Resilience*

Organizational resilience as a concept has been thoroughly studied in the crisis and disaster management field of research.[25] Explains resilience as the organizational capability to address unexpected events and business scenarios; overcome the challenges and successfully recover. [26] reflect upon this capability as a means to identifying new opportunities in adverse situations, achieving better results than before and strengthening the business position. [27] suggest accepting resilience as fundamental flexibility with which individuals, organizations or systems can positively respond to disruptions and do so without much regression. Resilience not only refers to the ability to absorb shocks from predicted interruptions, but also adjust to erratic unexpected tremors [28]. Overall, organizational resilience is perceived as a capability that helps avoiding the uninterrupted instabilities of disruptive corporate environments and accomplish structural goals efficiently. Also, according to [29], being resilient means understanding environmental realities and generate ideas to pull through the situations caused by disasters/ disruptions. In their conceptual framework on organizational resilience, [30] suggest making meaning of reality, adopting focused strategy and acting strategically with flexibility & proactiveness to enable the resilience in organizations. They further argue that identifying and understanding reality equips organizations to acknowledge their strengths, identify their susceptibility to unknown and disruptive situations and take appropriate actions. [31] Promote understanding environmental and organizational reality as it allows organization leaders to accept and establish organizational weaknesses which further helps in raising organizational ability to deal with uncertainty and risks. Establishing vulnerabilities helps

businesses identify possible solutions around the limitations. Flexible approach and strategic focus are prerequisite to business planning in crisis times as business ecosystem is under enigmatic complications.[30] Support acquiring strategic approach and thinking as organizations seek direction in dealing with pro-tem changes in existing and now outdated strategies. However, strategy should be accomplished by strategic acting for delivering intended results by innovative, flexible and proactive behaviors. [32] refers to this ability of the company to change due to any discontinuity as elasticity and recognizes it as one dimension of organizational resilience. [33][34] further support this concept and positively associate flexibility and proactiveness with resilience. [30] deduce that ingenuity, elasticity and motivation lead to greater organizational resilience. [35] Considering only resiliency while leaving out organizational agility can delay decision making and quick strategic acting thereby resulting in sub optimal response efficiency and business performance. Through empirical study they explain that environmental instability can be better managed by both agility and resiliency inherent; and companies operating with superior agility and resilience are better able to preserve their business value and sometimes enhance it even in turbulent environments[35]. Organizational resilience is defined as a competency for reacting to unforeseen incidents in different ecosystems and operating conditions; and agility as another strategic capability for bringing in synergy between potential solution approaches, resource profiles, business states, and tactical plan [36]. [37] Agility as the enterprise skill needed to understand, cultivate and utilize its internal and external capabilities. According to [38], agility should not be merely considered a static ability; rather it is persistent inherent readiness of a system to accept change in a rapid, proactive manner through exploitation of the relationships between its components and external environment. [39] describe tactical agility as a way to develop and subsequently implement swift, vital and elastic capabilities. Next they propose that organizations should adapt their resources in efficient manner,

reconsider and remodel their competencies and business models to survive and grow regardless of the cause of disruption. They further conclude that capacity to be flexible and strategically agile is prerequisite for thriving in a dynamic environment. [36] Scrutinize the interplay between resilience and agility in volatile economies and recommend developing both resilience and agility to respond, revive and recuperate from turbulent events. In an empirical study, [35] demonstrate that business ecosystem disturbances can be better addressed by building agility and resiliency and advocate for building both capabilities together. They further suggest these capabilities to be developed not only at organizational level, but also at entity levels specific to employees, teams, industries, etc. Improved results can be obtained if both the capabilities are better aligned and actions/efforts towards these are integrated and harmonized.

Hence, organizational resilience and agility both are considered as pivotal concepts for enterprise endurance in volatile & disruptive situations.

D. Enterprise Architecture (EA) & Its Benefits

[40] Zachman framework is generally recognized as the foundation upon which modern Enterprise Architecture (EA) is built. John Zachman describes enterprise architecture as the total set of intersections between the abstractions and the perspectives that constitute the total set of descriptive representations relevant for describing an Enterprise. What started out as an IT management discipline with a focus on managing growing IT complexity supported by visual representations and guiding principles & policies, EA has evolved to bridge silos between information, business and technology in organizations. [24] describe enterprise architecture as the systematic structural description for business & its processes and information technology infrastructure, which identifies and visualizes the company's business operations model and its internal and external integrations. [41] does not view architecture as only a technology initiative but considers it a strategically significant element of company's strategy and planning structure. It further defines enterprise

architecture as the coordinating and controlling logic for integrating and standardizing business processes and IT capabilities of any enterprise. [42] describes enterprise architecture as a thorough description of business structure having business components (entities), discernable & non-discernable properties of those components, and the interactions between them. Enterprise architecture describes the lexicon, the makeup of business parts & mechanisms, and their connections with the peripheral environment, and steering rules & standards for the prerequisites, construction, and progression of an organization. This definition of EA included organization vision & goals, behavior, structures, processes and roles, information and supporting information technology applications and systems needed for running the organization. [43] argues that while enterprise architecture is often associated with achieving technical goals, the intent of enterprise architecture is really to achieve business objectives. Enterprise architecture can be used to measure technical debt, aligning debt to business objectives, and producing actionable metrics that drive business insight through systematic approach. [44] maintains EA is a well-specified method for performing enterprise evaluation and assessment, design, planning, and implementation of strategy and related components (IT and non-IT) using an all-inclusive approach. By leveraging principles and practices developed through enterprise architecture, organizations can identify and plan strategic changes related to business, operating models, technology, people, etc. Different facets of enterprise are recognized and recorded by enterprise architecture to accomplish the changes sought by revised business goals and motivations. Modern enterprise architecture is not just an overarching system for guiding the development, practice and control of business, information, data, technical and network architectures. Driven by the organization's business requirements, it is also influencing and facilitating successful delivery of various initiatives, including (but not limited to) digitization, cloud transformation, customer experience, analytics and insights [45]. [46] considers enterprise architecture as an effort to provide rationality to the expression and

execution of strategy by delivering a prototype of the enterprise and conceptual language intended to reduce complexity and increase the accuracy for strategic and planning articulation; thereby reducing misunderstanding, sharpening the focus on priorities and increasing resilience.[44]notes the potential for enterprise architecture as a tool for comfortably introducing and implementing change in an enterprise, to reduce associated costs of change and improve prospects for accomplishment through an uninterrupted assessment and adjustment of the enterprise.[46]also concludes that enterprise architects can assist in reimagining business solutions and deliver capabilities that give businesses practical competitive edge while managing and sustaining the momentum of change and satisfying the stakeholders.[47]categorizes enterprise architecture benefits into intangible, indirect, hard and strategic benefits and identifies enhanced understanding of business strategy, improved business - IT alignment, better change management, upgraded strategic agility and business stability as key strategic benefits. Superior strategic synchronization with partners, advanced business processes, innovation, strong risk management & resilience, reduced complexity and improved decision making are the other important benefits derived by enterprise architecture.[24]identify four stages of enterprise architecture adaptation in organizations. They argue that effective application of each phase of enterprise architecture produces innovative or extended expertise; and professional profits are manifested in five fields: IT expenses, IT sensitivity, risk supervision, executive gratification, and strategic corporate results.[48] opine enterprise architecture provides a universal interpretation of the enterprise through tiered layering that supports business, application, and technology infrastructure layers. By architecting in the context of whole organization, EA presents well-rounded view of enterprise and allows businesses to make strategic decisions and plans.

Research Problem

Literature review of COVID – 19 resources suggest a significant disruptive impact of the pandemic on businesses across industries, markets, and geographies. Extreme economic uncertainty is caused by hard to predict factors such as re-eruption patterns of pandemic and further closing of businesses, timely availability of preventive medicinal cure, efficiency of containment efforts, fallout of geographical lockdowns on supply chains, consumer behavioral & spending pattern changes, fluctuations in supply and demand of commodities and tightening fiscal conditions. Existing literature shows that business continuity planning (BCP) alone may not be sufficient in dealing with such unique long duration disruption situations. BCP can be aided by inherent organizational resilience capability & agility to maneuver through these economic conditions. Existing literature suggests that organizations will need to be agile and resilient in managing environmental uncertainties by sensing reality, recognizing their strengths & vulnerabilities, re-thinking operating structures & models, adapting focused strategies and acting strategically in a flexible and proactive manner. Though scholars and researchers have positively associated enterprise architecture with organizational ability to (a) respond to crisis in proactive timely manner, (b) hold ground and (c) emerge stronger from the crisis, there is lack of information on how enterprise architecture can provide ability to understand & interpret current state and help in formulating next course of actions.

Research Question

This study aims to answer the research question: How Enterprise Architecture can help organizations navigate through the business uncertainty caused by COVID-19 pandemic.

Research Objectives & Scope

A. Objectives

The research is conducted with the objectives as under:-

- Understand the relevance of enterprise architecture discipline in improving organization resilience in the face of unique

economic and business challenges resulting from COVID-19 pandemic situation.

- Categorize enterprise architecture influence on various organizational views/dimensions at different levels of EA discipline maturity within organization.
- Suggest approach for employing enterprise architecture capability in formulating business response to economic disruption due to COVID – 19

B. Scope

The scope of this study is limited to:-

- Enterprise architecture (EA) domain and its sub-domains.
- Exploring if EA discipline can assist in making right choices while deciding on next course of action by providing a map of the business, including the information and systems that support it.
- Suggesting approach for employing enterprise architecture capability in formulating business response to economic disruption due to COVID – 19.

Research Methodology

This study endeavors to understand the relevance of enterprise architecture discipline in improving organization resilience in the face of unique economic and business challenges resulting from COVID-19 pandemic situation. We examined the available literature to understand the limitations of business continuity planning, significance of organization resilience & agility, strategic position of enterprise architecture in providing inputs for formulating organization response in unsettled business environment.

A. Data Collection

Literature on COVID-19 business impact, Business Continuity Planning, Enterprise Architecture benefits in general was sought for references using both academic and general sources. For diversified views, literature by academia, practitioners and industry was included in the review. The literature was charted for reference by searching published journals, white papers by academic institutions, IT organizations and IT service providers, and public internet using keywords related to enterprise architecture. Research papers, journal articles, conference papers, newspaper

reports, books, industry white papers, published government documents and electronic sources from mostly last twenty years were reviewed. The review findings were then analyzed for potential benefits Enterprise Architecture can provide while dealing with large scale business ecosystem disruptions.

Findings And Analysis

The COVID – 19 pandemic ending is yet uncertain. But it is social and economic impacts are becoming clearer implicating a less than optimistic economic & business situation. While immediate responses have been important, long term actions and strategies are crucial for the survival of businesses across globe. By reviewing the related literature, we found that while majority of the organizations rely heavily on traditionally existing business continuity management/ practices (BCM/BCP) for minimizing disruptive events' impacts, these practices are lacking in providing guidance & direction for dealing with large scale, prolonged, global economic disruptions such as one triggered by COVID – 19. Existing research ha recognized resilience and agility as crucial organization abilities in dealing with situations like this, and in preserving and enhancing business value. Enterprise architecture literature review recognizes EA as an enabler for business resilience and agility by virtue of its understanding and representation of organizations' internal operational strategizing mechanisms. The foundation pillars of enterprise architecture are understood to provide ability to understand & interpret current state and envision future state of information, business processes, business & application integration and technology. Additionally, various tangible, intangible, direct and indirect benefits of enterprise architecture capability are identified and correlated with overall business objectives, resilience and organizational agility. Further, based on these literature review findings, we understand that the effectiveness of enterprise architecture in providing value to business is a function of present EA maturity within. Based on this understanding, we discuss relevance, influence, benefits of enterprise architecture at different levels of maturity for an organization. Finally, we commend approach for

employing enterprise architecture capability while planning organization response to business disturbance due to COVID – 19.

Discussions And Recommendations

A. Relevance of Enterprise Architecture

In its nascent stages, EA capability is mostly technology centric dealing with the adoption and enablement of technical systems and infrastructure. In the intermediate levels of maturity, EA focus increases to include cradle to grave solutioning of IT systems spanning single or multiple business domains with a focus to fulfill business objectives. The highest levels of EA maturity are where a holistic, business objectives centric view of business and IT strategies, solutions and planning is taken. Several enterprise architecture maturity models have been defined by scholars and publications. The common key elements/ dimensions determining maturity across different methodologies are Architecture Process, Architecture development, Stakeholder support and involvement,

Governance, Business Linkage. We focus on the “4 stages of architecture maturity” namely Business Silos, Standardized Technology, Optimized Core, Business Modularity [24] and leverage enterprise architecture capabilities at different stages of maturity for formulating strategic disruption responses. In first stage of maturity 'Business Silos', IT is focused on local business unit problems focusing on only automating specific business processes designed by business executives. Hence, the architecture has no bearing on business solutions and vision. In second stage 'Standardized Technology' IT focus shifts to shared infrastructure, however, the role remains to automate local & segment – wise business processes with business driving technology & enterprise strategy. From EA impact perspective, both these stages are limited to technology primarily. Hence. we term both these stages of EA architecture as "Low" maturity

Table 1 lists key EA influences and benefits for various organization views at different levels of maturity.

EA Maturity Views	Low	Medium	High
<i>Business</i>	Support business, improve efficiency	Enable business, improve effectiveness	Driver business and innovations
<i>Strategic Planning</i>	None/ Project based, Focus on fulfilling business needs	Significant inputs to business - IT planning, Focus on supporting business capabilities	Key driver of business - IT planning, Focus on extending enterprise capabilities
<i>Organization Infrastructure & Processes</i>	Functional orientation, Operational Information	Process Orientation, Management Information	Business Integration Orientation, Market Information
<i>IT Infrastructure & Processes</i>	Foundation systems used as utility	Enterprise wide solutions used as service	Rapid reconfiguration capability used as strategic differentiator
<i>Value</i>	Cost reduction & improved TCO through standardization	Improved agility & resilience through IT enabled process improvement	Value creation through innovation, Enhanced competitiveness
<i>Stakeholder Management</i>	Project based communication with stakeholders	Regular consultation & feedback with business	Collaboration with business

level for EA capability as shown in Table 1. At this level, the EA capability influences operational planning covering business process

automation projects, their implementation and execution, business support, and addressing technology needs. Low maturity enterprise

architecture is technology and platform centric, focusing on services and composition of underlying IT platform, applications built on it, interfaces between the platform and applications, interfaces between the platform and external world. EA at this level supports the foundational capabilities of the business. The planning at this level is only at project level and the projects are designed, executed for specific business needs. Enterprise architects communicate with stakeholders concerned and responsible for project and carry understanding of the technological landscape and IT platforms. EA as a function provides a view into this technology landscape and IT platforms and can be used to drive efficiencies by means of more automation, removing redundancies and improving business and organizational processes by means of IT. Still, despite having a functional orientation and functional understanding of the organization, 'Low' maturity enterprise architecture capability is still considered a means to achieve utilitarian purpose of information technology. The capability at this level is yet not leveraged for the strategic planning and does not provide any inputs for the same. In "Low" maturity stage, local solutions are identified for local problems which increase local flexibility and reduces technical complexity. However, opting for local solutions decreases enterprise-wide flexibility and agility while introducing or modifying global solutions for changed business processes or operating models. Organizations having enterprise capability at this level of maturity may not find it easy to leverage new technology initiatives and solutions for addressing immediate challenges posed by COVID – 19 disruptions.

Enterprise architecture develops from having local view to enterprise view in third maturity stage 'Optimized Core'[24]. The focus is on enterprise system, standardization and optimization of enterprise business processes, data and business process platforms in addition to focus on IT. We term this stage as "Medium" maturity level for EA capability as given in Table 1. In addition to the role and tasks performed by EA in "Low" maturity level, the role of EA grows to facilitate achievement of company objectives by

enabling business outcomes forecasting, articulation of business process model and identifying IT capabilities required to implement the operating model. Medium maturity enterprise architecture looks within the enterprise and supports purpose capabilities such as strategy, portfolio, solution delivery etc. Organizational change is most prominent at this level as the business focus shifts from local solutions to global solutions. Enterprise-wide processes and data become standardized thereby becoming comparable and more predictable. A still has focus on IT applications, platforms and business process automation, but the focus area is now enterprise wide instead of just being project specific. Information technology in this stage is not just a utility for business process automation, rather considered a service fulfilling the needs and enabling the business capabilities to achieve business objectives. EA now has process orientation instead of mere functional orientation and is in position to provide significant feedback to Business – IT planning and improve business effectiveness. Enterprise flexibility and agility is increased due to global view of technology and business. Companies at this level of EA maturity will find it easier to adapt and improve their business models through better aligned information technology support while responding to COVID – 19 disruption.

In the "Business Modularity" stage, enterprise architecture capability enables strategic agility through business and technical modules which can be customized and reused. The modular architecture enables local experiments, and best ones can be adopted in larger context. Refer Table 1, we identify this stage as "High" maturity level for enterprise architecture capability. This stage enables organizations to quickly identify strategic opportunities that leverage their core, develop and implement corresponding business and IT processes to respond to changing market conditions. At this maturity level, flexibility grows both locally and globally due to increased business and application modularity. Changes are easier to implement because of easy plug and play implementation of business modules and technology functions. A "High" maturity enterprise architecture has view of

operating models, business capabilities, value streams and business integration. The business use case for enterprise architecture is based on metrics such as cost efficiency, speed to market and/ or strategic agility. In earlier maturity levels need for IT/ IT applications was driven by business. However, at this level IT usage and solutions are negotiated by both business and IT teams in agreement. Data, process, IT platform standardization from earlier maturity levels and business and technology modularity derived at this maturity level have better contribution in reducing business risk and security breaches and increasing disaster tolerance. Hence companies at this level of EA capability maturity are best placed to respond to COVID – 19 disruption challenges.

B. Enterprise Architecture Influence Categorization & Scope

As discussed above, business – IT alignment, business agility and enterprise architecture value delivered to organization increase with increase in the EA capability maturity,

reference Fig 1. Across different levels, enterprise architecture evolves from its role of enabling IT as a Back-Office Utility to acting as a Strategic Differentiator. The focal points where EA significantly contributes shift at different levels of maturity, however, the influence scope of lower levels’ maturity remains within purview at higher EA maturity levels also. Strategic business outcomes increase many folds from "Low" to "High" maturity levels and better operational excellence, greater product leadership and more strategic agility is attained. At “Low” maturity level, the enterprise architecture benefits obtained are operational in nature and IT system specific. At the “Medium” level of maturity, purpose driven EA benefits are achieved which fulfil the tactical management goals. At the “High” level of EA capability maturity, organizations derive strategic benefits by using and applying enterprise architecture tools and techniques. Hence, with increasing EA maturity, the quantum of benefits increases and assists in overall direction and performance of the organization.

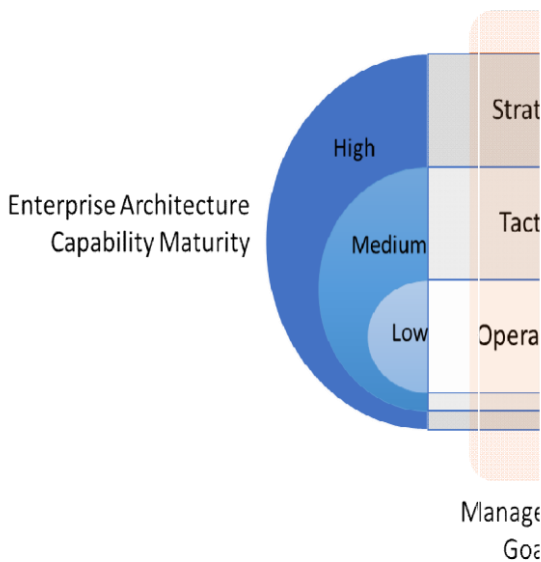


Fig. 1. EA Scope of Influence at Different Maturity Levels

Table 2: Phases of Businesses Response

React	Recover	Re-Imagine
1. Absorb the initial impact. 2. Focus on employee safety. 3. Focus on keeping key business functions operational while understanding impact of disruption. 4. Apply ad-hoc fixes & solutions for addressing immediate challenges.	1. Focus on restoring pre-disruption "business as usual" state with adjusted scale of operations. 2. Identify core business & support processes that need tweaking to achieve point 1 above. 3. Identify impacts of disruption on business ecosystem and changes needed for rearranging business operations.	1. Focus on growth in new normal. 2. Business strategy re-design and execution. Changed business operating models and structures.

The scope, scale and range of EA are as broad as the scope and scale of enterprises. Therefore the contribution of EA capability in helping organizations decide next course of action will depend not only on maturity of EA, but also the type of the organization, its business model and its response strategy to the disruption. Value preservation and value creation are two key themes based on which organizational response to disruption is shaped. Value preservation is about sustaining and continuing the existing business model. Value creation is about evaluating and modifying the business model according to change business dynamics. Theme dominance changes from Value Preservation to Value Creation as organizations move from ‘reacting to disruption’ to ‘re-imagining the businesses. As a result, the business strategies, planning and actions performed during response will try to address above mentioned themes and perform related actions with varying degrees. Organizations will focus on following while responding and re – shaping their strategies:

- Core organizational competencies
- Business offerings
- Channels
- Customer behavior & relationships
- Business Partners’ availability
- Own resources’ availability
- Organizational activities
- Business Processes
- Technical Capabilities

- Costs
- Revenue & Funding

C. Approach for employing enterprise architecture capability in formulating business response to economic disruption due to COVID – 19

We see businesses responding to COVID-19 disruption in three phases namely React, Recover and Re-imagine. Refer Table 2, the first phase “React” is about absorbing the initial impact of disruption, with focus on keeping business functions operating and employee safety. This phase is marked by extreme uncertainty. Ad-hoc fixes and solutions are applied to keep the business running while trying to understand & assess the economic impact on the overall business and its operating models. In the second phase “Recover”, uncertainty continues but some effects of disruption are understood and clues regarding business environment emerge. More planned and coordinated actions are taken to restore the pre-disaster business functional state and operations. Organizations try to identify changes in consumer, economic and competitive landscape. Adjustments in scale and methods of operations are carried out, corresponding business capabilities needing reinforcement are identified and worked upon as economic activity picks up.

The last phase “Re-Imagine” is about resumption of growth in new normal. In this

phase disruption impacts on the business environment are better understood. Changed market conditions, shift in consumer behavior, sentiments & preferences are well perceived and accepted. Well-designed strategic actions are executed for adjusting/ improvising business operating models and structures. There is focus on expansion, innovation and value generation. Duration of these phases will vary from company to company due to difference in nature of business, business environment, business model, business resilience, geography, industry etc. However, the organizational response to the disruption need not be strictly in sequential phased manner only. An organization while reacting (in the first phase) to the economic disruption may already start thinking about the next two phases of response and start building actionable strategy based on the understanding of known and unknown challenges. As discussed previously, depending upon the maturity of established EA capability within the organization, enterprise architecture can provide inputs across operational, tactical and strategic management focus areas. We suggest following approach for utilizing enterprise architecture in formulating company response to disruption and adjustment.

I. React Phase

During *React* phase, the focus is on keeping the business running (possibly at minimum level), employee/ resource safety and cost reductions.

At **operational** level, enterprise architecture can be used to:

- Identify applications needed to support critical business functions and workforce. Assess applications' scalability, performance at high user loads, disaster preparedness, risk profile, etc. Take corrective actions to ensure availability.
- Identify and update (if needed) IT access policies to support remote working.
- Identify and prioritize under-development IT efforts. Speed up development for applications supporting business operations. Halt not so

necessary IT work and relocate IT resources to more critical areas.

- Identify & reduce/ remove redundant IT effort.
- Speed up decommissioning of outdated/ redundant applications, repurpose (on - premise) or release (cloud) hardware for cost savings.

At **tactical** level, EA can be used to:

- Identify which business offerings can be kept operational by stepping-up technology usage in shortest time; and implement solution.
- Prioritize IT development effort to build and deploy business and workforce enabling/ automating applications & tools to support minimum viable business operations.
- Assess current enterprise IT landscape and rationalize the efforts and resources.

Identify existing business and IT capabilities that can be reinforced through people, process and technology intervention for increasing the operational efficiency. At **strategic** level, EA can be used to:

- For aiding business operations, identify & deploy technological quick wins for existing business capabilities such as third-party mobile applications, adopting collaboration tools etc.
- Identify and deploy new business and IT capabilities that can further the enablement of business continuity such as digitizing or automating easy/ repetitive processes, self-service, digital payment methods etc.

II. Recover Phase

During *Recover* phase, some impacts of disruption on business ecosystem are understood and changes needed for adjusting business process are being identified. Primary focus is on restoring pre-disruption "business as usual" state with adjusted scale of operations. Organizations can continue to leverage contribution of previous phase and carry on actionable suggestions provided by enterprise

architecture specific to “React” phase depending upon the situation.

At **operational** level, enterprise architecture can be used to:

- Identify and develop technical support/ applications needed to support changed business capabilities.
- Identify technical solutions for business operations, product & service delivery alternatives.
- Identify cost saving alternatives for IT service delivery.

At **tactical** level, EA can be used to:

- Identify cost, efficiency and operational improvements across People, Process and Technology elements of the organization.
- Assess identified improvements and design corresponding business capability, IT capability changes.
- Rationalize organization IT roadmap and re-think/ re-prioritize investments in systems and IT infrastructure to address the changes.
- Assess and update technology lifecycle model and rationalize technology asset usage across enterprise.

At **strategic** level, enterprise architecture can be used to:

- Identify products, services or business capabilities which can be reduced in scale or retired altogether while refocusing on ‘back to normal’ scenario.
- Identify and enhance capabilities for better fit and supporting the strategy.

III. Re - Imagine Phase

During *Re – Imagine* phase, organization focus is on reinventing themselves for the long term. Reinvention can happen by rethinking the business, operating model, refocusing the capacity, introducing new products/ services, developing new channels, rescaling digital components etc. Like *Recover* phase, organizations can continue to leverage contribution previous

phases and carry on actionable suggestions provided by enterprise architecture in this phase also.

At **operational** level, enterprise architecture can be used to:

- Support value creating work and long-term business strategy by developing new IT capabilities.
- Identify and develop new technology services/ offerings.
- Identify and improve automation scope, information flow etc. for better technology alignment, integration and adoption.

At **tactical** level, EA can be used to:

- Re – imagine business process lifecycle with the help of innovative technologies such as artificial intelligence, machine learning etc.
- Re – evaluate traditional technology operating model for value creation and tighter alignment with business strategy and organization transformation.

At **strategic** level, enterprise architecture can be used to:

- Identify new products, services or business capabilities which can be introduced in ecosystem as part of reimagination or scaling up.
- Identify new ways to approach markets and set up new (digital) channels and partnerships.
- Identify strategic business capabilities that can be transformed for better market impact and growth.
- Identify, transform, adjust value streams for optimization.
- Identify & test assumptions and possible scenarios.

Above proposed initiatives and their categorization across response phases and maturity levels can lend turn – key support to organizations and improve business agility and resilience. As emphasized earlier, EA pursuits across different phases need not be disjoint, sequential exercise. Depending upon organization setup, business nature, EA

adoption maturity and response type, reactive and proactive initiatives can co-occur and provide well-grounded guidance and direction during different phases of business response.

Theoretical Implications

This study will help organizations unlock value of their enterprise architecture capability and leverage the inherent information in rethinking & strategizing their business models and operations. Depending on size, market position, nature of business, different companies will react differently to the present business ecosystem disturbance. The suggested approach will help organizations navigate through this disturbance by adopting methods relevant to their unique situations.

Conclusion & Further Research

This research provides important theme for application of enterprise architecture as means to support organizational efforts in dealing with business ecosystem uncertainty and economic dependency in situations caused by COVID – 19 and similar long duration pandemics. Important EA benefits for key management focus areas were documented through extensive literature review. Subsequently major institutional response phases are identified, and appropriate enterprise architecture exploits are proposed for different adoption levels of EA capability. It is worth noting that indicated approach is most beneficial in strategic terms at higher EA capability maturity levels. However, it should not deter organizations from exploring potential applications of enterprise architecture methods at lower EA capability maturity levels.

Rather, organizations can incorporate enterprise architecture as additional dimension in overall strategic refocus and re-imagination for future benefits.

This work provides researchers a perception of various applications of enterprise architecture at different organizational response levels to business ecosystems disruptions. For further research, assessment criteria should be charted and developed for measuring the benefits and contribution of suggested concept. Next, the benefits and contribution should be empirically measured by employing the approach suggested, and rational should be provided for adoption of this approach and further investments in developing enterprise architecture capability.

Limitations

There are few limitations of this study. Firstly, enterprise architecture capability building is generally spinoff of information technology (IT) adoption. Organizations lacking reasonable IT implementation may not be able to realize any potential EA or IT benefits due to lack of integration with business. Secondly, the contribution of EA capability at very low maturity levels may not be significant enough and worth trying. And lastly, the approach suggested is based literature review and based on limited empirical data. Systematic field research is needed to empirically validate the concept presented in this paper.

References

1. Turner, J., & Akinremi, T. (2020). The business effects of pandemics—A rapid literature review. Enterprise Research Centre.
2. Carlsson-Szlezak, P., Reeves, M., & Swartz, P. (2020). What Coronavirus Could Mean for the Global Economy. Harvard Business Review.
3. Buck, T., Arnold, M., Chazan, G., & Cookson, C. (2020, March 29). Coronavirus declared a pandemic as fears of economic crisis mount. Retrieved March 29, 2020, from <https://www.ft.com/content/d72f1e54-6396-11ea-b3f3-fe4680ea68b5>
4. Long, A., & Ascent, D. (2020). World Economic Outlook. International Monetary Fund.
5. Delivorias, A., & Scholz, N. (2020). Economic impact of epidemics and pandemics. European Parliamentary Research Service, 1-10.

6. Ajami, R. (2020). Globalization, the challenge of COVID-19 and oil price uncertainty.
7. Hundt, S., Jahnel, J., & Horsch, A. (2021). Power Purchase Agreements and Financing Renewables: An Interdependency. *The Journal of Structured Finance*, 27(1), 35-50.
8. Karpati, J., Elezaj, E., Cebotari, V., & de Neubourg, C. (2021). Primary and secondary impacts of the COVID-19 pandemic on children in Ghana.
9. Sneader, K., & Singhal, S. (2020). The future is not what it used to be: Thoughts on the shape of the next normal. McKinsey & Company, 4.
10. Faridi, M. R., Faisal, S., Naushad, M., & Sinha, S. (2020). HINDSIGHT THINKING MET WATERLOO FOR THOMAS COOK PLC, UK. COULD GARTNER HYPE CYCLE HAVE BEEN THE HARBINGER FOR RESCUE?. *Academy of Strategic Management Journal*, 19(6), 1-15.
11. Hugelius, K., Becker, J., & Adolfsson, A. (2020). Five challenges when managing mass casualty or disaster situations: a review study. *International journal of environmental research and public health*, 17(9), 3068.
12. Higgins-Desbiolles, F. (2020). Socialising tourism for social and ecological justice after COVID-19. *Tourism Geographies*, 22(3), 610-623.
13. Hotchkiss, J. L. (2021). Wage Pressures in the Labor Market: What Do They Say? (No. 2021-05). Federal Reserve Bank of Atlanta.
14. Cho, D. I., & Ogwang, T. (2008). An objective evaluation of the Ivey Purchasing Managers Index. *Journal of Enterprise Information Management*.
15. Global, E. Y. (2020). COVID-19 and pandemic planning: How companies should respond. Ernst & Young Global Limited.
16. Stubbs, T., Kring, W., Laskaridis, C., Kentikelenis, A., & Gallagher, K. (2021). Whatever it takes? The global financial safety net, Covid-19, and developing countries. *World Development*, 137, 105171.
17. Niemimaa, M., Järveläinen, J., Heikkilä, M., & Heikkilä, J. (2019). Business continuity of business models: Evaluating the resilience of business models for contingencies. *International Journal of Information Management*, 49, 208-216.
18. Barnes, P., & Oloruntoba, R. (2005). Assurance of security in maritime supply chains: Conceptual issues of vulnerability and crisis management. *Journal of International Management*, 11(4), 519-540.
19. Elliott, D., Swartz, E., & Herbane, B. (2010). *Business continuity management: A crisis management approach*. Routledge.
20. Herbane, B., Elliott, D., & Swartz, E. M. (2004). Business continuity management: time for a strategic role?. *Long range planning*, 37(5), 435-457.
21. Wang, W. T. (2006). *Strategic alignment: A knowledge management approach to crisis management*. State University of New York at Albany.
22. Richardson, P. S., Dick, A. S., & Jain, A. K. (1994). Extrinsic and intrinsic cue effects on perceptions of store brand quality. *Journal of marketing*, 58(4), 28-36.
23. Mills, K., & McCarthy, B. (2016). The state of small business lending: Innovation and technology and the implications for regulation. Harvard Business School Entrepreneurial Management Working Paper, (17-042), 17-042.
24. Ross, J. W., Weill, P., & Robertson, D. (2006). *Enterprise architecture as strategy: Creating a foundation for business execution*. Harvard business press.
25. Wildavsky, A. (1991). *The beleaguered presidency*. Transaction Publishers..
26. Lengnick-Hall, C. A., & Beck, T. E. (2003, August). Beyond bouncing back: The concept of organizational resilience. In National Academy of Management meetings, Seattle, WA.
27. Home III, J. F., & Orr, J. E. (1997). Assessing behaviors that create resilient organizations. *Employment relations today*, 24(4), 29-39.
28. Tierney, K. J. (2003). Conceptualizing and measuring organizational and community resilience: Lessons from the emergency response following the September 11, 2001 attack on the World Trade Center.

29. Coutu, D. L. (2002). How resilience works. *Harvard business review*, 80(5), 46-56.
30. [Kantur, D., & İşeri-Say, A. (2012). Organizational resilience: A conceptual integrative framework. *Journal of Management & Organization*, 18(6), 762-773.
31. Kantur, D., & İşeri-Say, A. (2012). Organizational resilience: A conceptual integrative framework. *Journal of Management & Organization*, 18(6), 762-773.
32. Mallak, L. A. (1998). Measuring resilience in health care provider organizations. *Health manpower management*.
33. Conner, D. (1993). *Managing at the speed of change: Guidelines for resilience in turbulent times*. Villard Books.
34. Covin, J. G., & Slevin, D. P. (1986). The development and testing of an organizational-level entrepreneurship scale. *Frontiers of entrepreneurship research*, 1(3), 628-639.
35. McCann, J., Selsky, J., & Lee, J. (2009). Building agility, resilience and performance in turbulent environments. *People & Strategy*, 32(3), 44-51.
36. Gölgeci, I., Arslan, A., Dikova, D., & Gligor, D. M. (2019). Resilient agility in volatile economies: institutional and organizational antecedents. *Journal of Organizational Change Management*.
37. Hooper, M. J., Steeple, D., & Winters, C. N. (2001). Costing customer value: an approach for the agile enterprise. *International Journal of Operations & Production Management*.
38. Conboy, K., & Fitzgerald, B. (2004, November). Toward a conceptual framework of agile methods: a study of agility in different disciplines. In *Proceedings of the 2004 ACM workshop on Interdisciplinary software engineering research* (pp. 37-44).
39. Lengnick-Hall, C. A., & Beck, T. E. (2009). Resilience capacity and strategic agility: Prerequisites for thriving in a dynamic environment (pp. 39-69). San Antonio, TX: UTSA, College of Business.
40. Zachman, J. A. (1996). The framework for enterprise architecture: background, description and utility. *Zachman International*, 1-5.
41. Nitsche, A. M., Schumann, C. A., & Franczyk, B. (2021). A Conceptual Reference Framework for Data-driven Supply Chain Collaboration.
42. Alexander, J. (2018). *Capturing the Organization Organism: An Outside-In Approach to Enterprise Architecture*. Technics Publications.
43. Koenig, I. (2019). *Principle Based Enterprise Architecture: A Systematic Approach to Enterprise Architecture and Governance*. Technics Publications.
44. Kurnia, S., Kotusev, S., Shanks, G., Dilnutt, R., & Milton, S. (2021). Stakeholder engagement in enterprise architecture practice: What inhibitors are there?. *Information and Software Technology*, 134, 106536.
45. Bossert, O., & Laartz, J. (2016). How enterprise architects can help ensure success with digital transformations. *McKinsey & Company*, 1-6.
46. Veasey, P. W. (2001). Use of enterprise architectures in managing strategic change. *Business Process Management Journal*.
47. Niemi, E. (2008). Enterprise architecture benefits: Perceptions from literature and practice. *Tietotekniikan tutkimusinstituutin julkaisu*, 1236-1615; 18.
48. Prasath, S., & Nirmala, K. Adaptive Boosting Classifier Based Attack Detection for Secured Communication in Vanet. *International Journal of Advanced Science and Technology* (ISSN: 2005-4238), 28(17), 168-177.
49. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.

50. Herbane, B. (2010). The evolution of business continuity management: A historical review of practices and drivers. *Business history*, 52(6), 978-1002.
51. International Monetary Fund. (2020, April). *World Economic Outlook: The Great Lockdown*. Retrieved June 2020, from International Monetary Fund website: <https://www.imf.org/~media/Files/Publications/WEO/2020/April/English/Ch1.ashx?la=en>
52. Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., ... & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International journal of surgery*, 78, 185-193.
53. Skipper, J. B., & Hanna, J. B. (2009). Minimizing supply chain disruption risk through enhanced flexibility. *International Journal of Physical Distribution & Logistics Management*.

THE POWER OF COGNITIVE TECHNOLOGY IN BEAUTY INDUSTRY

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ABSTRACT

Cognitive technologies are giving new ways for businesses to create value for their customers. Businesses are now heavily investing into these technologies to give their customers more personalised offering. One such Industry which is influenced by these technologies is the Beauty Industry, which is moving from product-based model to experience based model. **Design/Methodology/Approach:** Various methods using which beauty Industry is leveraging the use of cognitive technology is by offering product personalization, catboats system and smart skin advisory. This paper focuses on how cognitive technology is used to provide skin advisory solution by using image processing techniques like open CV to extract skin features and further uses deep learning algorithm to recommend the right product based on the features. We also understand the step by step approach adopted for such recommendation system. This paper aims to study the working of an image base recommendation system, their use cases, short comes and areas of improvement. **Practical/Theoretical Implication:** Amid covid 19, cosmetic industry is facing huge losses and in such situation they have to come up with an alternate solution by bring their products and showrooms to the customers, a product recommendation solution stated in this paper will be a perfect solutions to gain customer trust and ensure brand loyalty

Keywords: Cosmetic Industry, Cognitive Technology, Deep Learning, Neural Networks, Recommendation system

Introduction

The cosmetics industry is a booming sector, and by 2023, the global demand for cosmetic products is projected to hit a size of \$806 billion. In the digital revolution, the beauty care industry has also been swept up and we today see a growing array of leading beauty brands adopting new technology to improve the experience of the customer. Personalized digital services are now in full swing, with industry leaders such as Sephora, Estée Lauder and Dior experimenting with artificial intelligence.

But what are the big trends in tech?

AI and Personalization:

Fifty percent of women complain that they can't find the right foundation shade for their face, and women with darker skin tones have been crying out for more options,"50 percent of women complain that they can't find the right shade of foundation for their face, and women with darker skin tones have been crying out for more choice." "But it would be "impractical" to place thousands of shades on shop shelves, he says. Instead a custom built foundation machine named Le Teint Particulier was produced by L'Oreal subsidiary Lancome. Which promises to find the "exact match" for your skin using AI.

Virtual 'Try on' apps: As we do more of our online beauty brands shopping, augmented reality (AR) is constantly used to boost the experience. These digital overlays are made more precise b

y advancements in image recognition and face tracking technology. Take Sephora's Virtual Artist, which allows customers to digitally try thousands of shades of lipstick and eyeshadow through their smartphones or in stores at kiosks. The app works by measuring where your lips and eyes are in real time.

Printed make up: Are we ever going to see robots putting our makeup on for us?

In the last few years a number of gadgets released indicate we could. Take the Proctor and Gamble (P&G) Opté wand, a make-up printer Launched in Las Vegas at the Consumer Electronics Show this year. To cover age spots, burst blood vessels and other blemishes, the wand scans the skin and precisely applies tiny quantities of make-up. These examples indicates the extent to which technology and beauty solution providers are running in parallel. With artificial intelligence, the possibilities for advancement in the cosmetics industry are endless, from facial recognition technology to machine learning databases and virtual contouring of makeup. Many brands have also begun investing in emerging technology and beauty Chabot's

The natural language processing technology segment dominated the industry, accounting for over 40% of the overall volume due to the surging demand for pattern recognition. Cloud systems are expected to gain momentum as

they facilitate secure and integrated data storage solution according to the business requirement. The Asia Pacific region is predicted to emerge as the fastest growing market owing to the rise in small and medium enterprises in emerging countries, such as India and China. Prominent vendors operating in the market include Google, IBM, Microsoft Corporation, Oracle Corporation, SAP, Statistical Analysis System (SAS), and Saffron Technology. Increased focus on research and development activities and adoption of artificial intelligence are being observed in the industry. We see the following market trends:

- **Integration of Technology and Beauty Industry** :Technologies like augmented reality, deep learning has completely reshaped the way that brands operate
They are used to provide the following
 - Personalized recommendation tools
 - Performance marketing measurement platforms
 - Demand forecasting and supply chain tools
 - Real-time customer service platforms
- **Facial Recognition Cosmetics:**
People are unique, so is their skin. Facial recognition allows them to identify a skin type accurately and select a suitable beauty product
- **Niche Focusing Cosmetic Industry** are now focusing on Niche market segment
- **Pause well Aging** : Targeting women in menopause by providing the right personal care products
- **Natural and Sustainable:** Sustainability is becoming increasingly important to transparency minded people who want to know where our products come from
- **Personalization:** Providing personalized service which focus on enriching consumer experience and thereby fueling customer loyalty

Business Problem:

With advanced technology such as Artificial Intelligence and machine learning the seller consumer world is shirking and luring customers with the ease of personalized solution, but providing personalized solution in beauty and cosmetic industry is still a challenge. Cosmetic and Beauty Industry are finding it difficult convey the exact benefits of the products to the consumers. With consumers moving from brick and mortar to online

solution cosmetic companies find it difficult to understand the exact need of their targeted audience. One of the biggest problems with cosmetics shops is that you cannot try most products. Yet, a lot of people choose beauty products according to their color, structure, and smell. As consumer awareness increases, they now seek for expertise before buying a skin product. Selecting a cosmetic product that is best suited for the skin is a difficult task. The latest advancements in science and technology has led cosmetic industries come up with a wide array of products each of which has a specific usage and caters to a specific need of the user. Due to a busy lifestyle the user does not have enough time to get their skin analyzed from a skin expert. The user may choose a product not aligned with their skin type and may not see the improved results. Cognitive cosmetic recommender will help users get their skin analyzed at home using a web base application and get product recommendations for best results.

Proposed Solution

Cognitive cosmetic product recommendation system: A product which works on **feature extraction** using image processing and machine learning based **recommendation system**. This model extracts facial features such as skin age, wrinkles, skin type and based on these features provides a skin product best suited based on the features. Provide useful information to the user about the face like Skin Age, presence of Wrinkles and Acne on the face. A cognitive cosmetic product recommendation system: Provide personalised skin solutions to the users based on their skin features. This model will extract facial features using augmented reality and AI based techniques and Machine learning algorithm will be used to recommend a personalized solution. Enable the user to click a selfie, which will be further analysed by the application to extract facial features using image processing. Provide useful information to the user about the face like Skin Age, presence of Wrinkles, Dark Spots and Acne on the face. Recommend the best suitable Product to the user based on extracted facial features.

This application captures users face image using image processing techniques Open CV,

then extracts features like skin type, skin age, wrinkles and acne using deep learning and machine learning techniques like CNN and Keras and finally recommends the product based on the extracted features

Literature Review

2019 was a banner year for makeup technology. Techbacked cosmetics brands will continue to disrupt the market in 2019 and beyond, from major beauty firms making their first technology acquisitions to an industry wide push towards personalized beauty products and experiences.

The possibilities are being explored by beauty and cosmetics companies with the help of artificial intelligence and machine learning. This article aims to provide an idea of what they might currently expect from AI in their industry to business leaders in the beauty, skincare, and cosmetics space. We hope that this report helps business leaders to gain information that they can confidently relay to their executive teams so that when thinking about AI adoption, they can make educated decisions. Established Skincare is a consumer app that develops personalized skincare regimens based on the particular skin type of a customer using machine learning. The company reports that the recommended routine is based on its Beauty Genome Project, a database of over 8 million reviews of

Customer items, 100,000 skincare products and 20,000 ingredients, as well as information about skin and ingredients from scientific or peer-reviewed journal papers.

We could not find any videos to show how the application works, but by first taking a quiz

That asks about their skin condition, including dryness, pigmentation, acne, and elasticity, clients may begin using the webbased application. The app also asks about variables that could influence the condition of the skin, such as age, exposure to the sun, ethnicity, diet, sleep, and activities such as work and exercise. The gathered data is analyzed and correlated with the database of the application. Then, machine learning algorithms fit the particular skin profile of the client and recommend a regimen for skin care.

Coty offers an augmented reality virtual mirror software that it calls Magic Mirror. Coty's magic mirror allows customers to virtually wear products from the Bourgeois Rouge Velvet

Lipstick collection. Bourjois is one of Coty's product lines. What's different from other VR mirror: Instead of tapping products from an on-screen selection, the customer needs to physically pick up a product on the display tray or shelf. This behavior activates the sensors on the mirror, while the computer vision technology virtually applies the shade of lipstick to the customer's lips on the screen: Coty explains that shoppers can complete their digital looks with onscreen eye makeup and blush, which is matched to each shopper's individual skin tone.

Role of Beauty is an application created that provides customers with personalized shampoo and

Conditioner. The company claims that the application

uses machine learning algorithms to Personalized shampoo formulations based on the type of hair and the treatments it wants from consumers, Such as conditioners, waxes, and oils. Clients need to respond to the survey regarding their hair type, hair texture, scalp moisture, fragrance preferences, shampoo and conditioner color, preferred bottle size, and frequency of use to begin the recommendation. This profile helps the algorithms to identify trends for the customer in the company database and come up with matches.

Plan Study

Here we understand in detail the working on an end to end recommendation system which incorporates technology such as artificial intelligence and machine learning to move one step ahead and provide personalized recommendation based on the skin features such as wrinkles, skin type, skin age, wrinkles on skin, acne on skin. Then after studying all these features our recommendation engine powered by machine learning algorithm gives away the best suitable products.

From technology and platform point of view we have used image processing library in python called OpenCV to extract capture face image and further create a boundary around the face to capture the area of focus. For skin feature extraction such as skin age, gender analysis, wrinkle analysis and acne analysis we have used Machine learning techniques such as Convolutional

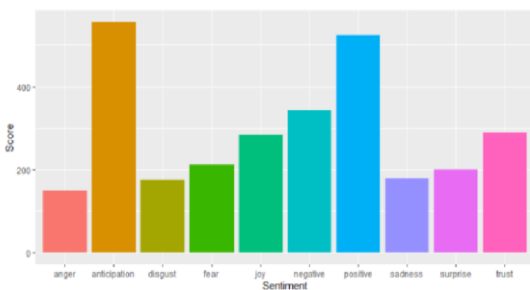
Neural Network. Further to recommend the optimum product we have used classification model called KNN.

B. G. thanks...”.Put sponsor acknowledgments in the unnumbered footnote on the first page.

Research Methodology

The Present working model is created based on the current consumer sentiments across cosmetic industry personalization by using twitter API.

We collected around 15000 tweets through API using R programming these sentiments are catering to cosmetic Industry. We later created a bar graph to understand the present consumer sentiments across the Industry. The sentiment chart is as follows

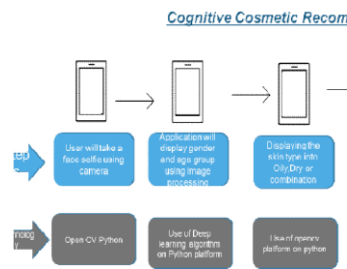


The Sentiment Analysis highlights that overall sentiment with respect to cosmetic Industry is positive but anticipation for this industry is equally high which indicates that consumers are anticipating something new and innovative form the industry

Model Working in Detail

The user story:

The Users first visits the web based application, he then reads all the instructions and clicks the selfie. Application then detects the face boundaries and remove the background thereby cancelling the noise .Application then processes the face image and displays the user skin age group and the gender. The application then analysis the wrinkles and acne on the skin and classifies it into .Low mid and Severe wrinkles and low mid severe acne. Based on all these features it finally displays the most suitable skin products and at last gives the option to the user to buy the product



The tools and algorithm adopted at each steps is as follows

- **Application platform:** The cognitive cosmetic product recommendation system was completely build on python platform and hosted on python flask
- **Capturing face Image:** Here we used image processing technique 'Open CV' to get access to the web camera of a system and capture image to store in the directory for further analysis
- **Feature extraction :** Here we used **deep learning (CNN) and neural network** technique to extract features like skin wrinkles, skin acne and skin age
- **For classification :** **SVM** algorithm to classify the features into the following
 - Skin Type: Normal, Oil, Dry and Combination
 - Skin Age : 15-20,21-25,26-30,31-35,36-45,46-55,56-65
 - Skin Wrinkles: Mild and Severe
 - Skin Acne: Very Mild, Mild, severe
- **Front End of the application: Tkinter** Python a python package used for application GUI
- **Backend of the application:** Dataset of images having different skin feature

Model Details:

Face image capturing: Here we have used Open CV a python library for image processing to capture and extract image using the laptop web camera

```

import cv2
from detect import detected
key = cv2.waitKey(1)
webcam = cv2.VideoCapture(0)
while True:
    
```

```

try:
    check, frame = webcam.read()
    print(check) #prints true as long as the
webcam is running
    print(frame) #prints matrix values of each
framecd
    cv2.imshow("Capturing", frame)
    key = cv2.waitKey(1)
    if key == ord('s'):
        cv2.imwrite(filename='saved_img.jpg',
img=frame)
        webcam.release()
        img_new = cv2.imread('saved_img.jpg',
cv2.IMREAD_GRAYSCALE)
        img_new = cv2.imshow("Captured
Image", img_new)
        cv2.waitKey(1650)
        cv2.destroyAllWindows()
        print("Processing image...")
        img_ = cv2.imread('saved_img.jpg',
cv2.IMREAD_ANYCOLOR)
        print("Converting RGB image to
grayscale...")
        gray = cv2.cvtColor(img_,
cv2.COLOR_BGR2GRAY)
        print("Converted RGB image to
grayscale...")
        print("Resizing image to 28x28
scale...")
        img_ = cv2.resize(gray,(28,28))
        print("Resized...")
        img_resized =
cv2.imwrite(filename='saved_img-final.jpg',
img=img_)
        print("Image saved!")
        detected(img_new)
        break
    elif key == ord('q'):
        print("Turning off camera.")
        webcam.release()
        print("Camera off.")
        print("Program ended.")
        cv2.destroyAllWindows()
        break

except KeyboardInterrupt:
    print("Turning off camera.")
    webcam.release()
    print("Camera off.")
    print("Program ended.")
    cv2.destroyAllWindows()
    break

```

For extracting features from an image i.e. extracting wrinkles from an image we have used a Python operator called as Sobel A 2D spatial gradient measurement on an image is performed by the Sobel operator and thus emphasizes high spatial frequency regions that correspond to edges. It is usually used in an input grayscale image to find the estimated absolute gradient magnitude at each point.

The code which incorporates sobel to find out wrinkles in the image is as follows

```

import os
import glob
import cv2
import numpy as np
import matplotlib.pyplot as plt

path = r'C:\Users\LENOVO\Desktop\Face'
classes = ['Wrinkle', 'flat']
sobely_kerut = []
sobelx_kerut = []
sobely_datar = []
sobelx_datar = []
per_kerut = []
per_datar = []
msg = "tipe: {0}, sobel_y: {1:1.6}, sobel_x:
{2:1.6}, per: {3:1.6}"
for i in classes:
    file_path = os.path.join(path, i, '*.jpg')
    files = glob.glob(file_path)
    for j in files:
        image = cv2.imread(j)
        image = cv2.cvtColor(image,
cv2.COLOR_BGR2RGB)
        image_gray =
cv2.GaussianBlur(image,(5,5),0)
        image_gray = cv2.cvtColor(image_gray,
cv2.COLOR_RGB2GRAY)
        sobely = cv2.Sobel(image_gray,
cv2.CV_8UC1, 0, 1, ksize=5)
        sobelx = cv2.Sobel(image_gray,
cv2.CV_8UC1, 1, 0, ksize=5)
        height, width= sobely.shape
        val_1 = cv2.sumElems(sobely)[0]/(height
* width)
        val_2 = cv2.sumElems(sobelx)[0]/(height
* width)
        per = val_1/val_2
        if i == 'Wrinkle':
            sobely_kerut.append(val_1)
            sobelx_kerut.append(val_2)
            per_kerut.append(per)

```

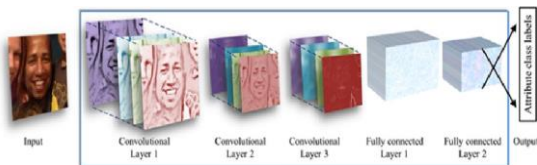

else:

```
sobely_datar.append(val_1)
sobelx_datar.append(val_2)
per_datar.append(per)
print (msg.format(j, val_1, val_2,
val_1/val_2))
```

Skin Age and Gender Analysis:

Levi and Hassner introduced and trained deep learning age detector model we use here this model was created in their 2015 publication, Age and Gender Classification Using Convolutional Neural Networks.

The working of the model can be illustrated from the following diagram



Overall Working of the model (Walkthrough) :

Application Walkthrough:

Step 1: Application Home page

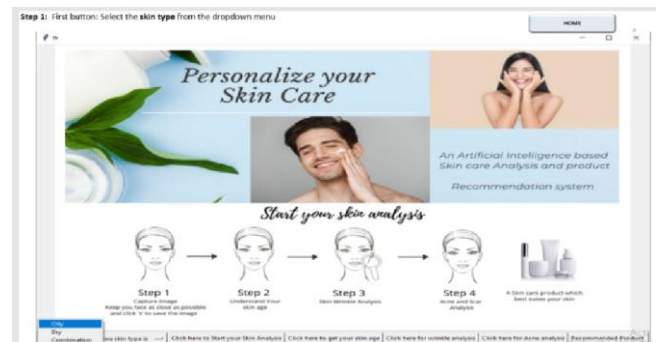
As the user visits the website for the skin assessment test he or she will be able to see the application homepage which illustrates the overall steps which needs to be followed for the complete skin analysis using graphics.

Along with the graphics. There are clickable buttons below each graphic which represents the overall flow which needs to be followed for carrying out the assessment

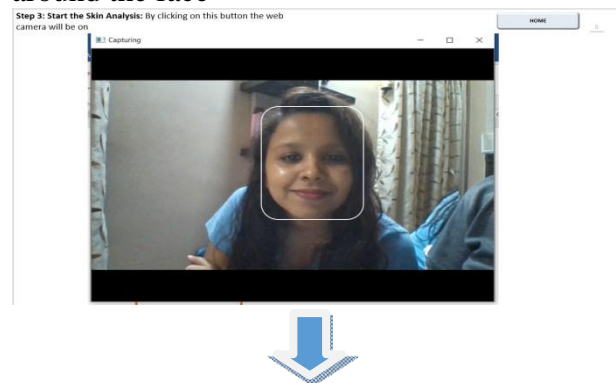


Step 2: As skin type plays a major role in determining the most appropriate product but understanding skin types from image can't result into various bugs as the skin texture

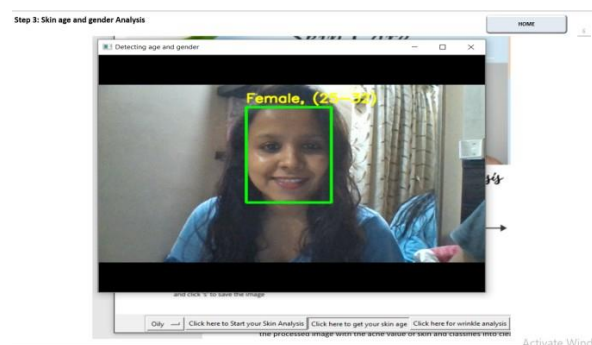
cannot be analyzed from the image therefore we plan to take a single input from the user about their understanding of the skin type .



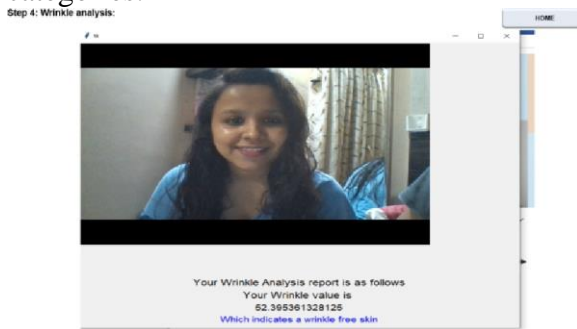
The next button. It's to capture image this particular button triggers the laptop camera to pop up when the camera is on there are instructions which the user needs to read and follow in order to get a clear and perfect image this particular step also creates a boundary around the face



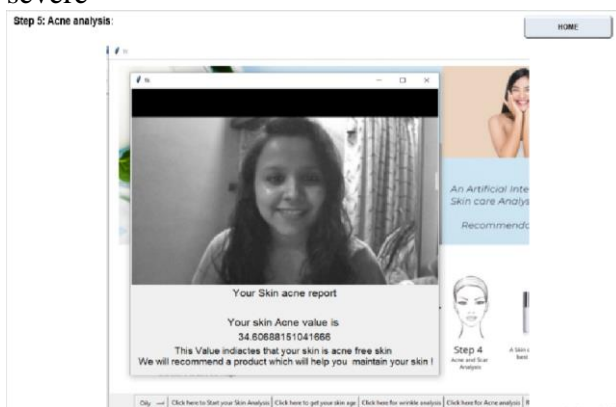
The next step is to determine skin age and gender as discussed earlier on clicking the button our neural network is called and the overall skin age and gender is displayed to the user please note that the skin age can be lesser or greater than the actual age of the user this depends on The overall health of the skin with a good skin person his skin age will be definitely less than his actual age



The next button invokes wrinkle analysis on the screen this determines if there are wrinkles present on the skin I need to present it categorizes the wrinkles into less moderate and severe .It also displays an overall wrinkle value of the skin this value help the algorithm categorizes the overall wrinkles into various categories.



The next step is of acne analysis which is very similar to wrinkle analysis even here after acne analysis the overall acne presence has divided into three buckets Has less, moderate and severe



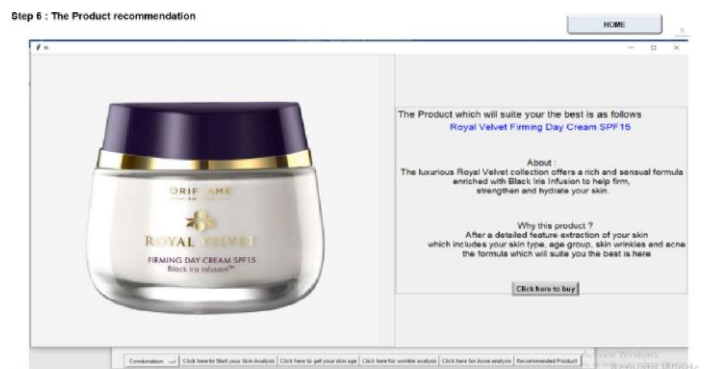
The final step is recommending the right product based on where is Skin features here the user will be able to see [OB]. A single skin product the overall composition of the product and why it is suitable to the user scan it also displays a link below which enables them to immediately buy the product from their online platform [OB].

At the end, user will see the recommended product as shown here.

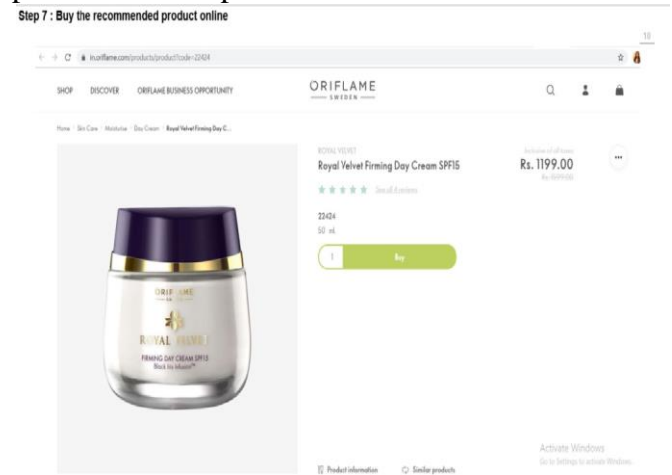
This screen will hold the following information:

- Product Description
- Product specification
- Why it is suitable for the user
- link to buy the product online

Users also have an option to provide feedback on the entire solution. This was the algorithm can be fine tune and made more accurate according to the feedback given



At the end the user also has an option to buy the product online by using a clickable button which takes the user directly to the e-commerce platform of that particular brand



Results and Analysis

At the end user is able to see a detailed report on her skin analysis. There is also a feature of taking input from the user there by the model can learn from the input. The results in this model are displayed by step to step bases. This platform is also connected to the e-commerce platform which enables the user to immediately place a buying request once the analysis is completed

Awareness of cosmetic trends .The first model that is detecting the skin age Has an accuracy of around 82% which means 82% of the times the overall prediction of age is correct. Talking about the next model which is wrinkle analysis

sure the overall accuracy is 72% we can increase accuracy here by adding more and more images to the testing data set at present we worked with around 500 images of wrinkled and non-wrinkled. Similar to the wrinkle analysis the acne analysis of skin shows around 76% of accuracy even here take it as he can be increased by Incorporating more images for the testing data set at the end the recommendation model has been a courtesy of about 86% your accuracy is high since the product portfolio we have considered is only 12 products therefore we can conclude that the model is somewhat over fitted .As in when we include more and more product portfolio we see that the model accuracy will go up and down and overfitting will be eliminated

We also see that the overall skin analysis add this platform typically takes around 3.5 minutes .Since this model does not take a single input from the user we can say that this model is completely user-friendly. We can plan to make this model highly scalable as it is currently being developed python and hosted python flask we can make the solution highly scalable by implementing the python flask solution on cloud premises

The overall platform architecture:

The various sources of data are as follows

Database for faces: 500 face images of non-wrinkled and wrinkled faces each. 500 face images of Acne and acne free faces .Customer historical data such as the previous purchase made feedback given. Platform Architecture:

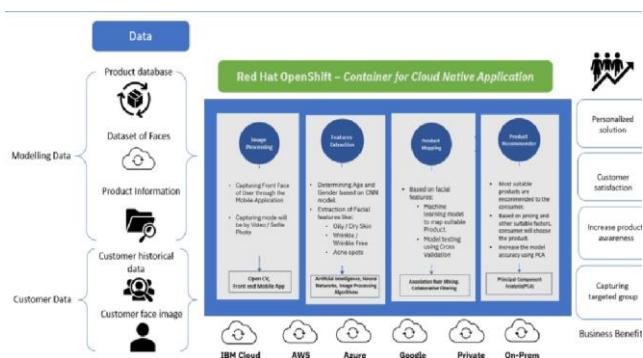
Here the platform we built our application is python and hosted on python flask. For scalability we can use cloud based platform like IBM Cloud, AWS, Azure, Google, Private and On-Premises.

Discussion

As we have seen from the sentimental analysis at the beginning of the application the sentiments indicates that there is high amount of anticipation in the consumers with respect to technology based trends catering to the cosmetic industry. This solution provides a unique business value proposition starting with enriching the overall consumer experience providing an export solution businesses benefit by integrating with upcoming technology can make the solution more agile and consumer centric. This will also enable additional point of sales this particular platform will help businesses to enhance virtual sales points there by increasing the overall revenue. As this application can be easily hosted on cloud native platform it plans to greatly reduce the upfront cost of implementation a POS system for many businesses. As we see this platform provides a competitive edge to the businesses especially the beauty industry I it aids. The overall brand image and promotes the private label products and thus adopt direct to consumer model of selling. This particular solution has high amount of opportunity as he I am machine learning technology has a major share in how a beauty and cosmetic company functions as it provides more consumer centric solutions therefore companies which are now investing in these technology will easily align itself Changing trends and consumer preferences.

Such type of solutions are already been adopted by many cosmetic companies with its own unique offering but what we have observed that most of these personalized solution take users input and based on the input uses ML technique to recommend the suitable provides, very less are the applications which lets the bot input all the user parameters from image and thus provide solution with minimum human intervention, but since companies observe that consumers find it difficult to trust of bots therefore they let the customer fill their requirements

We still see that this space tough has reach an epitome in research and development but when it comes to adaptability there are many myths and restrictions which needs to be overcome. These technologies sees a wide acceptance in gaming and simulation based application which is been used just for fun, to state an example we



see that there are filters on Instagram and snapchat these filters works on the similar technology i.e. augmented reality in try on category. These solution are yet to see its adoption in a more matured form.

Conclusion and Recommendations

Ultimate result of this platform depends upon the overall business impact this platform creates and we see that there are multiple factors that are impacted which are discussed as follows

Starting with customer satisfaction you'll see that there is an increase in customer satisfaction as customer will get access to white variety of product also customer will be able to enjoy a personalize service which is highly trend these days. The overall brand awareness also increases nearby customer is aware about various offerings by a particular brand. Talking about the next impact we can see the overall increase in the product awareness as customers are becoming more aware about the benefits and how does the product suit a particular skin. The product information is usually ignored which overall impact the awareness level of a particular product also since this platform analyzing skin in detail it help increase awareness about benefits of the product. To take an example of we know that Olay as a brand has around 8 different products under each prevention but each product has its unique preposition which are usually ignored such platform helps the consumer with a wide variety of product availability also. The brand is able to showcase the benefits of its product in a much more convincing way.

The third most important business impact is that this platform will enable the various cosmetic industries and Brands to understand the need of the targeted audience better. Please see nowadays beauty industry are focusing on providing niche services this particular platform will enable beauty industry to capture more and more data about the customers and understand the needs and their expectations thereby improving their overall Customer targeting and focusing on or promoting products to only those customers who are willing to buy the products thereby making the Optimum use Of market budget.

The next benefit is the business is able to align it's offering to current trends as discussed earlier do you know that few of the trends in cosmetic industry are sustainability, meat offerings, customized offerings, personalized offerings integration with technology these are a few of the trends which are seem to be popular with the consumers. This platform enables beauty and cosmetic industry as well as consumers to integrate with technology such as artificial intelligence augmented reality and understand the usefulness of techniques such as machine learning which are more and more and trend

Important benefit to business is the increase in e-commerce presents. Especially beauty and cosmetic industry are facing issues in selling the products in e-commerce platform since consumers cannot try the product online and prefer to buy it from the nearest brick and mortar store. This platform gives the consumer confidence about the product and expertise Solution and the last benefit that we can see is the personal solution this is one area where every industry is trying to fulfill the needs of the consumer this is one trend which every businesses are focusing on. This platform provides a direct personal solution based on individual skin type and screen features which makes it one step ahead of personalized solutions.

Recommendations

This research paper is solely concentrated on highlighting the growing and astonishing use cases of technology like AI and AR in beauty industry which is currently at a very nascent stage but definitely sees a very bright future in adopting such technologies to provide more client centric solution .

We demonstrated an end to end solution built on Machine learning technologies like CNN and KNN model to give recommendation based on features extracted from image. This developing is solely for the purpose to understand and study an end to end cognitive cosmetic product recommendation system. The authenticity of the system has been tested as a dry run was carried out with the application with people from different age group and with different skin types. The purpose that we wanted to serve through this paper was encouraging the use of such technologies into

making some serious business impacts. Two main algorithms, the first one which explains how image is captured and how area of focus is devised, is being explained in detail, and the second code which explains the feature extraction techniques, has been used here and is also discussed in detail. Here we saw that for recommendations, the KNN model gave better accuracy and recall value as compared to other models.

Such solutions can be made more and more user friendly and more accurate by adding more testing data and less input from the users. Recommendations can be made based on the chemical composition of the product which gives much more acceptable results.

We also recommend the solution for other industrial applications such as in dermatology. We have seen such application being widely used to understand the skin disease or early symptoms of different types of skin cancers. In the skin age prediction model, it is based on one of the research papers carried out on similar lines to detect skin cancer at an early stage such as applications. If tested and deployed, it can be a revolutionary early diagnostic system. Similar applications are used by lens cart which captures the face and based on facial features such as nose shape, eyes shape, face cut, hair line, recommends the most suitable frame that complements the features. Makeup try on also works similar but in a different way. It doesn't analyze anything using image; instead, it puts the shade on the skin so that the user will have a better understanding of the product before buying. Therefore, such applications are seen to be present already in the market but a unique kind of solution and its application, discussed here, is trying to integrate features of all existing applications.

Limitations

Few of the limitations that we can see are as follows

Adopting suggestions from bots: we see that consumers still don't take recommendations from a bot seriously. It is often seen that these artificial intelligence based applications are being used by consumers just for fun. Therefore, we can see there is still some gap from the solution existing in the market and acceptance level.

The key drawback of adoption is that AR and VR technologies are considered to be costly and immature technologies which are not appropriate for construction and engineering. The key drivers are that AR and VR allow project delivery changes and new and improved services to be delivered. Lack of substantiated business models is one of the weirdest things about Augmented Reality technology; it doesn't do all that well businesswise, amid rapid adoption and mass public acceptance. The sector is doing well. In the augmented reality app market, there is a steady flow of investments, and the general background is more than optimistic. All these investments, however, have yet to pay off big time. Pokémon Go, the greatest AR product of recent times, broke even only because of the brand's strength. The retention rate followed, after the hype died down.

For IKEA and Amazon AR applications, the same goes -

they're fun, but you can do without the

Lack of requirements for Augmented Reality Software Design & Production

For a software application, specifications are something of a common language.

It is one of the ways in which its compatibility and contribution to the technology's overall growth can be ensured. This is the thing that is actually under construction for Augmented Reality at the moment. There's an easy explanation - it's too soon. The technology is too recent, and both in hardware and software terms, it still comes to its own.

Privacy & Security also presents the AR industry with major challenges. There is a fair risk of falling into trouble without intending to do so, due to contradictions in virtual reality programming, oversight, and negligence. The main problem is that what is permissible and what is not in the world of augmented reality is not designated by any actual legislation. That implies that the program can be used just like it can be used for entertainment with malicious intent.

Few of the other limitations are as follows

- Application is supported for **laptop version** the mobile app based version is to be developed
- The product portfolio used includes **10 products** it can be made more scalable but for that subject matter experts are needed to

guide which product is suitable for which skin type

- This application is built to recommend **only a single most suitable product** an alternative or similar product functionality is not added

To conclude we studied detailed working of 'A digital Cognitive beauty consultant' which aids beauty and cosmetic industry to provide personalized solution according to their skin features. This application captures users face image using image processing techniques, then extracts features like skin type, skin age, wrinkles and acne using deep learning and

machine learning techniques and finally recommends the product based on the extracted features

Cognitive cosmetic product recommender fulfils a role of virtual beauty consultant

Impacts: Enrich customer experience by providing expert and personalized solution

Additional point of sales: Opportunity to enhance virtual sales thereby increase revenue

Provide competitive edge and aid brand owners in promoting their private label products and this adopt direct to consumer model of selling

REFERENCES

1. Kumar, S. (2005). Exploratory analysis of global cosmetic industry: major players, technology and market trends. *Technovation*, 25(11), 1263-1272.
2. *Exploratory analysis of global cosmetic industry: major players, technology and market trends*, by Sameer Kumar Copyright © 2004 Elsevier Ltd. All rights reserved.
3. Kumar, S., Massie, C., & Dumonceaux, M. D. (2006). Comparative innovative business strategies of major players in cosmetic industry. *Industrial Management & Data Systems*.
4. Ramli, N. S. (2015). Immigrant entrepreneurs on the world's successful global brands in the cosmetic industry. *Procedia-Social and Behavioral Sciences*, 195, 113-122.
5. SARMA, K., & CHOUDHURY, P. K. (2019). A study on Customer awareness and perception towards cosmetic service providers in India with reference to Hyderabad. *Journal of the Gujarat Research Society*, 21(13), 151-166.
6. Khan, M., Chakraborty, S., Astya, R., & Khepra, S. (2019, October). Face Detection and Recognition Using OpenCV. In *2019 International Conference on Computing, Communication, and Intelligent Systems (ICCCIS)* (pp. 116-119). IEEE.
7. Goyal, K., Agarwal, K., & Kumar, R. (2017, April). Face detection and tracking: Using OpenCV. In *2017 International conference of Electronics, Communication and Aerospace Technology (ICECA)* (Vol. 1, pp. 474-478). IEEE.
8. Kamper, H., Elsner, M., Jansen, A., & Goldwater, S. (2015, April). Unsupervised neural network based feature extraction using weak top-down constraints. In *2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (pp. 5818-5822). IEEE.
9. *Convolutional Neural Network Based Feature Extraction for IRIS Recognition*. April 2018 *International Journal of Computer Science and Information Technology* 10(2):65-78
10. Tamilselvi, R., & Balaji, P. (2019). The Key Determinants of Behavioural Intention Towards Mobile Banking Adoption. *International Journal of Innovative Technology and Exploring Engineering*, 8(10), 1124-1130.
11. Jogin, M., Madhulika, M. S., Divya, G. D., Meghana, R. K., & Apoorva, S. (2018, May). Feature extraction using convolution neural networks (CNN) and deep learning. In *2018 3rd IEEE international conference on recent trends in electronics, information & communication technology (RTEICT)* (pp. 2319-2323). IEEE.
12. Benediktsson, J. A., & Sveinsson, J. R. (1997). Feature extraction for neural network classifiers. In *Neurocomputation in Remote Sensing Data Analysis* (pp. 97-104). Springer, Berlin, Heidelberg.
13. Talwar, S., Dhir, A., Khalil, A., Mohan, G., & Islam, A. N. (2020). Point of adoption and beyond. Initial trust and

- mobile-payment continuation intention. *Journal of Retailing and Consumer Services*, 55, 102086.
14. Larsen, R. H., & Tambo, T. (2014). Managing cosmetics technologies in dynamic environments. In *Proceedings of the 4th Nordic Retail and Wholesale Conference. Nordic Retail and Wholesale Association*.
15. Arora, K., Singh, S., Saxena, C., & Chaurasia, L. Pharmaceutical and Nano Sciences.
16. Wandrey, F. How science, technology and social changes influence the cosmetics of the future.
17. Trehan, S., Michniak-Kohn, B., & Beri, K. (2017). Plant stem cells in cosmetics: current trends and future directions. *Future Science OA*, 3(4), FSO226.
18. Drucker, S. M., Fisher, D., & Basu, S. (2011, September). Helping users sort faster with adaptive machine learning recommendations. In *IFIP Conference on Human-Computer Interaction* (pp. 187-203). Springer, Berlin, Heidelberg.
19. *Cosmetics and Skincare Disruptive Technology Report, 2020: Market Ecosystem, Trends, Leading Players and Future Disruptions*. DUBLIN, April 29, 2020 /PRNewswire/ -- The "Cosmetics and Skincare Disruptive Technology, 2020" report has been added to ResearchAndMarkets.com's offering.

SHOCKING INCIDENTS OF COLLISIONS IN THE HIGH SEAS

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ABSTRACT

The incidents of High sea collisions have resulted in the creation of great panic among the families of both traditional and mechanized fishing community. This research study high lights the major incidents occurred in Indian Ocean and Arabian Sea in the recent past. The sufferings of the victims of these accidents have led us to conduct this study. This would bring to the fore the prime causes of the accidents and the solutions to avert them. Through the citing of various accidents information is passed on to the stakeholders about the circumstances that lead to the accidents. Information on preventive measures to be adopted by the fishermen forms part and parcel of this discussion. Accidents occur due to the negligence of both the fishing boat drivers and the duty in charge of the ship. This study is based on the interview conducted among a few drivers of mechanized boats, Engineers and Captains of cargo and supply vessels. The news about the recent accidents has drawn the attention of the concerned state governments, Government of India and International organizations and Governments that deal with marine activities. Our research findings indicate that the laws governing the maritime activities are in a confused state. So, the study would pave the way for the International Maritime authorities to make new rules and regulations so as to regulate the movements of the boats and ships in the High Seas.

Words highlight: Exclusive Economic zone, High Seas, International Waters, Maritime Activities, Traditional fishermen, Mechanized boats, Fishing boats, Cargo ships, Collision

Introduction

In the present days, number of accidents in the High Seas or International Waters is on the rise at an alarming rate. Accidents pertaining to the collision between ships and fishing boats are highlighted in this article. The victims are usually fishermen. As a result, the dependents of them do suffer enormously. It is apt to have a close look at the causes of such accidents. It is no secret that a world map can give a vivid picture about the boundary of each and every country. Where one country's border ends, another country's begins. In case of oceans and seas, don't we have demarcated boundaries? Do any laws govern the waters? In this article, we will analyze and answer some of the pivotal queries. It is sad that as many as 9 major incidents took place from 2012 to 2021 in International waters. Since this issue assumes importance in the fishermen's life, let us analyze a slew of facts connected with this. It is also worth to remember the incidents happened between 2017 and 2018.

Incidents

2017 January: Seven injured after a ship collided with a fishing boat 65 nm off Kochi
2017 June: Three dead, 11 injured when Panama-flagged merchant vessel Amber L hit a

fishing boat Carmel Matha 14 nautical miles off Kochi coast
2017 August: A Hong Kong-flagged ship collided with a fishing boat Arockia Annai, 39 nm off Kollam coast
2017 October: Unidentified ship rammed a fishing vessel, 19 nm off Colachel
2017 October: Unidentified merchant ship rammed fishing boat Immanuel, 50 nm off Beypore
2018 January: Unidentified ship hit fishing vessel Nelson off Kanyakumari coast

International waters

The term, "International waters" is most often refers to waters beyond the "territorial sea" of any state. International waters (high seas) do not belong to any state's jurisdiction. These waters are common for all where a state cannot claim but is disputed by the neighboring countries. The high seas – the area outside any country's national waters – cover nearly two-thirds of the oceans and are largely ungoverned. The high seas make up 50% of the surface area of the planet. States have the right to fishing there. Upon analysis, it is noticed that if states have the right to fishing, then why can't their fishers do so in high seas? Our fishers in mechanized boats venture in to these

open international waters. If high seas areas were closed to fishing, some countries would benefit directly and others indirectly through the protection of some fish stocks. The high seas are a headache for the people who manage fisheries. These fisheries are common resources, accessible by anyone. That's why, some could view the high seas as a global "fish bank".

Territorial waters

What does the law of the sea say about territorial waters? What is meant by the term "territorial waters"? The 1982 United Nations Convention on the Law of the Sea defines that the **Territorial Sea** is a belt of coastal waters extending 12 nautical miles (22 km/14 mi) from the base line. It is abundantly clear that in the event of an accident, a law of that country will apply only within this area. It is the exclusive right of that country to build, extract natural resources and either encourage or forbid sea passage through it. Ominously, there is a growing apprehension among the fishermen whether they are permitted to fishing beyond this zone. Fundamental changes have to be made in the maritime laws that give conflicting signals to the fishermen. No doubt, they can fish but not in the territorial waters of other countries. Since the availability of fish is scanty within this zone, they go for fishing in the High Seas and the water column of Exclusive Economic Zone.

Exclusive Economic Zone (EEZ)

Maritime countries are also entitled to an exclusive economic zone (EEZ) which is made up of the water column and the seabed out to a distance of 200 miles (about 322 km). This is about 60% of the 364 million square kilometers of global oceans. It is also said that the maritime country that owns the EEZ also owns the sea life and mineral resources found within it. However, it cannot prevent ships, aircraft and other vessels from foreign countries from passing through it and over it.

International crimes

No doubt, water bodies do not end with these. There are still a lot of ocean beyond the EEZs and 12 mile limits. Which laws will be in force when crimes such as piracy, human trafficking and crimes against humanity are committed in

this part of the ocean? Are the laws of the country owning the vessel applied? In this connection, there arises the question of jurisdiction. The concerned country can bring to the limelight the laws that are in force in that particular country. These laws are very often challenged by any other country. Obviously, it takes time for the International courts to recognize such laws. Similarly, the verdicts of the International courts are not accepted by the affected nations. It is due to these reasons the crimes committed in such circumstances are dragged on for so many years. *Enrica Lexie case* is the shining example of this.

Collision at Mid Sea

Incidents of collision at mid sea are on the rise time and again. This necessitated the stakeholders to take the matters very seriously. Although the Government of India, the fisheries departments of the concerned states and the coast guards are concerned about these matters, the fishermen are in trouble very often. Normally the fishing boats do not collide with the ships. It is the ships that collide with the boats. Gone are the days when many such incidents took place. At the same time, one cannot expect of these in the present scenario when technology has developed to a greater extent. However, it has to be observed that technological development has got its own repercussions too. Before the emergence of industrial revolution and technological advancement, a duty in-charge used to stay in captain's cabin to steer the ship very promptly. Now, the mechanized world is not bothered about the course of the ship. It is believed that the technology is in upper hand and therefore the steering part of the ship is no more a matter.

"The ships, during the course of their journey, would move to a certain direction and this is possible because of the setting of the steering for a considerable amount of time", said Antony Jayaraj, an engineer in a ship. His words aptly describes about the existing condition of modern shipping industries. He continued to say that most of the accidents occur due to the negligence of the duty in charge. There would be none on duty for a certain hours. It is observed that at the time of the occurrence of accidents, none in the ship

might notice it. As the size of the ship is much bigger than the fishing boat and the height of the ship is more than that of the boat, the noise produced by the collision is unheard of in the captain's cabin to make them alert about the accident. Something they are insensitive to or unaware of. In the event of a major collision also feeble noise would be heard to the crews in the ship. As usual, the ship would move with the same pace as if they have not damaged the boats. In this regard, it is suggested that the crews of the ship should undertake their duties routinely so that they might notice the boats if they were on their path. Many of the ships give scant regard to this particular aspect.

Collision between "IB Rabbal" and "APL Le Havre"

The newspaper, **The New Indian Express** dated, 13th April 2021 expressed that three fishermen were killed when **APL Le Havre**, a container ship with Singapore registration collided with a fishing boat, **IB Rabbal** owned by Mamantakkathu Jaffer of Beypore. It occurred around 60 nautical miles off the Mangaluru coast on 12th April night. According to sources, the crew of the ship launched a rescue operation and saved five workers of whom three died. The survived ones were Vel Murugan of Colachel and Sunil Das of West Bengal. According to Kerala Fishing Boat Operators Association Vice president, Haneefa Haji, there were 14 workers in the boat of which 7 were from Colachel and the other 7 from Odisha and West Bengal.

Incident of "Mercedes"

In the recent incident in which the boat, **Mercedes** belonging to Franklin of Vallavilai met with an accident at mid sea on 23d April 2021 about 600 nautical miles away from Goa coast, the ship that brought about the accident has not been caught so far. Initially, on witnessing the floating of the wheel house of the boat by another boat by name, **Periyanayahi**, it was speculated that the boat might have been damaged fully and as a result, it might have sunk in to the sea. But, to their fortune and luck, it was found subsequently that it wasn't damaged fully and all the 11 crews managed to get in to the damaged boat and could reach the Thenkapattnam harbour on

1st May 2021 after a long voyage of 8 days. Who is held responsible for this accident? The ship is largely to be blamed for this. She has to be charged with this grave crime. Normally, the culprits are hardly accounted for. Had all the 11 crews been lost to the sea, the condition of the 11 family members would have been moribund and pathetic. The mental agony suffered by the family members of the crew until the receipt of the good news is unimaginable. It is the responsibility of the Government of India to ensure the safety and security of the fishermen. The ship that caused the damage has to be tracked and identified at once. There should be a proper mechanism so as to do this promptly. Laws should be enacted so that necessary compensation shall be provided to the innocent victims.

Kerala Matsiya Thozhilali Aikyavedi President, Charles George, on an earlier occasion said that a certain merchant vessels, instead of going through High Seas, came to the territorial waters in order to receive signals to their mobile phones to contact with the family members. However, in the case of 'Mercedes', it did not happen so.

Accidents at dusk

At times, accidents occurred at dusk too when light in the boat is not visible. The gillnet boats of 1970s did not have such facilities including proper lighting as we have today. There was every room for major collisions in those days. The fishermen would be in dilemma as to find out the direction of the moving ship. Everyone in the boat must be aware of the approaching ship and so they would be in panic so much that the ship might dash against the boat from any direction. In order to move away from the path of the ship, the driver of the boat would steer it frantically to a safer side. It so happened in 1978 when a merchant vessel was about to hit a gillnet boat. I, (A. Sajeen, one of the authors of this article) was also one among the 5 crews in the boat which was fishing about 20 nautical miles away from the Kochi coast. Luckily, we were saved solely due to the courage and tactics employed by our fellow driver. Intelligently, he drove the boat so fast towards the right direction so that the one on duty in the cabin of the ship could see the boat. When the crew in

the captain's cabin noticed our boat's dangerous situation, he changed the direction of the ship. Thus, another major accident was averted.

Further, it is noticed that many a ships have the habit of escaping from the accident spot after hitting the traditional fishermen. They fail to give sufficient warning to fishermen when they are resting at sea. To their surprise, they would not find out the black sheep. After reporting to the government authorities, it would be difficult for them to detect the crime makers. Why does it happen? Advanced technology and modern communication system would make it easy to find out the ship that causes the damage. How much would they get as compensation? Does any law stipulate any fixed amount for the damage? They might sometimes lose their fishing gear too. Has any fisherman got any amount as compensation so far? There are numerous ways such as blowing the fog horn, use of water cannon and fire warning shots for the captain or the one on duty to give alert to the fishing boats. It is uncertain that they do the precautionary measures to avert the mishaps.

Incident of shooting

It is equally shocking that there occur shooting in the high seas. It so happened on 15th February 2012 when two Indian fishermen were killed off the coast of Kerala by two Italian marines aboard the Italian-flagged commercial oil tanker, **MB Enrica Lexie**. The ship continued to move, but was intercepted by the Indian Navy and the marines were detained. Here, in this case, the marines, during interrogation, said that they had suspected the fishermen of sea pirates. Nevertheless, it was a lame excuse. It was very clear that the fishermen had every reason to substantiate that they were fishermen. Here too, the question of jurisdiction arose. This has been the cause of friction between India and Italy for so many

years. More worryingly, the case has not been settled so far. What is the need for this heightened tension? Powerful International Organizations with strong international laws can help ease the tension among maritime countries.

Conclusion

In all the above-mentioned cases the victims are poor fishermen. As usual our leaders would express deep concern over such incidents and reiterate the need for reforms in the existing laws. The political parties would make visit to the spot and give a lot of promises. Of course, they will take actions. Most of the efforts would end in futile. A mature and timely response is the need of the hour. Truly, there would be an unacceptable delay on the part of the government authorities in acting on it. In the aftermath of accidents, with the help of floating materials, the victims could swim in the water for long hours in spite of the tough weather. Before they would go missing, the rescue workers should reach the spot. They have to act swiftly and efficiently so that they can save lives. The presence of dedicated, strong, courageous and industrious sons and daughters of fishermen as workers or officers in the Fisheries department and coast guard can help save hundreds of lives. There would be peaceful public outcry for some time after the incident. It will go for a little more time. In due course, it will be forgotten forever. The concerned governments and departments should realize that this is a matter of serious concern and so it has to be looked in to its totality. The issue has to be approached with a human touch. A safe and dignified environment has to be assured to the fishermen. There is an imminent need to review the International law that governs the maritime countries. Sooner the governments realize this, the better for our fishermen.

References

1. C. John Bosco, President, Thoothoor St.Thomas Deep Sea Boat Owners and Workers Welfare Union - 21.02.2021
2. S. Bibin, Secretary, Thoothoor St.Thomas Deep Sea Boat Owners and Workers Welfare Union - 25.02.2021

3. Patrick, Executive member, Thoothoor St.Thomas Deep Sea Boat Owners and Workers Welfare Union - 25.02.2021
4. Marythasan, President, Jesus Boat Union Thoothoor---27.02.2021
5. Charles George, President, Kerala Matsiya Thozhilali Aikyavedi, Kochi-18.03.2021
6. Soosai Antony, Captain of Cargo ship, Chinnathurai- 21.03.2021.
7. Antony Jayaraj, Engineer of Supply vessel, Thoothoor-5.05.2021.

IMPACT OF VARIABLE CUSTOMER ORDER DECOUPLING POINT ON PRICING AND THE EFFECT OF IT DURING A PANDEMIC

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ABSTRACT

The demand fluctuation in the industries have become a greater concern in this modernisation world. Pricing is a way to have a competitive advantage in the market, the paper suggests the varying the position of the CODP customer order Decoupling point which will have an effect on the pricing of the component. The position of CODP also has an impact on the forecasting of the component. The model focuses on including the position and the price changes and the importance of varying the position of the CODP which changes the forecasting cycle and the impact of these considering a case of a pandemic is studied and the results are analysed. The paper follows the formulation of the pricing model based on the generic components of the pricing and making a numerical simulation and a study on the forecast behaviour with respect to a inventory changes. Since the CODP is added in the pricing the variation could be studied and it also provides a few suggestions considering the variable CODP and the effects of it on the organisation considering a case of pandemic situation, the benefits and adverse effects.

Keywords—(CODP) customer order decoupling point, forecasting impact, pandemic situation, pricing model

INTRODUCTION

The world has become a competitive environment where thriving in a business is one of the key goals for each of the organisations, in order to achieve this the main focus of each and every business is the customer, as mentioned by the saying “Customer is the king in the market”. So to regain the trust or to have a customer satisfactory product, the customers’ needs should be satisfied. There are various ways to understand the customer needs and even so not all the needs of the customer can be satisfied, some of the basic ones of some group of the customer needs to be solved so that the business can thrive among that group. So the few factors which the organisation focuses on achieving could be meeting the demand on time, price, customisation offered and other factors, etc. The factors mentioned above are one of the easy and crucial factors which can be attained in the factory manufacturing based on the few alterations pertaining to the sector. The pricing is also an important factor while considering the customer satisfaction. Well in order to achieve with the customer satisfaction, customisation of the product has become one key selling point and the more the customisation the more the pricing varies and the inventory of the items also increases. So as the customisation increases the cost and the demand supply also gets tougher that is the production of the item and the forecasting of the materials required gets difficult and this

increases the cost associated with it. So the attention was towards CODP Customer Order Decoupling Point which is different for different sectors.

The various positions of the CODP depend on the sectors, so based on the positioning they may be Assemble to Order, Make to order, Made to stock, Design to order. So the positioning of the materials determines the production rate, the inventory stores, the hours of work done, the ordering times and the at last, the demand satisfaction so since the positioning alters a lot of parameters they also affect the pricing and forecasting. And hence in cases of a pandemic like the present COVID scenario which we are facing in the 2019-2020. The demand is unpredictable and hence the customer satisfaction and requirements need to be met, so in case of a huge mass production, the movement of the CODP upwards may help the customer with a lot of options but it is difficult for production in times like this and hence the managerial and the top management decision should be taken to try and invest in R&D and try to move the product CODP position downstream which standardises the process and hence the standard product which are available for the production can be used and ensure the delivery this will also have an impact on the cost of the product.

The forecasting is also the part which varies with the positioning and hence focusing on that to create a variable multiple CODP positioning to enable ease and try a new strategic planning

to go about with further production. Also with the view when a pandemic is in place can be understood considering the present scenario and deriving a possible solution or a model or framework can be put in place to cope up in these situation where demand is unpredictable and even the material purchasing which took a toll can be considering and a new strategic plan can be created. The variations and the unpredictable demand will cause a lot of problem, even the availability of material is at question in this case and hence the normal procedures or processes will take a serious toll and a new feasible procedure is required in order to cope up with the changing scenario. One of the few such strategies would be having agile strategy, digitisation, investing in R&D, etc.

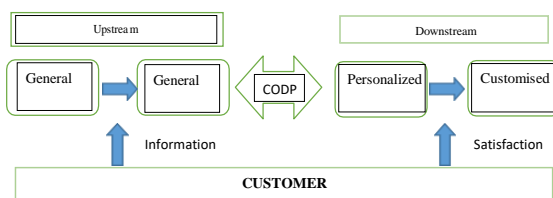


Fig.1 : The basic representation of position of CODP Customer Order Decoupling Point in a general manufacturing sector

The above figure gives a schematic representation of the process of the production in an organisation and the position of the CODP in a generalised way, where the process in front of the CODP is generally done to stock and the process after the CODP is the way to make with respect to the order or in fact called customisation. But in order to have the flow right we need to make sure there is a flow of information from the customer which needs to be considered, and the result should be measured to check whether the customer satisfaction has been met. Also the process in front of the position of CODP is called Upstream and the process after the position of CODP is called Downstream.

LITERATURE REVIEW

The main focus of the organisation in the current scenario is to compete strategically, both in the manufacturing and SCM. They have suggested few changes in the manufacturing and supply chain control systems proposing a dual approach as to movement of CODP in the downstream and upstream. This movement of CODP affect or causes respective changes on the few of the factors. (Olhager, 2010)[1]. The focus on the forecasting practices in SCM at

Life sciences, retail chain and FMCG. It also focuses on extensive demand management and on proposing a model for the forecasting. The use of management skills for the forecasting is used, the management skills related to demand management, forecasting management challenge, forecasting methods, spare part forecasting are considered. (Abu Raihan Bhuiyan Albarune, Study of Forecasting Practices in Supply Chain Management, 2015)[2]. It is believed in the marketing that a customer who is satisfied will buy again and an unsatisfied customer will not buy again from the same brand. In the long run, for a company or a brand to survive, customer retention is important which can be achieved through customer satisfaction. The acquisition cost for new customers is much higher than retaining an existing customer. Thus, retention of the customer helps the organization to increase their profits. This retained customer can help in reducing the cost of marketing and they also help in developing a steady stream of sales as the customer demand increases. In general, customer satisfaction would be a psychological state that is formed when the expectations of the customer are met by the use of the product. The bullwhip effect says the distortion in customer demand between order to supplier and sales of the buyer. The bullwhip effect is caused by demand forecasting. The E-SCM uses lead time and selection of forecast models. Hence seasonality is used for the reduction of uncertainty in bullwhip effect. Hence the study suggests use of exponential smoothing to reduce bullwhip ratio. (Erkan Bayraktar, 2008)[3]. The demand of the retail and restaurant services. They put forth a proposal of forecasting demand based on the purchase date and external information such as date, weather, temperature and events. This also takes into account the hypothesis of the manager such as store manager, area manager as parameter. These will be helpful for the estimation of sales and number of customers and show that manager can learn background factors underlying customer behaviours. (Takeshi Takenaka, 2011)[4]. Forecasting here takes into the consideration of the expertise of the people in the organisation. This suggesting relies on the credibility of the system information and the degree depends on the level of expertise, hence considering the judgemental opinion of the experiential people in the organisation will add or increase the

accuracy of the forecasting methods. This was found to be useful in case of long term demand forecast. (Jorge Alvarado-Valencia, 2017)[5]. The impact of data created due to Internet of things (IOT) on demand forecasting was studied through research. The basic details on the IOT and the demand forecasting was conducted such as the different types of forecasting methods and data collection techniques was gathered through the various available sources. The advantage created in the decision making of the organisation due to the real time data from IOT was studied. The accuracy of the forecasting using the real time data is verified to get the results. (Samir Yerpude, 2017). [6]

The difference the model produced by the use of data from the past and the data that is acquired in real time creates a varied yield. This variance is found using few exercises. The use of real time data is much used in cases such as lag length and in forecasting for short period. Hence the use of real time data is preferred (Croushore, 2001)[7]. Inventory control system are relied on the accurate forecasting of safety stock and two or more methods are used for forecasting. Hence combining forecasts is done in order to reduce forecast errors and also done in order to accuracy, largely ignoring the overall shape and distribution of forecast errors. These are essential in managing the level of aversion of risk and uncertainty for companies. This explores the forecast combinations transform the forecast errors distributed towards desired properties of safety stock calculations. (Devon Barrow, 2016)[8]. Empirical research suggest that quantitatively derived forecasts are very frequently judgemental, and the evaluate the performance of these judgemental adjustments in practical demand and sales but the analysis does not distinguish between slow moving, fast moving and non moving items. But integrating this judgemental decisions with the statistical forecast is difficult. The company relies upon commercially available statistical forecasting demands based on the marketing intelligence gathered by company forecasts. (Aris. A. Syntetos)[9]

The shelf space allocation (SSAP) is one of the major dealing in FMCG . It is compliment to maintain or implement product design during the selling season and drastically change assortment decisions based on shelf space allocation in response to up-to date demand

observations. The previous one are based on the fixed assumption of movement, well this is based on a dynamic framework with space elasticity and potential demand sequentially. (Kazuki Ishichi, 2019)[10]. Sharing information increased the accuracy of the model but the focus on the sharing some prior information related to the retail forecasting level especially in FMCG also the information related to the pricing and promotional strategy. Hence in omni channel sales, more information on the sales and using various forecasting methods can built for operations and hence combining forecasts in better way. (Dazhi Yang, 2019)[11]. Demand forecasting is an important part in the logistics and supply chain management , in the state of the art and key challenges are discussed. An integrated approach for in market product demand forecasting and purchasr order generation is studied. For a supply of products from wholesaler to the distribution company is forecasting using the SMA model, multiple linear regression and symbolic regression with generic program (Galina Merkurjeva, 2018)[12]. The demand fluctuation has created a uncertainty that make companies to hold a lot of inventory and meeting these demand is a major concern. The use of real time data combined with the floating decoupling point creates a system to solve this by creating a inventory policy and the real time information. The results can be used to improve the demand supply of the materials. (Marcos Calle, 2016)[13]. The inventory and order based production control system is a model based on the forecast driven products system where the production decision is based on the forecast. And hence the model her has to deal with the tandem of both the forecast and the inventory model and hence it is non-linear and converting it into a linear model and then solved analytically. (Joakim Wikner, 2017)[14]. Manufactures in case of mass customization face a lot of problems when it comes to inventory and having a proper supply chain for their organisation, a supply chain model was formed considering the manufacturer and the module suppliers and it proposes a cost structure for different modules like the supplier and the manufacture. The developed model suggests the achievement of customer satisfaction and improve response time. (Qiuxia Hou, 2016)[15]. Customers are the key for the market and hence the customization has taken a

change and in this situation analyzing the single and multiple customer order decoupling point with respect to the customer value is done and thus create a multiple objective approach. (H.shidpour, 2014)[16].

RESEARCH METHODOLOGY

The aim of this paper is to create a pricing model which tells us that price is a function of the position of the CODP and that having a variable CODP will have respective impact on the price. So for this case we consider an organisation with existing process and a few changes are made or considered to see the effect also this effect are studied how they might have an impact or use in case of a pandemic. In order for the creation of the pricing model, the understanding of the pricing structure is important and hence, the general pricing structure of most of the organisation includes few generic cost components such as manufacturing cost, inventory holding cost, ordering cost, investment cost, supplier cost (in case of supplier material), purchase cost and profit of an organisation and also importantly the cost that has been incurred to the organisation due to the customization of the products depending on the customer order which includes the cost that will be incurred in R&D to get the design specific to that order, cost involved in finding the source and purchase of the special components required for that order, the ordering cost involved for that and the inventory that need to maintained for various such components and when a company focuses on customisation, it might have $N - \text{Number of customised products}$.

A. Here in order to get a clear model we are doing a few of the assumptions.

- The cost is considered and is achieved as to be minimum
- The supplier cost is considered for the overall total cost since most of the organisation includes the buying of the material from third party supplier
- This model is considered and developed for manufacturing sectors while this model can be extended to other sectors as well
- There are no other cost involved in the model such as the shortage cost, waiting cost, quality cost and the time and location factors such as the time taken for the transport of

material from one location to other are not taken into consideration

- The CODP position is taken as α as ratio of time of general standardised production to customized production which varies from (0 to 1)
- The other assumption that is considered is that in the supply chain model, the final product that is when produced will be transferred to the customer without delay and all the semi finished products and work in progress are maintained as buffer stock

B. CODP

CODP Customer Order Decoupling Point is not same for all the sectors or industries, it varies with each and every industry, and based on the position of the CODP, there exist few of the process description as assemble to order, Made to Stock, Made to Order, Design to Order, etc.

- Assemble to Order : Assemble to Order is when in an organisation, the products such as components are maintained as inventory to meet the demand and in most cases to meet the inventory, they are maintained as two bin system based on the ABC classification of materials depending on the volume and cost and then they are later assembled to designed to the customer order (Customisation), this type is mostly found in Automobile sector
- Made to Stock : Made to stock in generally found in FMCG, where there is less or minimum customisation and where the entire product is maintained as stock after the complete production depending on the demand in the product, rather than having individual component as inventory.
- Made to Order : Made to Order is involved in organisation where customisation plays a huge role, in this the inventory is maintained based on the customisation required but the amount and the variety of the material is high and the customisation may be introduced at any stage
- Design to Order : Design to order is where the product is under customisation according to the customer from the design phase itself and the material and other product varies with each design and hence forecasting is difficult

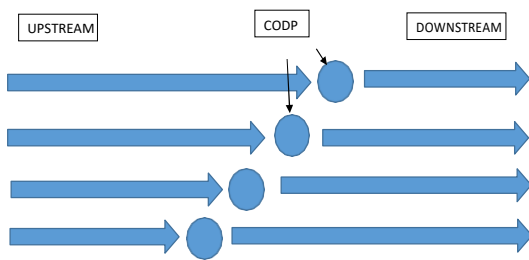


Fig2: CODP positioning in Assemble to Order, Make to stock, Made to Order, Design to Order respectively

C. Variable CODP

The variable CODP is the concept framework where in an organisation for a particular component or product, in the design, manufacturing or assembly instead of having a single CODP fixed point, the suggestion of a variable CODP in the process. This definitely is not numerical to find the exact position, but the experience of the managers and the personnel which is also involved in the same depending on their particular organisation. The impact of having a variable CODP will help in the having a increased and proper forecast of the components required for the making of the product since most of them would be standardised. The strategy or the framework here would be having a dynamic and feasible production line and product such that it improves or helps in the addition or change of the position of the CODP, there by will have enough information for meeting the demand and at the same time to have proper supply of the required materials, at the right time as and when required.

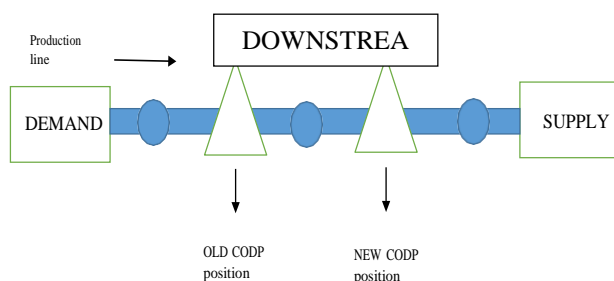


Fig3 : Variable or Multiple CODP in the production line

This having a variable CODP will help the organisation focus on the production and plan to achieve the price variation in the long run

and ease of having a standardised process.[Oljager J, 2010][1].

D. CODP Impact on Forecasting

So what impact does variable CODP have on forecasting ?, well having a variable CODP has impact on a lot of factors such as production time, inventory and hence the inventory is directly linked to the forecasting and in cases on a pandemic where the demand is unpredictable, it is important to work with a low inventory and at the same time be capable of meeting the customers demand. So in case the demand is high and the CODP is moved downstream, the standardization can be brought up and hence the varying demand can be tried to achieve. Few of the relation varies for supplier and manufacturer as the change or having the variable position had different impact when considered from different perspective.

E. Pandemic

A pandemic is a considered as a case where the entire world is under restriction and the accurate demand forecasting is too unpredictable and even the purchase of material or components is difficult and in this scenario, maintaining the customer is one important thing. Since the market is less, we need to make each and every order satisfactory and in time. Since most of the companies / organization in such as case are required to work only at half of their production intensity, i.e the man power employed should be as per the restriction of the government and also the logistics will also take a hit since most of the international import and export will be under restriction too and the lead time taken for the each and every material will be high. Also the availability of the required products might not be consistent and the demand will increase and this in turn will increase the price for that particular product due to the restriction in place. So having a variable CODP, instead of a fixed position will help the organization in order to move the production and also a change in price with it. The for cast varies and this help them to focus on the standardized material and provide in time.

MODELING AND RESULTS

On considering the pricing model and CODP , we need to create the model in such a way so the cost is optimal. So in this case, we consider the total cost (T) as a cost of generic supplier (Sc) and the manufacturer (Sm). The supplier cost here includes the cost of the product such as manufacturing cost (Ms), the holding inventory cost (Hs), the work in progress cost (Ws) and the investment cost (Is) and at the same time , when we consider the manufacturer, the cost that are included are the manufacturing cost (Mm), holding cost (Hm) and Purchase cost (Pm) and in this case , the position of the CODP affects all of these factors and hence the factor of α is added to it and each of the factors varies with the change in the position of CODP in the production line and adding a intelligence cost at the end , the cost that is incurred due to the change in the position of CODP.

SO the total cost

$T = \text{cost of supplier} + \text{cost of manufacturer}$

Optimal Total Cost $T = \text{Cost of supplier} + \text{cost of manufacturer} + \text{intelligence cost}$

Explaining the same, cost of supplier

$Sc = \text{manufacturing cost of supplier} + \text{inventory holding cost} + \text{investment cost} + \text{waiting cost} + \text{cost involved in work inprogress}$

$Sc = N (m) (\alpha) + (Ws) (\alpha) (t) (\alpha) + (Is) + (Hs) (\alpha) (Ai) (\alpha) + N CT (\alpha)$

Cost of manufacturer

$Sm = \text{manufacturing cost of supplier} + \text{inventory holding cost} + \text{purchase cost} + \text{intelligence cost (cost involved in customisation)}$

$Sm = N (m) (\alpha) + N (Hm) (\alpha) (t) (\alpha) + Pm + (\alpha) T$

TABLE I. THE TABLE EXPLAINS THE NOTATION AND THE DEFINITIONS IN THE MODEL

Notations	Definition
α	CODP position as a ratio of production time
N	Range which denoted the number of components
T	Total cost
Sc	cost for generic supplier
Sm	cost for manufacturer
m	average manufacturing cost
t	production time
Ws	average holding cost of Work in progress of supplier
Ai	average holding cost of inventory of manufacturer
Hs	holding cost of inventory of supplier
Is	Investment cost
Hm	holding cost of inventory of manufacturer
CT	waiting cost
Pm	Purchase cost of the manufacturer
T	cost involved in customisation

Well the table represents the notations and their definitions for the model that is created. The model denotes the “(α)” factors addition in each of the cost factors by the relation it has with each of the following which can be explained as in (Qiuxia Hou, Positioning of CODP in Internet Environment, 2016)[15].

- Since the position of the CODP is a function of other factors, they are respectively related to the change in the position of CODP
- Incase of the corresponding investment, the position of the CODP affects it as the position is moved downstream, the standardization is focused and the R&D has to play a major roleand hence the investment cost here increases linearly as the CODP is moved down
- If the products are being standardized, then the role of the manufacturing that is happening in the manufactures end will be reduced and hence the relation with it will be the cost decreasing as the position moves down but at the same time the cost associated with the supplier increases as the production of it increases
- Since the material cost increasing in time, at the supplier the cost of the holding WIP will be less than the inventory cost when compared with the manufacturer costThe cost associated with the inventory also varies since the

customisation factor is reduced and hence the inventory of various components are reduced and the standardised components are increased

- The cost involved in the customization is reduced as the CODP position is moved downstream since, the production time involved in making of customised product will be reduced.

Adding the customisation cost in the process will lead to following changes in the pricing of the supplier and manufacturer. Production time of supplier increases by r while the production time of the manufacturer decreases by $(1-r)$ and the intensity of the same is also increase and decreases for the supplier and manufacturer respectively. This change in the CODP will also affect the inventory since the production is affects the material stored inventory, and it affects the inventory holding cost and at the same time causes changes to the inventory of the semi finished products and the work in progress components. The below visual representation are obtain through numerical simulation in order to understand the nature of the model with respect to the change in the position of CODP.

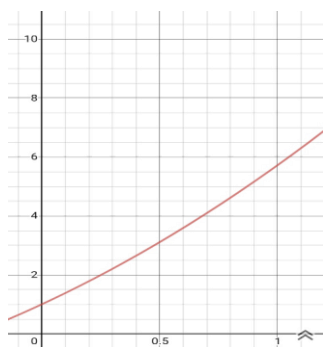


Fig 4: The numerical simulation runs give the following result for the cost of the supplier

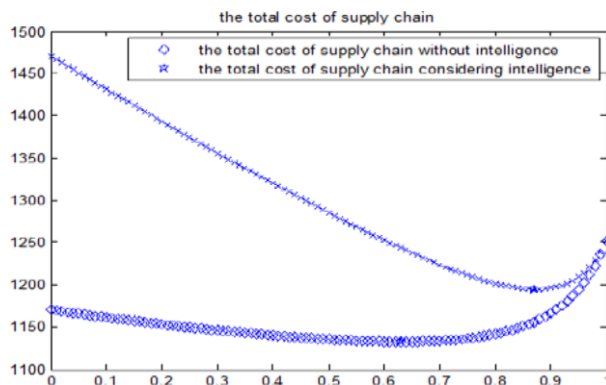


Fig 5: The total cost with and without the intelligence cost (cost due to customisation)

The below results are attained from the numerical simulation of the model formed and the following representations are attained. The results suggest that the price of the supplier goes high with the increase in the (α) value, the position of CODP from 0 to 1, for the supplier but at the same time, the price for the manufacturer tend to decrease with the position moving downstream. But on considering the total cost of the entire supply chain, the price associated with it when compared with the intelligence cost. So this is because of the fact that the movement of the position of the CODP downstream will help to increase the standardisation in the product and try to eliminate the customised products. This effect will have respective change in the price or cost of both the supplier and the manufacturer, well considering the supplier, the CODP position is based on the demand of the manufacturer and in the positioning of CODP, the requirement for components are varied and this variation affects the values that are related to the cost, considering the variable CODP, and the position is moved towards the downstream will the change in the production time affected with the supplier as the demand increased and hence the production limit increases causing increase in the cost and at the same time the inventory of the components required for the making of the components also increases this will cause the increase in the production material cost and the cost involved in the storing of the inventory. Considering the manufacturer in this case, the movement can be either upstream or downstream depending on the decision of the personnel in the organisation, so incase once moves it downstream, the CODP is causing standardisation in the process and product and the position in the upstream mean a lot more of customisation and we consider the CODP is moved downstream and this will actually standardise the product and most of the product would have been already with supplier and hence the time of production at the manufacturer end reduces and the ordering cost along with the inventory holding cost associated with specific component also reduces. The cost of customisation or intelligence cost also reduces and this causes an overall reduction in the cost of the manufacturer. But the entire concept of the supply chain should be considered and hence as in the Fig 5, the total cost is compared when the customisation is included and not included and

Discussions and Recommendations

the optimal value for each can be obtained in each case and a choice can be made.

F. Pandemic Case

Impact of the above model in case of a Pandemic, Considering a situation where the entire world has been put under restriction and hence there is unpredictable demand and the supply of materials is not consistent, also getting the sales number high has been a problem. Well based on this suggested model, a few of the following steps can be taken as part to overcome the issues that we face in such a scenario and how having a variable CODP will help in the process. Having a variable CODP, A variable CODP will help in the standardization of the products and hence the dependency on specific materials for customized products will be eliminated, this increases ordering during the times of pandemic where supply is a question

- The movement of the position of the CODP either upstream or downstream has relative change in the production time and the fact that man power is under restriction can be overcome when the production time can be achieved
- Moving the CODP downstream , will force standardisation and hence the pending inventory can be used up and the inventory cost can be reduced also getting the more standard material should be less difficult when compared with customised product
- Varying CODP also caused price variation which can be controlled in the desirable way

Following the few points might help some of the organisation in overcoming such a situation or even finding a new market.

LIMITATIONS

The limitation of this model is that this may not be applicable to all the organisation in the market. It was generally focused for manufacturing sectors which includes customisation in their product, there are a lot of industries which does not come under this category. This method is sure to bring about some changes in the existing process and hence the implementation and acceptance of this model is going to be difficult. In the fast

moving, world customisation is one of the key factor for customer leads and hence as the CODP moves down, the standardisation of product is required and hence the application of this model will be limited to products. The model eliminates few of the cost factor which may have impact on the total cost such as location, time, etc. . Even the suggestion in the case of pandemic which are provided will not be applicable to all the sectors . The results are based on numerical simulation and not on the real time data and hence some variation are possible

CONCLUSION

The conclusion of this would be that the model created is in effect shows that the all the pricing factors which we considered in the assumptions are affected by having a variable CODP Customer Order Decoupling Point, which may be either one or multiple and that decision is to be taken based on the organisation, there are a few organisation which already have a single CODP and this model shows the changes that are incurred when involved the change in position and the changes in the product such as the customisation of it. On considering the case that we have taken, the movement of the CODP will have its respective effect on each of the factor considered and the other cost factors which are not affected due to the change are not considered. In the new competitive and unprecedented market, there has to be lot of strategies that has to be framed in order to sustain in the environment, the few of which are the cross function involvement of the departments, digitisation, agile working, lean manufacturing and cost saving in all the places which is possible and at the same time meeting the customer requirement. Having a Agile working is important , We have also considered the pandemic case and few suggestion have been provided using the model developed which can provide a possible solution for an issue. The framework suggests the organisation to have a variable CODP rather than an fixed CODP for each of the component and as the CODP varies, the level of customisation that is involved in the product also varies and this causes the variation in the price and the forecasting inventory reduction. One such personal example which can be

considered for such as framework, is the launch of new Iphone SE (2nd generation) during time of the pandemic, where they have applied the concept in which no design or R&D was involved for the new product, but it makes use of the items which are already in use for the making of other component and try to put it in the new phone through which they found a new market and the have use the standard product available already which they are using and with no inventory of new components or production, but it would have taken them as little of R&D while still they found a new product. The model also says the same, as the CODP is moved downstream, the cost associated with the supplier increases

since the standardisation of the product is focused and the customisation of the product is leveraged and even the control of the process is also possible as the CODP is moved downstream, since the process and the cost can be controlled. The total cost associated with the supply chain also changes and the cost can be made optimal and considered depending on the organisation. Also in case of any pandemic, having a variable CODP can help to attain control over the situation or even possibly be able to find a new market, the inventory can also be reduced and the number of ordering can also be reduced and will help to overcome the situation.

REFERENCES

1. Olhager, J. (2010). The role of the customer order decoupling point in production and supply chain management. *Computers in industry*, 61(9), 863-868.
2. Albarune, A. R. B., & Habib, M. M. (2015). A study of forecasting practices in supply chain management. *International Journal of Supply Chain Management (IJSCM)*, 4(2), 55-61.
3. Bayraktar, E., Koh, S. L., Gunasekaran, A., Sari, K., & Tatoglu, E. (2008). The role of forecasting on bullwhip effect for E-SCM applications. *International Journal of Production Economics*, 113(1), 193-204.
4. Takenaka, T., Ishigaki, T., Motomura, Y., & Shimmura, T. (2011, September). Practical and interactive demand forecasting method for retail and restaurant services. In *Proc. of International Conference Advances in Production Management Systems* (No. 3-4, p. 2).
5. Alvarado-Valencia, J., Barrero, L. H., Önköl, D., & Dennerlein, J. T. (2017). Expertise, credibility of system forecasts and integration methods in judgmental demand forecasting. *International Journal of Forecasting*, 33(1), 298-313.
6. Yerpude, S., & Singhal, T. K. (2017). Impact of internet of things (IoT) data on demand forecasting. *Indian Journal of Science and Technology*, 10(15), 1-5.
7. Croushore, D., & Stark, T. (2001). A real-time data set for macroeconomists. *Journal of econometrics*, 105(1), 111-130.
8. Barrow, D. K., & Kourentzes, N. (2016). Distributions of forecasting errors of forecast combinations: implications for inventory management. *International Journal of Production Economics*, 177, 24-33.
9. K. N. J. E. B. R. F. P. G. Aris. A. Syntetos, "The effects of integrating management judgement into intermittent demand forecasts," *International Journal of Production Economics*.
10. Ishichi, K., Ohmori, S., Ueda, M., & Yoshimoto, K. (2019). Shelf-space Allocation Model with Demand Learning. *OPERATIONS AND SUPPLY CHAIN MANAGEMENT-AN INTERNATIONAL JOURNAL*, 12(1), 24-30.
11. Yang, D., & Zhang, A. N. (2019). Impact of information sharing and forecast combination on fast-moving-consumer-goods demand forecast accuracy. *Information*, 10(8), 260.

12. Merkurjeva, G., Valberga, A., & Smirnov, A. (2019). Demand forecasting in pharmaceutical supply chains: A case study. *Procedia Computer Science*, 149, 3-10.
13. Calle, M., González-R, P. L., Leon, J. M., Pierreval, H., & Canca, D. (2016). Integrated management of inventory and production systems based on floating decoupling point and real-time information: A simulation based analysis. *International Journal of Production Economics*, 181, 48-57.
14. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. *International Journal of Innovative Technology and Creative Engineering* (ISSN: 2045)
15. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA
16. Shidpour, H., Da Cunha, C., & Bernard, A. (2014). Analyzing single and multiple customer order decoupling point positioning based on customer value: a multi-objective approach. *Procedia Cirp*, 17, 669-674.

HOW AFTER SALES SERVICE INFLUENCES BRAND LOYALTY IN THE AUTOMOTIVE INDUSTRY

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ABSTRACT

This study aims to determine the impact of the after sales service of a four-wheeler on customer loyalty in the Indian market. It explores the factors in after sales services like availability of dealership nearby, spare parts availability and customer satisfaction in authorized service centers. It also helps in analyzing gender-based preferences and their loyalty to a brand. Primary research is conducted with the help of a structured questionnaire designed to get customer's after sales service experience and its impact on their buying decision while the purchase of a new vehicle. These correlations and the analysis are done using independent T-test, bivariate correlation analysis and visual analysis. The results of the study suggest that the after sales service is one of the major factors in customer retention which leads to brand loyalty. This research paper can help automobile manufacturers and retailers as they can formulate their after sales service by better understanding the preferences and satisfaction of the customers to maintain brand loyalty.

Keywords— Brand Loyalty, After sales Service, Auto-dealerships, Automotive Industry

INTRODUCTION

India has one of the largest automotive industry in the world. Even though it is dominated by the two-wheeler segment because of the growing middle class and young population, there has been a considerable increase in the passenger vehicle segment over the past few years. Passenger vehicles are sold through auto-dealerships located all over the country. Since most of the passenger vehicle manufacturers (OEM) sell their products only through auto-dealers who maintain an exclusive showroom for a particular brand. A typical auto-dealership does both the sales of the vehicle and after sales service for those vehicles. It sells passenger vehicles, automobile ancillaries, motor insurance and also has a service centre. In a dealership, even though their primary focus is on the sales of the vehicles after sales services also generates nearly equal revenue as the sales of the passenger vehicles.

Between the financial year 2013 - 2019, the sales of automobiles in India increased by 6.71 per cent CAGR with an estimated 26.27 million vehicles sold between the year 2018 – 2019 out of which 3.38 million were passenger vehicles. India is also a major exporter of automobile. The export of automobiles grew by 14.50 per cent in the year 2019. The automotive industry in India has also attracted investments in form of Foreign Direct Investment which is valued at \$23.89 billion between the period of 2000 –

2019. And going ahead, the Indian automotive industry including the auto component segment is expected to ₹ 16.16-18.18 trillion by the year 2026.

Almost all the major automobile manufacturers in the market have a wide range of product portfolio catering to most segments of people in the country. These products are equipped with the latest technology and safety features. So, auto-dealers, in order to differentiate themselves from the competition, needs to work more on catering to the needs of the customers even after the purchase of the vehicle. After-sales service is provided by both authorised service centres which are a part of the auto-dealers and it can also be availed in an unauthorised service centre which is the local mechanic store present throughout the country. When the warranty of the vehicle is still in effect, the customer must visit the authorised service centre so that they do not void the warranty issued by the manufacturer but they can always visit the unauthorised service centre for minor repairs which does not void the warranty. And also, when a customer considers to sell their vehicle, the history of maintenance done in the authorised service center can help in determining the resale value of the product.

Services provided by the auto-dealers or manufacturers to the customer after the purchase of the product to make their experience with the product more satisfactory is termed as after-sales service. After sales

strategy is a crucial part in a company's sales strategy. In a price sensitive market like India, after sales experience for achieving customer satisfaction is at a premium which affects the customers perception of the brand.

Satisfactory experiences in after sales service leads to customer retention by the brand in the automotive industry. With an increasing acquisition cost per customer because of the competitors and poor market conditions, customer retention becomes more important than ever. In the automotive industry, the customer is not only satisfied just by the product offered but also by the service which they receive after the purchase of the product. A satisfied customer will lead to a better customer retention in a brand. This helps in improving the brand loyalty in the industry. Hence evaluating the importance of the after sales service is necessary for a better planning of after sales service strategies in the automotive industry.

The specific objectives of the study are as follows:

- To study the after-sales service factor's influence on brand loyalty.
- To identify the preference of customer among various factors in buying decision of their second vehicle.
- To identify maintenance preferences based on gender.

Literature Review

After sales services can be characterized as the services received by the customer after the purchase of the product/service [1], which provides support services to the purchased product/service [2], and its objective is to make the post purchase experience satisfying for the customer [3]. After sales service happens before (e.g., sales experience), during (e.g., purchase), or after (e.g., maintenance or repair service) the purchase of the product/service [4].

It is believed in the marketing that a customer who is satisfied will buy again and an unsatisfied customer will not buy again from the same brand. In the long run, for a company or a brand to survive, customer retention is important which can be achieved through customer satisfaction. The acquisition cost for new customers is much higher than retaining an existing customer. Thus, retention of the customer helps the organization to increase

their profits. This retained customer can help in reducing the cost of marketing and they also help in developing a steady stream of sales as the customer demand increases. In general, customer satisfaction would be a psychological state that is formed when the expectations of the customer are met by the use of the product.

A satisfied customer shows three types of behaviour which are retention, repurchase and recommendation to another customer [5]. 'Growth strategies International' (GSI) performed a good statistical analysis of customer satisfaction [6]. The product which was purchased and the received usage experience determines the future perception of the product's quality, its price and its new value [7]. The profitability of an organization depends on the level of satisfaction it is able to provide to its customers which creates a good customer relationship [8].

By lowering the perceived expectations of the customer, customer satisfaction can be increased or it can also be increased by increasing the service value in the customer's perception [9]. When the auto-dealer provides satisfactory service to the customer, the customer's expectations are met consistently [10].

Generally, a customer tends to replace their vehicle once every five years on an average. Even though while buying the vehicle for the first time, the customer buys it based on the product propositions, a negative experience post purchase brought on by the bad after sales services can make the customer change his view about the brand. With all the market players having a standard base quality maintained across its vehicles after sales become a valuable factor which helps them in differentiating themselves in the industry. When the customer decides to buy their next vehicle, their after sales service experiences can be a deciding factor in repurchasing from the same OEM or the same auto-dealer. As time moves on after the initial purchase of the vehicle, the customer tends to lose interest in the car which generally happens in four or five years after the initial purchase and at this time customer loyalty created by the strong after sales experience helps the manufacturers to reinforce their relation with the customer. But a negative experience post purchase can be

damaging to the brand as it makes them lose the customer.

After sales service factors include the availability of spare parts and the support for distribution of those parts [11], in addition to the repair and warranty service [12]. It also includes the set-up of the parts, customer help and support (e.g., toll free telephone numbers or on-line customer support), educating the consumer and their training, management of auto-dealer, remote sensing and diagnosis, roadside assistance [13], regular maintenance for prevention of failures (i.e., maintenance activities that are done after a certain part of the product has been in service for a period of time), maintenance to avoid breakdowns (i.e., the maintaining of part of the product just before it breaks down or when it starts to perform with reduced efficiency [14], improving the design [15], replacement privileges [16], loaning a product to replace a defective product while it is under repair [17], customer query/complaint management, following-up on the query/complaint to check if the issue has been resolved, status updates, and support given to the supplier in terms of developing new and creative uses for a product.

The various factors which are included in the after sales service can be categorised into the following groups: (a) original product/service usage; (b) original product/service repair and maintenance; (c) prevention of problem; (d) improvement and (e) follow-up. In order to achieve these, auto-dealers have made some radical changes in their operations and have become even more flexible [18]. The auto-dealership model includes the traditional '3S' - offering 'Sales, Service, and Spares' in an attractive showroom format and also provide those in smaller remote setups. To increase their speed of service, auto-dealers employ the help of mobile service vans which is a part of a hub-and-spoke model that is used to cover a larger extent of the area with increased speed and also provides roadside assistance for immediate needs of the customers.

Customer loyalty is referred to the behaviour of the customer which shows that they like to continue the relationship with a company. The willingness of the customer to purchase again from the same company, having a bias towards the company or recommending the brand to

another customer translates to a strong customer loyalty to the company.

There are two types of loyalty based on the customers: behavioural and attitudinal loyalty as stated by [19], [20] Dean, 2007 [21]. Based on [20], [21], [22], it can be said that the behavioural parts of the customer loyalty were shown while deciding the repurchase of the product, referrals, and continuance of customer relationship. [23] defined characterized attitudinal loyalty as an ideal evaluation that will be held with adequate quality and consistency to advance a more than once good response towards a product/service in a store.

By the SERVQUAL method, a knowledge gap between the expected service and the management perception of consumer expectations, and a delivery gap between service quality specification and the service delivery were identified. The knowledge gap is with respect to the spare part availability in the service centre where there is a disparity between the auto-dealers perceiving the need of spare parts for the customers and the actual needs of the customer. The delivery gap is with respect to the accessibility of the service centre and also the satisfactory service provided by the service centre.

In addition to that, from all the papers reviewed, the most common gap that has been found was that the time period at which the research was conducted and the market place where it was conducted. There is a need for a standard research in the Indian market at this crucial time when the auto-dealers are re-evaluating their business models to make it more flexible to overcome the current obstacles in the market. As the industry moves towards an online ecosystem, the customer's after sales service experience will greatly impact the repurchase of the vehicle from the same brand. OEMs will need to take up initiatives that will improve the customer's ownership experience. The aftersales experience clearly takes the spotlight as a major differentiator, pivotal for in purchase decisions. This paper focuses on two key aftersales elements: spare parts and service centres, and studies their relationship with brand loyalty.

RESEARCH METHODOLOGY

The research methodology used in this study is descriptive and analytical based on primary data. The primary data is collected through a structured questionnaire from respondents who are residing in India. The questionnaire was designed to gather data about respondent’s gender, the brand of car they used in the past and the one they currently own, period for which they owned their previous car, maintenance preferences, their buying behaviour with regards to the post-purchase experience with a brand, the frequency of their visit to the service centres, priority given to get the maintenance service, acceptance of recommendation given by the service centres, basis on which they accepted the recommendations, availability of spare parts for their vehicle, availability of dealerships near them, quality of service provided by authorised service centres and their relationship with unauthorised service centres. The influence of the after sales service on brand loyalty was identified through this study.

A. Validity and Reliability

In order to examine the model’s reliability, exploratory factor analysis was implemented. Cronbach’s α test was used to gauge the inner consistency. The lowest value of Cronbach’s α obtained was 0.839 which denotes that the

internal reliability is satisfactory. From Table II, we can see that the value of Composite Reliability (CR) of all factors is more than the required edge of 0.7. The Average variance extracted (AVE) for each build or factor is more prominent than the edge estimation of 0.5. High AVE and CR value ensure convergent validity. The loading value (Table I) of all the items exceed 0.5 and thus are within acceptable levels.

TABLE I. ROTATED COMPONENT MATRIX

	Component	
	1	2
Spare parts for my car are easily available		0.918
I can easily reach the nearest service centre	0.987	
I do complete maintenance regularly and so I don’t feel the need to replace any spare parts	0.806	
Authorized service centre provides satisfactory service	0.901	
I have developed a good rapport with the mechanics in unauthorized service centre and hence I like to take my car there	0.987	
I can find genuine spare parts for my car and not duplicates		0.929
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		

^a Rotation converged in 3 iterations

TABLE II. RELIABILITY ANALYSIS

Comp- onent	Cronbach's Alpha	CR	AVE	Item	Factor loading
1	0.94	0.958	0.852	I can easily reach the nearest service center	0.987
				I do complete maintenance regularly and so I don’t feel the need to replace any spare parts	0.806
				Authorized service center provides satisfactory service	0.901
				I have developed a good rapport with the mechanics in unauthorized service center and hence I like to take my car there	0.987
2	0.839	0.921	0.853	Spare parts for my car are easily available	0.918
				I can find genuine spare parts for my car and not duplicates	0.929

B. Survey

A convenience sampling was done for the survey. The sample size includes male and female car owners presently living in India. A range of car brands was owned by the respondents of the questionnaire. The data collected were classified, tabulated and analysed mainly to identify the factors

influencing the buying decision of brand-loyal customers. Using the research instrument, the survey has been done in June 2020. The total number of respondents for the questionnaire is 202 out of which 40 were not complete. Thus, we had a total of 162 data which comprised of both male and female respondents. These respondents were

a mix of customers who were first time car owners and those who have already owned a car. These respondents were then classified into customers who were loyal to a brand and those who were not.

These data were then analysed using independent sample T-test and bivariate correlation analysis. Several other insights were also generated using visual data analysis in excel.

A bivariate correlation analysis is used to analyse the linear relationship between two set of variables. Means of the independent groups are analysed using the independent sample T-test which is a statistical method of analysing the

significant difference between the means of the groups.

C. Hypothesis

The hypothesis of the study are as follows:

H_{0_1}: Easy availability of spare parts does not influence customer loyalty.

H_{1_1}: Easy availability of spare parts influences customer loyalty.

H_{0_2}: Accessibility of service centres does not influence customer loyalty.

H_{1_2}: Accessibility of service centres influences customer loyalty.

H_{0_3}: Satisfactory service provided by the service centre does not lead to customer loyalty.

H_{1_3}: Service provided by authorised service centre satisfactory leads to customer loyalty.

DATA ANALYSIS AND FINDINGS

TABLE III. DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean	Std. Deviation
For how long do you own a car?	162	1	4	2.45	0.985
How do you prefer to do the maintenance service for your car?	162	1	2	1.35	0.477
How regularly do you take/give your car for maintenance service?	162	1	5	2.76	1.396
If yes, based on the recommendation, how often did you change the spare parts in your car?	154	1	4	2.15	1.015
Which of these did you prioritize while considering the recommendation made by the service centre?	162	1	2	1.70	0.461
Spare parts for my car are easily available	162	1	5	3.91	0.883
I can easily reach the nearest service centre	162	1	5	4.10	0.879
I do complete maintenance regularly and so I don't feel the need to replace any spare parts	162	1	5	3.52	0.992
I have developed a good rapport with the mechanics in the unauthorized service centre and hence I like to take my car there	162	1	5	3.10	1.031
I can find genuine spare parts for my car and not duplicates	162	1	5	3.52	1.212
Valid N (listwise)	154				

The data in Table III generated by descriptive analysis, gives the general mean and the range of the data provided by the respondents. A mean of 2.45 in the first row indicates that majority of the respondents in the survey had owned the car for a period of 3-5 years on an average. Similarly, a mean of 1.35 in the second row indicates that the

majority of the respondents preferred to drive their car to the service centre. This because of the predominant male respondents in the questionnaire which is shown in Table V.

Mean of 2.76 in the third row of Table III indicates that most of the respondents had taken their vehicle for maintenance only once in a year. The fourth row which shows the data collected for the acceptance of the

recommendation of the service centre with a mean of 2.15 indicating that the respondents did their research before accepting the recommendation of the service centre.

The respondents also accepted the recommendations based on the urgency of the service needed as indicated by a mean of 1.70 in the fifth row of Table III. Respondents had a positive response to the availability of spare parts in general as indicated by a mean of 3.91 in the sixth row of Table III. They also had a positive response for the dealership availability which is indicated by a mean of 4.10 in the seventh row of Table III. The mean of 3.52 for the regular maintenance suggest that the respondents were neutral in their response indicating that they did replace their spare parts more often as they did not get regular maintenance.

The ninth row of Table III has a mean of 3.10 which indicates that most of the respondents were neutral about taking their car to an unauthorised service centre. This is because of the respondents preferred to take their car to the authorised service centres and since they didn't take their car to the unauthorised centre, they were neutral in their answers. The last row has a mean of 3.52 which indicates that most of the respondents were able to get genuine spare parts for their car.

TABLE IV. BIVARIATE CORRELATION

		Gender of the respondent	How do you prefer to do the maintenance service for your car?
Gender of the respondent	Pearson Correlation	1	.643**
	Sig. (2-tailed)		0.000
	N	162	162
How do you prefer to do the maintenance service for your car?	Pearson Correlation	.643**	1
	Sig. (2-tailed)	0.000	
	N	162	162

The data in Table IV is generated by using a bivariate correlation analysis. It shows that a Pearson Correlation of 0.643 between the gender of the respondent and how they preferred to get the maintenance service for their car. This is further analysed in the Table V and Table VI where the respondents are split into male and female and an analysis is done with the maintenance preference.

TABLE V. BIVARIATE CORRELATION - MALE

	N	Minimum	Maximum	Mean	Std. Deviation
Gender of the respondent	115	1	1	1.00	0.000
How do you prefer to do the maintenance service for your car?	115	1	2	1.14	0.348
Valid N (listwise)	115				

Gender of the respondent = Male

The data in Table V shows the analysis done between male respondents and their maintenance preference. The mean of 1.14 in the second row indicates that the majority of the male respondents preferred to drive their car to the service centre for getting their maintenance done. This is also shown in Fig.1.

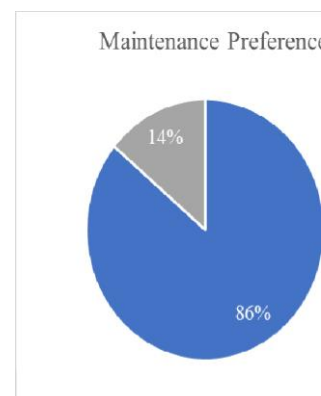


Fig. 1. Maintenance preference of male respondents

TABLE VI. BIVARIATE CORRELATION - FEMALE

	N	Minimum	Maximum	Mean	Std. Deviation
Gender of the respondent	45	2	2	2.00	0.000
How do you prefer to do the maintenance service for your car?	45	1	2	1.87	0.344
Valid N (listwise)	45				
Gender of the respondent = Female					

The data in Table VI shows the analysis done between female respondents and their maintenance preference. The mean of 1.87 in the second row indicates that the majority of the female respondents preferred free pick up and drop services for their car for getting their maintenance done. Female respondents preferring the above option may be because of various factors among which safety concerns can be one of them. The data in the Table VI is also shown in Fig. 2.

Fig. 2. Maintenance preference of female respondents

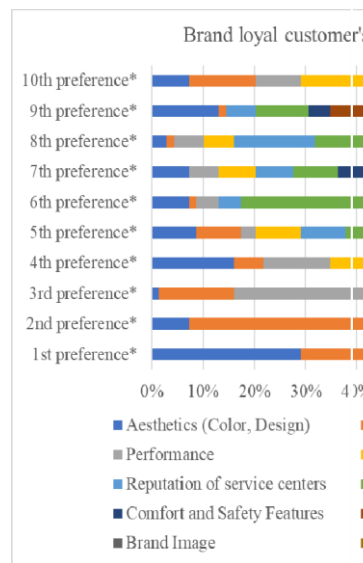
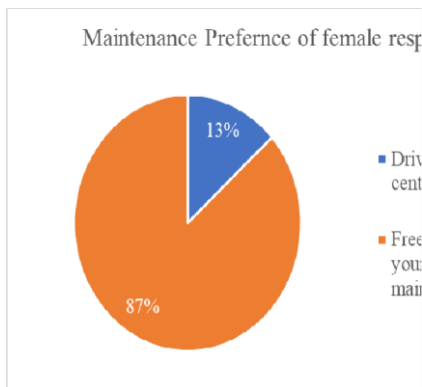


TABLE VII. BRAND LOYAL RESPONDENTS PREFERENCES

	A	Pr	Pe	M	R	AD	CS	F	BI	AS
1 st preference	20	12	3	7	4	0	3	6	14	0
2 nd preference	5	25	19	4	4	3	1	0	6	2
3 rd preference	1	10	19	17	7	6	4	2	3	0
4 th preference	11	4	9	9	14	6	5	4	2	5
5 th preference	6	6	2	6	6	12	14	8	5	4
6 th preference	5	1	3	0	3	18	0	16	2	21
7 th preference	5	0	4	5	5	6	18	4	13	9
8 th preference	2	1	4	4	11	7	16	9	8	7
9 th preference	9	1	0	0	4	7	3	17	7	21
10 th preference	5	9	6	17	11	4	5	3	9	0

*Legends

A	Aesthetics
M	Mileage
Pr	Price
R	Reputation of service centres
AD	Availability of Dealership nearby
CS	Comfort and Safety Features
F	Family Size
BI	Brand Image
AS	Availability of spare parts
Pe	Performance

The data in the Table VII and Table VIII gives the details of the preferences of respondents while buying their car. The data is split into brand loyal and un-loyal respondents which is present in Table VII and VIII respectively. From Table VII, it can be seen that the majority of two out of three after sales service factors are present in the top five preferences of the respondents. The same data is represented as a chart in Fig. 3.

Fig. 3. Brand loyal customer's preference ranking

TABLE VIII. BRAND UNLOYAL RESPONDENTS PREFERENCES

	A	Pr	Pe	M	R	AD	CS	F	BI	AS
1 st preference	23	21	22	9	3	1	6	4	4	0
2 nd preference	10	28	19	14	4	2	8	0	8	0
3 rd preference	2	20	22	25	6	4	10	2	2	0
4 th preference	4	7	8	15	28	7	4	5	9	6
5 th preference	16	4	5	6	10	21	11	10	7	3
6 th preference	7	2	1	0	1	14	0	28	10	30
7 th preference	7	0	3	8	6	15	26	6	11	11
8 th preference	10	2	0	4	12	15	3	11	13	23
9 th preference	6	1	0	1	8	11	8	22	19	17
10 th preference	8	8	13	11	15	3	17	5	10	3

From Table VIII, it can be seen that the respondents who are not brand loyal had given more preference to after sales service factors like reputation of the service centre and availability of dealership nearby while buying their new car because of the post-purchase experiences they had with the previous brand. The same data is represented as a chart in Fig. 4.

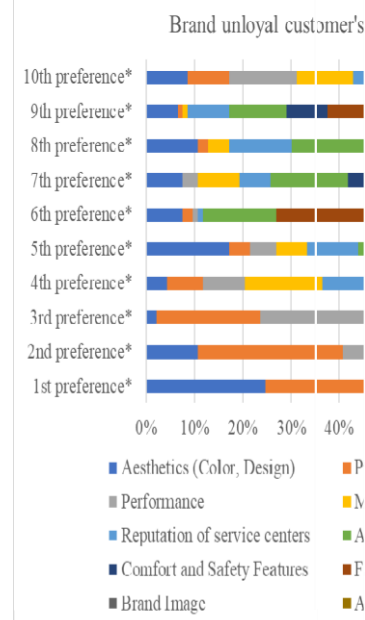


Fig. 4. Brand unloyal customer's preference ranking

TABLE IX. INDEPENDENT SAMPLES TEST

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Spare parts for my car are easily available	Equal variances assumed	12.431	0.001	-3.218	160	0.002	-0.439	0.136	-0.708	-0.170
	Equal variances not assumed			-3.387	159.469	0.001	-0.439	0.130	-0.695	-0.183
I can easily reach the nearest service centre	Equal variances assumed	2.416	0.122	-3.194	160	0.002	-0.434	0.136	-0.702	-0.166
	Equal variances not assumed			-3.395	157.351	0.001	-0.434	0.128	-0.686	-0.181
Authorized service centre provides satisfactory service	Equal variances assumed	10.939	0.001	-2.905	160	0.004	-0.467	0.161	-0.785	-0.149
	Equal variances not assumed			-3.015	159.691	0.003	-0.467	0.155	-0.773	-0.161

Independent sample T-test is done to compare

the means of the brand loyalty and the after-sales service factors. The data is grouped as brand loyal respondents and un-loyal respondents. From the Table 6, it can be seen that the sig. value for the spare part availability is lesser than 0.05 and hence the null hypothesis H0_1 can be rejected which means that the alternate hypothesis of spare parts availability influencing customer loyalty is accepted.

The second null hypothesis H0_2 is also rejected since the sig. value (2-tailed) is lesser than 0.05 which means that the alternate hypothesis H1_2 is accepted. It shows that the availability of dealership nearby has influenced the customer loyalty in the industry. And the final third null hypothesis H0_3 is also rejected

as the sig. value is lesser than 0.05. The alternate hypothesis of satisfactory service provided by the authorised service centre leading to customer loyalty is accepted.

DISCUSSIONS AND RECOMMENDATIONS

The findings of the study reveal that the after-sales service factors influence the brand loyalty in the automotive industry as proved by the tested hypothesis. In the case of brand loyal customers, they were satisfied with their post purchase experience of their previous car. The factors of after sales like spare parts availability, availability of dealership nearby influenced their decision in buying a newer car. They also accepted that the authorised service

centre provided satisfactory service. This customer satisfaction created by the dealerships, lead to the brand loyalty of the customers. In case of the brand un-loyal customers, they were faced with problems of unavailability of spare parts for their previous car, dealerships not being nearby and they also did not receive satisfactory service from the authorised service centres. This made them to visit nearby unauthorised service centres. All these factors combined led them to change their preference of brand while they bought their current car. This can be seen in the ranked buying preference where the two out of three after sales service factors are present in the top half of the preference table.

This shows that the OEMs should provide more satisfactory after sales service for more customer retention. The customer's expectations should be met in all the dealerships and should encourage the customers to get their services done in authorised service centre where the customers can be provided with quality service. In the automotive industry where customer retention is not easy, focusing on all the touchpoints including after sales service becomes more important. Hence, it is important for the OEMs to make all their auto-dealers to provide the best service throughout the country so that they can retain the customers are increasing their market share. The auto-dealers are also benefited by meeting the customer's expectation in after sales service by providing customers with genuine spare parts, quality of service and the speed of the service as they all account for more revenue in the automotive industry. OEMs and auto-dealers can also partner with vehicle ownership assistance provider companies to outsource their non-core business activity like vehicle pick up and drop services. This helps them to provide a more satisfactory service to the customers.

This study also identified the maintenance preference of the male and female respondents. Male respondents predominantly opted to drive to the service centre to get the maintenance service for their car while in contrast, female respondents preferred free pick up and drop services for their car. This can be because of various factors like the distance to the nearest

dealership, customer's schedule, safety concerns and trust between the customer and the service centre. The auto-dealers should try to bridge the gap in case of male respondents so that they use the pick-up and drop service more often. And in the case of female respondents, the auto-dealers should make their service centre more women-friendly in order to encourage them to drive down to the service centre. All these will be converted to customer satisfaction leading to customer retention by the auto-dealers.

The manufacturers and the auto-dealers should consider partnering with other after-sales service providers in case they are not able to deliver or meet the customers expectation of the service. In practise, many of the auto-dealers outsource some part of the after-sales services like pick up and drop service, car detailing or modifications that the customer wants. Although this is done by the auto-dealers in the premium car segment, the mid-range segment can use the services of other companies as their workload can be delegated. These companies also help the auto-dealers to improve their efficiency in the service bay of the authorised service centres which increases the revenue of the auto-dealer. In addition to this, there are also authorised dealers of auto component suppliers which is an exclusive showroom for a particular brand of automotive parts supplier. These dealers also have a service centres attached to them that can provide the customers with the replacement of certain parts of the passenger vehicle which is manufactured by that parts supplier. All these service providers pose a challenge to the auto-dealers and the manufacturers in retaining their customers and maintain brand loyalty. The manufacturers and auto-dealers need to make changes in their sales strategies for the after-sales service in order to attract the customers to get their maintenance services done in the authorised service centres.

Currently, the world is experiencing a pandemic situation caused by Covid-19 which has reduced the sales and services in the automotive industry. In the post covid-19 scenario, many customers will be needing maintenance service for their cars since they haven't used it for a long time during the lockdown periods. This will cause a sudden surge in the demand for

after sales service in the automotive industry. The customers will also be preferring the free pick up and drop services for their car due to the safety concerns posed by the pandemic. The service centres must handle this demand to retain their customers and maintain brand loyalty.

LIMITATIONS

As in any research, there are a few gaps in this study. Also, in our country, electric vehicles are being introduced slowly into the market. The problem with the electric vehicle with regards to the after sales service is that the electric engine in these vehicles has lesser moving parts in comparison to the internal combustion engine. This means the need for maintenance is lesser when compared to a combustion engine vehicle. The automotive industry must make significant changes in their after-sales service strategies to tackle this problem. One of the ways to do this is by focusing more on the automotive ancillary parts which can be provided to the customers.

Another limitation of this study is that it did not consider the growing auto rental industry. Millennials and Gen-Z people do not prefer to own a car. They are moving towards car rental, lease and car-pooling facilities provided by companies. Corporates are providing their employees with cars in collaboration with companies which provide car lease along with a fleet management system. OEMs are also providing car lease options to the customers directly which takes care of the maintenance services of the car. This can lead to an increase in the brand loyalty for the manufacturer.

In addition to that, the unauthorised service centres form a major part in the Indian after sales market. Nowadays, unauthorised service

centres are upskilling to better serve the customer needs as it is their core business service. They provide a variety of additional service options to the customers as they are in a highly competitive market where they need to compete with authorised service centres and other unauthorised service centres. The quality of experience provided by these centres are much better than the one provided in authorised service centres in some areas. And with the help of web aggregators, getting a service for a car has become hassle-free process. These gaps in the research can be further explored and analysed to find ways by which the manufacturers and the auto-dealers can increase their market share.

CONCLUSION

This study identifies how the after sales service influences the brand loyalty in the automotive industry. The automotive industry is in a state of constant flux where many innovations are being made year-round. It is a very competitive market place where OEMs compete for the market share. In such a market space, retaining customers is more important now as the acquisition cost is also on the rise. Hence focusing on every single factor which can lead to loss of customers is much more crucial to maintain the market share. One of those factors is the after sales service which proves to be very important as it engages with the customer for an average of 3 years before they buy their next vehicle. The study identifies the factors of after sales service that the customer considers to be more important and how it had influenced them in buying their next vehicle. The study also provides suggestions to auto-dealers and OEMs to improve their after sales service and in turn increase the brand loyalty.

REFERENCES

1. Rampal, M. K., & Gupta, S. L. (2008). Chapter 21-23: Service Marketing: Concepts, Applications and cases.
2. J. W. J. C. Christopher Lovelock., "Chapter 1-3: Services Marketing: People, Technology, Strategy," in A South Asian Perspective, New Delhi, Pearson Education, 2008, pp. 1-39.
3. Berndt, A. (2009). Investigating service quality dimensions in South African motor vehicle servicing. African Journal of Marketing Management, 1(1), 001-009.
4. Landrum, H., Zhang, X., Prybutok, V., &

- Peak, D. (2009). Measuring IS system service quality with SERVQUAL: Users' perceptions of relative importance of the five SERVPERF dimensions. *Informing science*, 12.
5. Heskett, J. L., Jones, T. O., Loveman, G. W., Sasser, W. E., & Schlesinger, L. A. (1994). Putting the service-profit chain to work. *Harvard business review*, 72(2), 164-174.
6. Coldwell, J. (2001). Characteristics of a good customer satisfaction survey. *Customer Relationship Management*, 193-199.
7. Dubrovski, D. (2001). The role of customer satisfaction in achieving business excellence. *Total quality management*, 12(7-8), 920-925.
8. Reichheld, F. F. (1996). Learning from customer defections. *Harvard business review*, 74(2), 56-67.
9. McCollough, M. A., Berry, L. L., & Yadav, M. S. (2000). An empirical investigation of customer satisfaction after service failure and recovery. *Journal of service research*, 3(2), 121-137.
10. Lewis, R. C., & Booms, B. H. (1983). The marketing aspects of service quality. *Emerging perspectives on services marketing*, 65(4), 99-107.
11. M. A. b. C. M. M. F. A. R. Zanudin b .Hj. Awang., "Measuring Service Quality in Higher Education: The Customization of SERVQUAL Model".
12. T. S. Jimei Li, "The Instruments of Information Systems Service Quality Measurement," in *The Sixth Wuhan International Conference on E-Business – Innovation Management Track*, 2012.
13. Kolanović, I., Skenderović, J., & Zenzerović, Z. (2008). DEFINING THE PORT SERVICE QUALITY MODEL BY USING THE FACTOR ANALYSIS. *Pomorstvo/Journal of Maritime Studies*, 22(2).
14. Yap, S. F., & Kew, M. L. (2007). Service quality and customer satisfaction: antecedents of customer's re-patronage intentions. *Sunway Academic Journal*, 4, 59-73.
15. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. *International Journal of Innovative Technology and Creative Engineering* (ISSN: 2045
16. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.
17. Parasuraman, A., Zeithaml, V. A., & Berry L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality *Journal of Retailing* Vol. 64.
18. Krishnamurthi, S., & Selvaraj, F. J. (2017) Factors Influencing Customer Loyalty on After-Sales Service among Selected Car Segments. *International Journal for Advance Research and Development*, 2(2).
19. Nordin, N., & Razak, R. C. (2014). The concept of Kano-QFD integration for non-linear customer needs in product and service design. *Advanced Review on Scientific Research*, 4(1), 1-6.
20. Nadiri, H., Hussain, K., Ekiz, E. H., & Erdoğan, Ş. (2008). An investigation on the factors influencing passengers' loyalty in the North Cyprus national airline. *The TQM Journal*.
21. Karatepe, O. M., & Ekiz, E. H. (2004). The effects of organizational responses to complaints on satisfaction and loyalty: a study of hotel guests in Northern Cyprus. *Managing Service Quality: An International Journal*.
22. Yi, Y. (1990). A critical review of consume satisfaction. *Review of marketing*, 4(1), 68-123.
23. Liu-Thompkins, Y., Williams, E. V., & Tam L. (2010). Not all repeat purchases are the

- same: attitudinal loyalty and habit. College of Business and Public Administration. Old Dominion University, Norfolk.
24. Back, K. J., & Parks, S. C. (2003). A brand loyalty model involving cognitive affective, and conative brand loyalty and customer satisfaction. *Journal of hospitality & tourism research*, 27(4), 419-435.
25. Dean, A. M. (2007). The impact of the customer orientation of call center employees on customers' affective commitment and loyalty. *Journal of Service Research*, 10(2), 161-173.
26. Swalih, M., Adarsh, K., & Sulphay, M (2021). A study on the financial soundness of Indian automobile industries using Altman Z-Score. *Accounting*, 7(2), 295-298.

IMPROVING OMNI CHANNEL RETAIL OPERATIONS THROUGH BUY-ONLINE-AND-PICK-UP-IN-STORE INITIATIVE

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ABSTRACT

Purpose: The impact of having Omni channel inventory and initiative of Buy Online Pick in Store for Luxury Items can be studied. To understand how important, it is now to switch to Omni channel mechanism for any brand post pandemic to sustain. **Design/Methodology/Approach:** A common inventory will help to make the idea of Omni channel to be possible. BOPS revenue should be spread across channels in a distributed retail structure in which store and connected networks are operated separately to reduce enticement differences. It is not effective to assign all returns to one network. **Practical Implications:** The research will try and identify the factors and the parameters that make the inventory as common for all the channels available for a Luxury Brand. A person can order anything online through a mobile app, complete the process by collecting from the store and initiate the return policy through the brand website. **Originality/Value:** Existing research is restricted to addressing the scope of the Omni channel Retail or how they will be changing the way the customers shop. This paper, for the very first time, will describe how it will help the luxury brands to sustain in the market post COVID and how BOPIS will be beneficial for the brands because Buy Online Pick in Store is not always profitable for those products which sell well in the stores.

Keywords-Retail Operations, Omni channel, Strategic Consumer Behavior, Decentralization

INTRODUCTION

(A. Hübner, 2016) an explore learning one of its kind to establish a detailed classification of accomplishment of Omni-Channel on the basis of commodity flow sources and destinations. They describe three major Omni-channel forward distribution systems using comprehensive analytical research: conventional physical store purchasing, home based delivery, and picking up from the stores. Resources for home transport and store deliveries may be Distribution Centers (DC) of a manufacturer, store of a manufacturer or directly transported from DC of a distributor. These further portray the distinction between Click & Collect and ship-to-shop programs, where Buy Online Pick in store operation customs store records besides the ship-to-shop habits distributor lists to meet Buy Online Pick in Store orders. Digital retail revenue is expected to rise to 60 billion US dollars by 2020. In the region, e-commerce is steadily growing. At the lowest rates customers have a continuously growing range of goods. Definitely, e-commerce is triggering the biggest revolution in the retail industry and this phenomenon will continue in the coming years. The e-commerce industry in India is forecast to cross US \$53 billion by 2018. Retailers can take advantage of digital retail (e-commerce)

platforms, allowing them to spend less on real estate while serving more consumers in Tier 2 and Tier 3. It is expected that conventional retail would hold a strong 75 percent share by 2021, organized retail share would hit 18 percent and retail e-commerce share would hit 7 percent of the total retail market. (IBEF, 2020) According to Harvard Business Review, 73 per cent of all consumers use multiple platforms during their buying journey. It is only when the customer collects as much information as possible from a variety of sources that they decide to buy from a retailer to support their decision to buy. By new advances in skill and digitalization, Omni channel retailing has now developed the standard, and customers can easily brand the transition between multiple channels for one purchase (Roberts, 2017).

Sellers should take advantage of the blurred lines between the networks to follow an industry-friendly business model, such as offering a virtual online exhibition to encouraging consumers to preference up the goods in individual or consuming an offline showroom and taking goods transported to clients. When the number of touch points grows, so does the need to move seamlessly from one touch point to another. Whether it's a social advertisement, an email newsletter, a mobile push notification, a chat-bot conversion

or a face-to-face chat with your store staff. By breaking down the walls of a business between the channels, the consumer is empowered to interact with a company in such a way that feels natural to them. Omni channel Retailing is a multi-channel retailing in which a Brand is present in different platforms, and in order to have an integrated customer experience, these platforms are interconnected to each other. For example: If a person orders from online through a mobile app then he can collect his order from a physical store of that brand and the same time can ask for the return policy through the brand's website. Not only this the grievances can be entertained on brand's social media platforms. So, a complete integration of all the resources leads to Omni channel Retailing. The major role played in this is common inventory for each and every platform (S. Derhami, 2019). India is projected to develop the fastest-growing e-commerce marketplace in the world, motivated by vigorous sector asset and a speedy growth in the figure of Internet handlers. Numerous actions take strong hopes of Indian e-commerce markets rising. India's luxury marketplace is anticipated to rise by the end of 2018, to US\$ 30 billion, from US\$ 23.8 billion in 2017 backed by increasing foreign brand awareness among Indian youth and higher upper-class buying power in Stage 2 and 3 cities. Whereas the conventional road to purchase for luxury goods once was straightforward – knowledge of appraisal to purchase to loyalty – the cycle is far from linear these days. Shopping behaviour, with frequent switching from offline to online and from one computer to another, has become more complicated. Channels have also proliferated rapidly; while print publishing remains important in the world of luxury, social media, video, micro-publishing and mobile communications have all become essential components of the marketing mix of any company. When it comes to knowing the luxury road to purchase, it is vital toward take a Buyer engrossed view. Aimed at brands towards succeed in today's Omni-channel world, all consumer touch points, online, offline and in-store must be understood, then relevant content and product interactions are delivered at these decision points. The good news is that customers have a lot of digital footprints left. Consumers today, for example, are increasingly

using smartphones along the purchasing route, finding a store, making a purchase and even buying online during a physical shopping visit. They prefer to use large amounts of click-and-collect. And they rely on on-line videos to inspire shopping, using useful interactive tools like these to gain insight into your audience's habits, desires and purpose. Unique of the popular Omni-channel movements is the 'Buy-Online-Pick-up-in-Store' prototypical, recognized as BOPIS, which combines online and offline processes by letting patrons to position and collect commands online in their selected outlets. This also provides retailers with the ability to cross-sell and cross-promote goods, leading to progress in revenues. BOPS amenities are extra convenient for consumers than household delivery, as they ensure not require waiting at home based. They can also be additional affordable because maximum of the retailer's BOPS facilities is accessible free of charge. It is proposed that since consumers are today sound alert of the advantages of Omni channel selling and therefore assume a all-in-one clothes shopping practice across numerous networks, sellers must adopt an offline information-online fulfilment prototypical and operational information-offline fulfilment ("buy online, pickup in store") model (D.R. Bell, How to win in an Omni channel world, 2014). Buy-Online-Pick-in-Place would be used once online data offers ample trust to clients as the interface is user friendly and the information provided is transparent about the product with proper description and details along with the assistance provided through either call centre or chat box and the immediate offline delivery provides high utility to them. Given its success, it is very difficult for the retailers to fulfil BOPS orders in stores. Inaccurate shop inventories hamper cross-channel delivery and improve walk-in customer stock possibilities. (Bart L.MacCarthy, 2019). Therefore, it is required that there is a revamp in the inventory system so that a retailer of one store sitting at one corner can have a live data visualisation about the products being sold at other corner of the country.

Objective

This research paper is designed to capture the impact of having Omni channel inventory and

initiative of Buy Online Pick in Store for general items can be studied. Through this research paper it will be easy to understand how important it is now to switch to omni channel mechanism for any brand post COVID pandemic to sustain.

In this research the subsequent research interrogations are talked:

1. What type of merchandise resolve the BOPIS opportunity be appropriate for?
2. In what way does BOPIS influence the client base of vendors?

LITERATURE REVIEW

Dual brooks of study are linked to our study, explicitly omni-channel retailing and order completion modes.

2.1: *Omni channel Retailing*

The statement omni channel retailing in the works coined as per "an interactive buying environment combining the returns of physical provisions with the insightful online shopping knowledge" and contended that innovation and digitalization accelerated the transition from multichannel retail to the omni channel landscape. Retailing has arrived the era of the omni-channel. Clients expect a channel-agnostic and all-in-one clothes shopping skill through retail provisions, mobile devices, online, and other. Both experts and theoretical scholars agree that the upcoming of selling is omni-channel. As customers are familiarized to shopping online, brick-and - mortar retailers have gradually accompanied online businesses with their stores. Traditionally, the online platform was seen as a different way to market the goods. Nevertheless, several retailers have recognized the need to leverage their current networks to expand the proposal for consumer interest and increase operating performance (Jisoo Park, 2020).

Though this original stage of omni channel retailing unlocks up original chances and openings, sellers face tasks and restrictions as well. Certainly, meanwhile regulars use numerous networks and assume an even process involvement, omni channel structures are an obligation for retailers and consequently the task is to contrivance such strategies flawlessly

and efficiently in demand to best meet customers ' potentials. (D.R. Bell, 2014)

Consumers drive to a brick-and - mortar shop to explore and discover the best-fit merchandise in predictable marketing surroundings, and the operation receipts dwell at the identical retail stock. All pre-purchase spending processes, like exhibiting, are carried out online in an exclusively e-commerce logic. The product will be exhibited online in such a situation by means of photos, videos and comprehensive descriptions provided by the retailer. For positive cases, the seller lets preceding regulars to nonstop their judgement by examining the produce, as afterward assembly an order, the lone period a buyer has an unintended to patterned the produce is constantly upon transfer. All these efforts are expected at the removal of physical retail supplies. An omni channel setting, however, can show a combination of online and offline showcasing and execution. Things may be exhibited digitally with in-store distribution (online purchasing and in-store pickup) or the contradictory may be true, where the produce is physically established with "online" completion. The later circumstance is mutual in around businesses where the regulars purchasing such a product are critical to undergoing a produce in person.

2.2: *Order Fulfilment modes*

Order completion is one of the phases in the e-performance cycle that starts with a customer's order approval and ends with the purchaser getting the goods they need at the time and place they need (J.M. Tarn, 2003). In this brook, we evaluate the order fulfilment styles primarily, which mention to the actions that materially transfer the merchandise to the buyer.

The distribution styles can be separated into appeared home-based delivery against unattended home-based delivery, in the age of single-channel and multi-channel selling. Previous studies primarily examine home delivery using simulation approach (K.K. Boyer).

2.3: *Omni channel in Luxury*

While retailers may well understand the importance of having consumers to experience

their goods, inventory of all goods is typically not feasible, particularly when selling with high-value, high-volume items. In additional confrontations, efficiently varied outlets can demonstrate involved challenges in the occurrence of physical (spatial) and economic (financial) restrictions. Therefore, with the amplified status of outlets in omni channel sceneries and the necessity to generate a well-organized and actual outlet in an assumed showcase centre is apparent in order to recover buyer skill and gratification. In detail, a set of well-chosen goods to be demoted in an outlet restricted by financial and spatial constraints can indirectly result in a advanced degree of effective sales. An integrated outlet exploits the anticipated showcase value, letting a wider range of consumers with potentially unlike preferred goods to consume the ability to view, sense and practice the various structures and choices of their preferred goods. The bodily and financial limitations for outlets are just as critical as they are in conventional retail settings if not more so. Businesses may theoretically decrease the owed budget for each outlet and provide additional outlet sites with a good outlet that encounters those limitations. It would require a wider coverage area with equivalent investment in money savings, foremost to a growth of their topographical influence (Jisoo Park I. D., 2020). There are many things we love about shops – personal service, the opportunity to touch and feel items, experience fun and instant gratification. And we also seem to love online shopping; after all, it's fast, convenient and removes the need to make queues or drag heavy bags around. Technology will allow us to take the best of both worlds and create a more seamless, pleasurable and welcoming experience. For starters, how would you find a physical store and navigate it first time? On your smartphone, you can use Google Voice Search to connect to Google Maps, and then use Street view inside the shop to understand the layout. Luxury produces things beyond just the commodity and makes customers feel good about it. What luxury is capable of reinventing that in the digital sense. There is hope, though. There are three things you can begin to do, two immediately and one that is facing a bit of a future. Next, open your

eyes and realize that the shop assistant is the number one omni-channel tool.

What are omni-channels? They understand you, they remember your number, they know what you want, they 're going to call another shop to get what you want, they 're going to ring you as new product comes and write to you to make sure you know it all. It is a really easy example-being the main assistant in the digital store. Look at the signs from the audience; you can do a lot to identify a customer using research, display & social. Second, forget the noise, and consider what is really going on. Much progress has been made in the field of attribution. You have all of these touchpoints which have a certain amount of exposure before sale. You can take data from the log file and add some digital contact before anyone gets to your site. Instead of thinking, 'I really have to join every channel together,' just consider, 'What is the stuff that really drives sales to me?' 'When you just get those stuff right then it will actually have a greater effect on the customer. The last thing you can do if I'm frank, is harder. You can start connecting, and enter your data online and offline. Collect, centralize data and then meld it. (Naughton, 2017)

2.4: Buy Online Pick in Store

Numerous sellers find BOPIS to be a means to attract new clients. Shoppers have become ever further famous. Consumers with BOPIS Instant gratification experience, stop delivery and distribution variations and appreciate the ease of shopping hassle-free (their things were selected and filled by the store supervise as of the period). It is not impractical for sellers to imagine marketplace growth with this sole mixture that has never been followed before. Additional more pessimistic opinion, however, is that BOPIS merely transfer regulars from online completion to store completion; regulars by means of BOPIS would have well-ordered online anyhow. Towards identify the consequence of BOPIS on the lowest stroke of sellers, it is beneficial to differentiate amid the request cannibalization and claim formation situations labelled directly above (E. Çeven, 2017)

BOPIS 's emergence indistinct the difference amid store processes and online. While BOPIS

commands initiate online, the record in retail supplies is cast-off to achieve them. Thus, an actual application of BOPIS involves good message amid the online and offline systems. Very few sellers have fully eradicated their online and offline channel storage tower, retaining one unified accounting book with a related administrative framework for all revenue irrespective of network. (Forrester, 2014)

This paper studies on-line and offline channel management. In this paper, we learning a original method to appeal clients to store, BOPIS, by which the retailer bonds with customers the real-time data about stock account standing. Around the turn of the century, with the introduction of e-commerce, many producers or suppliers have launched a straight online sales platform that contests with their own retail associates. Omni channel management in industry has gained a great deal of attention; the subject is widely surveyed in (Bell, 2014). Furthermore, there are a few other papers that empirically research how consumers migrate in a multichannel world between channels and the part of marketers in determining immigration concluded their communications policy (Ansari, 2008).

(Chintagunta, 2012) research the preference of customer channels in grocery stores and calculate the comparative deal prices when homes pick amongst the online and offline networks. (Ofek, 2011) emphasis on the influence of produce revenues on a multi-channel retailer and explore how pricing strategies and physical approaches. As a consequence of the extra connected opening, the levels of store assistance change.

A particular quality of the BOPIS issue is the occurrence of pre-specified firm limits for the order space and the promoted pick-up time when a well-ordered piece is available. Although an important quantity of studies has been supported out in the warehouse fulfilment literature to diminish travel distance and throughput time, only a very incomplete amount of effort has been done on optimization of execution presentation in the occurrence of detailed delivery limits. Seeing BOPIS from the point of view of the product category, we deliver the seller with specific strategies for determining whether or not a certain form of

produce should be permissible for BOPIS in rappsorts of its holding period. This influence is literally significant provided that most real-world retailers follow the same set holding period for their BOPIS services; and phenomenon which kinds of goods should be permissible for BOPIS.

RESEARCH METHODOLOGY

A pilot survey was carried out to collect data from a random group of people who were family, associates and fellow Friends. The questionnaire was updated, based on feedback. The revised questionnaire was used in an online survey portal for collecting data to understand what products can be initiated through BOPIS, how does BOPIS impact the retailer's customer base. The survey focused mainly the cities of Vadodara, Ahmedabad & Mumbai which are hubs of online shopping in the Western Indian region. The respondents were mostly the youth going to college and the parents who buy from online and physical stores. The collection of samples was done keeping in mind that the sample population are most likely the people who regularly buy from online platforms. As a result, at a higher degree, the lifestyle, employment, shopping habits and preferences were seen as very similar in nature. We faced a few respondents who for different reasons don't prefer online shopping and didn't find the data relevant to them to be examined as part of this analysis. The respondents included youths who frequently buy online, and the parents who use many platforms. The data were collected over a span of 1-2 weeks. The total sample size obtained after initial data screening was 160. The methodology measures are as follows:

1. Questionnaire Training.
2. Taking pilot poll.
3. Questionnaire examination after pilot survey.
4. Collection of primary data through on-line survey and questionnaire.
5. Statistical Review of the data obtained.
6. Divide the whole sample into subpopulations or clusters dependent on variables such as age, class, job, wages, etc.

7. Performing demographic research to evaluate important variables influencing the behavior of customers belonging to a single category shopping online.

8. Analyze the effect of various variables on the measure depending upon how much a customer wants to shop digitally.

Data Collection

A survey was conducted via google forms on the above structure, and 16 questions floated across India in the questionnaire. Data were collected through pupils, youth and parents who regularly purchase from online platforms as well as physical stores. Some of the answer to the questions was captured using a 1 through 5 Likert scale. Answer 1 was to capture the worst-case scenario and response 5 was to capture the best-case scenario as the respondents viewed it. Few questions have been asked as multiple choices, and ask the respondent to select one of them. The vector dichotomous values were replaced by the values 1 and 2.

DATA ANALYSIS & RESULTS

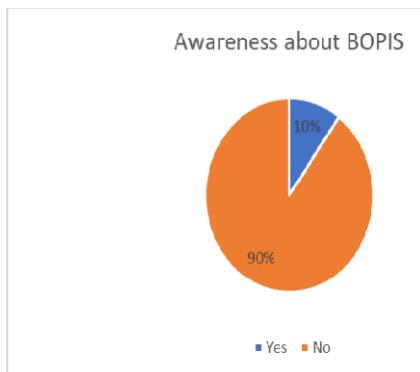


Figure 1: Awareness About BOPIS Initiative

As a part of the research we communicated with different end consumers and retailers through the questionnaire to get the results to understand the situation of BOPIS in India. On asking about the awareness of Click and Collect system amongst the end consumers, only 10% of the sample size was aware about the provision.

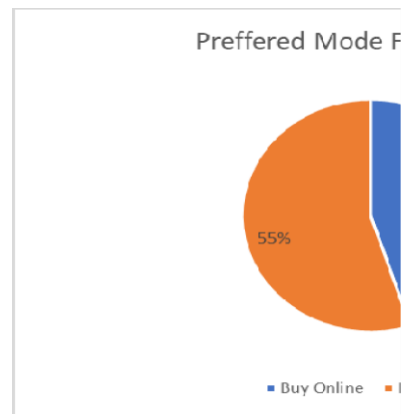


Figure 2: Preferred Mode For Shopping

When asked about the frequency of the purchase from Online as well as Physical stores, 45% of the customers preferred going online in which 95% of the sample size was in the age group 18-35 years. Out of this 45% of the size, 61% of shoppers used a Laptop in total and 39% used a mobile computer. What we find quite interesting is that as part of the process, just 29% of the shoppers on the mobile devices actually used a retailer app. Our expectation was that those customers who used the app would rate the experience of shopping online as higher than those who merely used a web browser. Nevertheless, what we found was that satisfaction with the interface was exactly the same as the browser interface. Going deeper, we found that while it may be easier to find items when using the app, the browser experience 's versatility of payment options would be slightly better particularly if the payment card wasn't already on file. When asked about awareness about BOPIS format just 10% was aware of it. 75% of customers who are aware of BOPIS say they are probable to kind an extra buying and 49% of customers made unintentional buying while picking up their objects in-store. When given the detailed explanation of BOPIS and then asking what factors they will be looking for Click & Collect format to be present, the primary factor (76%) for choosing the BOPIS option was financial incentive (i.e. saving on shipping charges).

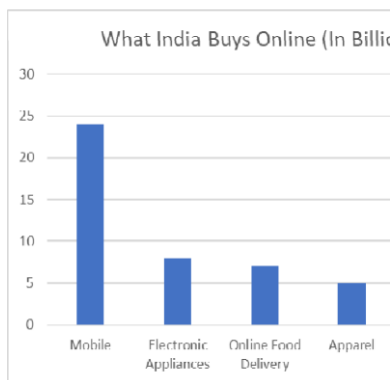


Figure 3: What India Buys Online?

Next in importance was pace and suitability (the necessity of picking up an object on the similar daytime). When picking up goods at the superstore, a fast in-and-out knowledge is at the top of customers' minds. No waiting in line, ease of discovery the pick-up site, a devoted pick-up counter and chosen space spots can subsidize to the quick in-and-out knowledge. When it derives to existence informed, rapidity was once again the reliable theme, as 83% predictable to catch back in 24 hours or less after placing an command online that their piece is ready for pickup. Within the first four hours, almost 60% expected to hear. Convenience was the main reason for the location of the pickup, as 77% chose to pick up their goods either at the front of the store or at the front. At the back of the shop, just 8 per cent were willing to pick up their pieces. 80% expect to be able to pick up their products from the moment they reach the store in less than 10 minutes, with a further 27% expecting less than four minutes. Consumers have correctly and on time measured filling orders as the most critical feature of an outstanding experience. Less essential is the choice of paying in-store, a try-and-buy service and dedicated parking spaces. 10% of all sales will be satisfied by Click and Collect by 2025. 50% of defendants have definite where to shop online based on whether or not they might pick up in-store.

For further analysis, apart from the customers even retailers were interviewed for qualitative analysis to explore:

- Do you have the provision for click and collect?
- What is the frequency of the goods sold after choosing click and collect?

- What changes you feel will be happening in the physical stores to make this successful?

- If not, are you willing to choose BOPIS?

90% of retailers idea to implement BOPIS by 2021. When asked about the current format they are having their business, majority of them were present as physical stores, very few had a digital platform but no one had the provision for Click & Collect. Luxury retailers were very optimist about the BOPIS system, where the customers can look out for products online and then pick from the physical stores instead of waiting for the delivery or paying for the shipment cost. When further asked they were in the thought that a revamp in inventory system will be required to cater to Omni channel System and to apply one of the schemes of Omni channel i.e. BOPIS. To make it more attractive for the customers and to make the experience memorable for them when they visit the physical store to collect the product bought already online, they believed that a robust structural change will be required in the stores which will be more inclined towards digital technology.

DISCUSSION

From the study it is clear that customers want tempo, comfort and appropriate message for a improved involvement of BOPIS. An unimportant share of total transactions are currently completed by clicking and collecting, but it is increasing in use, with 49 per cent of Indians trying it for the initial period in 2016. Retailers will profit from having a good in-store involvement — at least sometime 59 per cent of customers plan to buy additional products. Retailers will examine how they can offer opportunities to attract the 41 per cent of consumers who are unlikely to buying extra goods. It's fascinating to notice that 77% of shoppers didn't want to be pulled to the rear of the store to pick their things. Businesses will align their financial interests with the pace and comfort they intend to upsell the customers visiting their stores to pick up their products (Abbu, What consumers expect when they buy online, pick up in store, 2017).

When picking up products at the supermarket, a fast in-and-out experience is at the top of consumers' minds. No waiting in line, comfort of discovery the pick-up site, a devoted pick-up counter and chosen parking spots can pay to the quick in-and-out involvement. (Abbu, 2017)

If a store provides free delivery, consumers may have goods delivered to their doorstep considerably more costly. Rather of charging \$3 + for shipping a single item, consumers can save both money and time by collecting up their order in store relatively. Around the same time, they will also reap the benefits of fast shopping online. When consumers need an item right away, buying an in-stock item online is much easier and getting it ready for shipment in an hour than waiting for an Amazon delivery two days or longer. It's important to quickly have things in the customer's hands and BOPIS can deliver just that. BOPIS aids as a generous of protection that the item consumers want when it's ready for purchase is 100 per cent at the store of their choosing. The last thing a customer wants is to buy an item by choosing a BOPIS delivery option via the app, only to get to the store and find out that the product isn't available or has been replaced by something else. (Gannon, 2014)

We've seen a number of major stores suggest BOPIS recently and understand the paybacks of this fulfilment choice. Let's take a look at three retailers that put the skill into action.

1) *Walmart* - Walmart includes on-the-go delivery on the curb side and in-store for customers. Clients can shop online the large range of foodstuffs from Walmart and have them available when it's suitable for the shopper. Walmart's grocery pickup blends the suitability of shopping online with the comfort of never parting your home, all at no extra charge.

2) *Lifestyle* - Like Walmart, Lifestyle also offers the BOPIS competences to make spending for customers easy and convenient. Pickup Order enables customers to order objects from Lifestyle.com or the app and pick them up from their local store. In addition, Lifestyle's Drive Up allows consumers to

browse from thousands of products in the Lifestyle app, which will alert users when the order is complete to pick up.

3) *Shopperstop* - For some time now Shopperstop has offered pickups in-store. This service helps consumers to order a dog food bag or repair a broken leash on the similar day so pet proprietors don't have to wait for transport to look after their adored animals.

CONCLUSION

We are investigating a precise omni channel completion approach in this paper: buy-online-and-pickup-in-store (BOPIS). We are generating a stylised prototypical that integrates essential foundations of omni channel retail settings; in specific, clients are gradually choosing networks to buying and achieve. We discovered that BOPIS excite request since customers over an effect of data and a suitability outcome. The prior influence happens as BOPS reveals obtainable store list data in real-time. Goods accessible for pick-up from the store must be in stock. With the information that, Clients are more probable to call the shop. The latter is due to the circumstance that BOPIS bids a new and possibly more expedient shopping manner. By serving consumers preference substances and transfer them to counter counters, BOPIS decrease shopping disturbances.

While BOPIS is a general consumer accomplishment option, we too want to be careful when applying it. By being careful when selecting the set of goods suitable for in-store pickup, retailers can profit from this original accomplishment policy. BOPIS may help attraction more buyers to the shop, thereby refining the sales of items that beforehand writhed to sell fit; though, the BOPIS choice may be unintentional for successes as an outcome, shop traffic is popular. Also, while BOPIS can be a fruitful policy for a retailer to cultivate their customer base, BOPIS can concurrently thrust current online clients to the store network where the profit margin may be lesser equated to the online network. Finally, retailers with dispersed operations will enhance incomes by properly assigning BOPIS income

amid the online and storing channels, and giving full praise to either channel is rarely ideal.

In our model, we have positioned two expectations to abridge the examination: (1) the online channel is exogenous and always in stock, and (2) all customers test the facts online when BOPIS is being providing. The probable influence of BOPIS on the working costs is beyond the possibility of our current examination. On the one hand, BOPIS help to decrease the cost of online delivery, as its handovers the last-mile distribution load to customers. In contrast, BOPS is tracked by new whole execution. For instance, stores need to train their staff to do timely pick-and - pack tasks and grip increased request; stores need to letting more staff to grip online orders. For future research a more detailed cost-based study of BOPIS is left as a significant subject. Tasks where the good benefit of a retailer does not lie.

Some products, like clothing, have non-digital qualities which can only be connected in the offline network. Clients who buy online cannot distinguish how much they like the merchandise, and may ultimately return some online procurements. (Gao, 2015) Build an alike prototypical where the retailer may provide information about the product in an omni channel setting. One of the types of knowledge they research is virtual showrooms, by which consumers can practically try on a product online; for example, consumers can check the t of a shirt through a digital avatar on the UK luxury shirt brand Thomas Pink 's website. This kind of knowledge system can be a double-edged weapon: while helping to decrease online yields, Omni channel channel customers may not support the store after an undesirable simulated try-on involvement.

The Omni channel tactic conversed in this paper, BOPIS, talks online-based procurements that are finished in the store. BOPIS customers obtain online data in the essence of (Bell D. S., 2014) which provides a agenda for Omni channel retail, but their request is encountered in the store. The opposite shopping act is when consumers study the product in shops, and then buy online, typically at lesser prices. This is known as show rooming behaviour and has been extensively disapproved: showrooms and E-Tailers in brick and mortar stores are suspect

of free-riding on inventory exhibitions (S. Gallino, 2014). Recent research by (Balakrishnan, 2014) shows that show rooming behaviour strengthens retail rivalry, and (Mehra, 2013) lessons how a brick and mortar seller can respond show rooming behaviour through tactics such as price matching and retail club associations. (Bell D. S., Inventory showrooms and customer migration in Omni channel, 2013) empirically studies the position of provision of offline showrooms from the E-Tailer perspective to alleviate customer indecision.

FUTURE SCOPE

Our demonstrating method has some restrictions which we consent as themes for upcoming study. For instance, the consumer claim expected in our prototypical is deterministic, so makes can guesstimate all the demand-related strictures in our model in the real applied world. Additional spread our research's range of claims, the next stage is to reflect a model of accidental market mandate. In addition, to distillate on store list planning, we do not take addicted to account the consumers who want to shop online straight and, in most cases, online customer orders are not satisfied by store list. The ship-to-store (STS) and ship-from-store (SFS) modes were eventually presented however. Since of these developing methods of circulation, retailer's prerequisite to re-design their production plans and revisit their relations with contractors (Briel, 2018)

Although the outline of new stages has altered the retail market over the last periods, the sustained evolution of the retail business will be determined by the junction of these and other systems into a single, unified consumer experience: omni channel marketing. Customers already connect with a sole shop through multiple networks and increasingly suppose these channels to "speak to" each other (A. Sorescu, 2011), to be combined into a unified shopping skill (R. Hansen, 2015) that allows them, for example, to use numerous networks for product detection, purchase and after-sales facility (S.A. Neslin, 2006). The junction of these grids into a single boundary would undoubtedly recover purchasing purposes for consumers, but retailers would endure to function self-sufficiently. Upcoming work will recognize human resource doings that lead to

the alteration of the structural attitude and the development of human omni channel competences, and thus aid as backgrounds of omni channel organizational competences. For example, investigate laterally this line may examine the impact of incentive schemes, work rotation, or training on omni channel-organizational aptitude. Possible work will examine how dissimilar digital in-store novelties effect the attitudes and experience of customers, and the output of retailers. For example, research in this vein may achieve laboratory or field trials to test and measure the result of new numerical in-store skills.

LIMITATIONS

The rise and admiration of BOPS facilities has transported omni-channel retailers equally blessings and tests. Retailers will achieve BOPS orders in an lossmaking way deprived of sympathetic whether to conduct in-store alternative operations while risking store facilities for walk-in customers. We originate the solutions in this homework founded on a given level of facility. A rational delay is to analyse the retailers' best level of facility for BOPS contributions. Refining the quality of facility could lead to augmented request and

thereby sales development while at the same time insertion greater working prices on retailers. Work on deciding the best level of service to equilibrium the trade-off amid service and cost could be very appreciated.

In command to stop skewed results, we connected with retail specialists with varied backgrounds, but discussion with a dissimilar group of contributors could lead to dissimilar forecasts. Specifically, members from Western states conquered the pool of experts and excepted participants from the Eastern states. Additional curb is our study's comparatively minor sample scope which bounds the generalizability of our answers and our aptitude to draw any clear deductions.

An exact feature of the BOPS delinquent is the being of pre-specified hard limits for the order gap and the promoted pick-up dated when a well-ordered item is obtainable. While there is a large amount of trainings in the silo fulfilment literature on plummeting carriage distance and portable period, only a very minor amount of investigate has been achieved to exploit the efficiency of the manufacture in the attendance of strict limits.

REFERENCES

- Hübner, A., Holzapfel, A., & Kuhn, H. (2016). Distribution systems in omni-channel retailing. *Business Research*, 9(2), 255-296.
- Sorescu, A., Frambach, R. T., Singh, J., Rangaswamy, A., & Bridges, C. (2011). Innovations in retail business models. *Journal of retailing*, 87, S3-S16.
- H. Abbu, "What consumers expect when they buy online, pick up in store," *The Business Of Retail*, 7 December 2017.
- Kauffman, R. J., Lee, D., Lee, J., & Yoo, B. (2009). A hybrid firm's pricing strategy in electronic commerce under channel migration. *International Journal of Electronic Commerce*, 14(1), 11-54.
- Balakrishnan, A., Sundaresan, S., & Zhang, B. (2014). Browse-and-switch: Retail-online competition under value uncertainty. *Production and Operations Management*, 23(7), 1129-1145.
- MacCarthy, B. L., Zhang, L., & Muyldermans, L. (2019). Best performance frontiers for buy-online-pickup-in-store order fulfilment. *International Journal of Production Economics*, 211, 251-264.
- Bell, D. R., Gallino, S., & Moreno, A. (2014). How to win in an omni channel world. *MIT Sloan Management Review*, 56(1), 45.
- Bell, D. R., Gallino, S., & Moreno, A. (2013). Inventory showrooms and customer migration in omni-channel retail: The effect of product information. Available at SSRN, 2370535.
- Von Briel, F. (2018). The future of omni channel retail: A four-stage Delphi

- study. *Technological Forecasting and Social Change*, 132, 217-229.
10. Chintagunta, P. K., Chu, J., & Cebollada, J. (2012). Quantifying transaction costs in online/off-line grocery channel choice. *Marketing Science*, 31(1), 96-114.
 11. Bell, D. R., Gallino, S., & Moreno, A. (2014). How to win in an omni channel world. *MIT Sloan Management Review*, 56(1), 45.
 12. Çeven, E., & Gue, K. R. (2017). Optimal wave release times for order fulfillment systems with deadlines. *Transportation Science*, 51(1), 52-66.
 13. Forrester Research. (2014). Customer desires vs. retailer capabilities: Minding the omni-channel commerce gap.
 14. C. Gannon, "BOPIS: How Buy Online, Pick-Up in Store is Catering to Consumer's Needs and Boosting Retailer's Bottom Line," BigCommerce, 2014.
 15. Engel, E., Gao, F., & Wang, X. (2015). Chief financial officer succession and corporate financial practices. Working paper, University of Chicago.
 16. Kumar, N., & Maurya, P. (2020). Working from Home/In Quarantine: Commodifying COVID-19 "lockdown" period in India.
 17. Tarn, J. M., Razi, M. A., Wen, H. J., & Perez, A. A. (2003). E-fulfillment: the strategy and operational requirements. *Logistics Information Management*.
 18. Park, J., Dayarian, I., & Montreuil, B. (2021). Showcasing optimization in omni channel retailing. *European Journal of Operational Research*, 294(3), 895-905.
 19. Boyer, K. K., Hult, G. T., & Frohlich, M. (2003). An exploratory analysis of extended grocery supply chain operations and home delivery. *Integrated Manufacturing Systems*.
 20. Mehra, A., Kumar, S., & Raju, J. S. (2013). Showrooming'and the competition between store and online retailers. Available at SSRN, 2200420.
 21. E. Naughton, "Omni-Channel In The Luxury World," Google, 2017.
 22. Ofek, E., Katona, Z., & Sarvary, M. (2011). "Bricks and clicks": The impact of product returns on the strategies of multichannel retailers. *Marketing Science*, 30(1), 42-60.
 23. Hansen, R., & Sia, S. K. (2015). Hummel's Digital Transformation Toward Omni channel Retailing: Key Lessons Learned. *MIS Quarterly Executive*, 14(2).
 24. T. Roberts, "What is Omni channel Commerce? Definition, Benefits and Trends," Bloomreach, April 2017.
 25. Gallino, S., & Moreno, A. (2014). Integration of online and offline channels in retail: The impact of sharing reliable inventory availability information. *Management Science*, 60(6), 1434-1451.
 26. Neslin, S. A., Grewal, D., Leghorn, R., Shankar, V., Teerling, M. L., Thomas, J. S., & Verhoef, P. C. (2006). Challenges and opportunities in multichannel customer management. *Journal of service research*, 9(2), 95-112.
 27. Zunk, B. M., Marchner, M., Uitz, I., Lerch, C., & Schiele, H. (2014). The role of E-procurement in the Austrian construction industry: Adoption rate, benefits and barriers. *International journal of industrial engineering and management*, 5(1), 13-20.
 28. Lin, H. F. (2014). Understanding the determinants of electronic supply chain management system adoption: Using the technology–organization–environment framework. *Technological Forecasting and Social Change*, 86, 80-92.
 29. Hameed, M. A., Counsell, S., & Swift, S. (2012). A meta-analysis of relationships

- between organizational characteristics and IT innovation adoption in organizations. *Information & management*, 49(5), 218-232.
30. Hassan, H., Nasir, M. H. M., Khairudin, N., & Adon, I. (2017). Factors influencing cloud computing adoption in small medium enterprises. *Journal of Information and Communication Technology*, 16(1), 21-41.
31. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. *International Journal of Innovative Technology and Creative Engineering* (ISSN: 2045
32. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, [https://doi.org/10.1080/09243046.2021, 1918608](https://doi.org/10.1080/09243046.2021.1918608).
33. Mohtaramzadeh, M., Ramayah, T., & Jun-Hwa, C. (2018). B2B e-commerce adoption in Iranian manufacturing companies: Analyzing the moderating role of organizational culture. *International Journal of Human-Computer Interaction*, 34(7), 621-639.
34. Thong, J. Y., & Yap, C. S. (1995). CEO characteristics, organizational characteristics and information technology adoption in small businesses. *Omega*, 23(4), 429-442.
35. Ali, N. M., Mat, N. K. N., & Ali, N. M. (2015). The conceptual framework for E-commerce adoption model. *American Journal of Economics*, 5(2), 148-154.
36. Grandon, E. E., & Pearson, J. M. (2004). Electronic commerce adoption: an empirical study of small and medium US businesses. *Information & management*, 42(1), 197-216.
37. Jia, L., Hall, D., & Sun, S. (2014). The effect of technology usage habits on consumers' intention to continue use mobile payments.

ASSESSING THE IMPACT OF DIVERSITY AND INCLUSION POLICES ON EMPLOYEE MOTIVATION AND BEHAVIOR

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ABSTRACT

Diversity and culture are an important part of employee's life through their corporate journey. There are many types of functions to diversity and inclusion made by the organization, like sharing thoughts, words, skills, due of the diversity and employees from various cultures, development of interpersonal relationship with other employee's, employees learn how to work with people from diverse backgrounds, stereotyping is removed between the employees. On the other hand, there are both negative and positive sides to it which includes communication gaps and change management at workplace. Diversity and culture are two different functions that can be used to sort and understand the difference between groups and people from one another in the workplace so that culture is looked upon. The factors that are key in a diverse workplace, within an organization are, gender, race, and background, motivation, behavior which all employees have different in them. Diversity and culture are different functions that can be used to separate groups and people from one another. The type of workplace management diversity, within a workplace indicates that the workplace effective in terms of gender, race, and background, culture in which employees adheres to various elements and qualities differing from each another. Companies define diversity and inclusion as a huge range of differences that affect the motivational and behavior of the employees at workplace.

Keywords— *Diversity, Inclusion, Motivation, Behavior, Job satisfaction*

INTRODUCTION

As we see diversity and inclusion an important part of an employee's career whenever they go into a corporate life. We define diversity as "diversity includes all the concepts of an employee's cultural background and ones individual experiences. A common idea of people of diversity and inclusion is that certain people are in the umbrella of this function and that is true. (Ashton 2010) Diversity includes the complete globe of secondary and primary functions of an individual, including Gender, Race, motivation, Background and Sexual orientation. Secondary dimensions commonly include: communication style, work style, skills sets, organizational role/level, economic and financial status, and demographics origin. (Amadeo 2013) It is known that each employee posses a different numbers of qualities from these two dimensions. The Survey and research indicate that when appreciated in workplace diversity and inclusion play an important role in employees motivation and behavior .In case of inclusion there are many people from various backgrounds which give it in boost to their work in place where they have complete job satisfaction and they are happy with the inclusion polices which the organizations have for the employees, various techniques have been introduced by different organization to help

boost diversity and inclusion in their companies. Now considering the IT sector many companies have been including and adapting to inclusion polices in company. Women and LGBT communities now days having been included in the organization and thus there new inclusion policies which the companies are using to have effective approach of employees towards diversity and inclusion practices of their organization and which will help them to understand the various techniques one can be motivated by at workplace and the behaviour need that they adhere in the organization. Inclusion is the function that companies are using effectively to add leader in the company from various backgrounds and experiences.

LITERATURE REVIEW

A. *Our old finding*

To compete efficiently in the market, companies should make job roles and positions so that workload and stress can be deducted, and the behaviour and approach towards Work and their motivational, behaviour factors of employees, their performance and skills can be improved with the help of diversity and culture in the organization. Nowadays organizations have various practices in their organization to keep the employees motivated at workplace. Diversity and inclusion management play an important role in and employees career.

Diversity and inclusion practices differ from company to company. Employees are hired from various backgrounds and culture in the company from all the country. To keep these employees satisfied and motivated at workplace as they come from different backgrounds and meet new people share thoughts and words. Some might agree to each other while the others disagree. As people from same backgrounds are seen to be get along very well in the company and the others employees may feels dissatisfied at work and lead to low productivity. Keeping in mind that organizations have started to practices new diversity and inclusion plans in their company. Organizations today have to build an efficient human resource in order to be competitive. With the increase in competition in the market, organizations now need to look on new diversity and cultural organization techniques to keep the employees motivated..

B. Traditional Methods

Diversity and inclusion have been increasingly used in the organization and are the most utilized organizational function in order to keep the employees motivated and satisfied at work keeping in mind with their motivational factors with their work according to their behaviour. (Kooij et al., 2008). The Male female ratio varies from organization to organization. Organizational diversity and culture and its various dimensions is a study that will analyze to find characteristics of diversity and culture that might have influence on organizational behaviour and motivational factors of the employee's. These factors have been analyzed and show that there must been effective plans for the diversity and inclusion practices in the company. Diverse workplace motivation and satisfaction can also be connected to each other factors of workload and work life balance, stress and supervision at work, and the balance in learning and development and work life. To succeed and maintain a healthy competition environment at workplace, we must be able to draw on the most important resource – the key skills of the workforce. . Analyzing the effect of diversity and inclusion policies on individuals, and other management it is understood through various diversity and inclusion practices, employee engagement techniques, traditional feedbacks and by developing a framework. (Ilmarinen,

2001). Organizations see employee engagement as a important part of the diversity management and inclusion policies initiative in the organization, in order to keep and maintain effective diversity and inclusion policies. This is a bit difficult to achieve as the employees from same background are asked to work on the project this brings a change in the diversity of the organization which affects its motivational factors and behavior. (Hofstede2010).

PURPOSED METHODOLOGY

The study initially, focuses upon understanding the organizational culture effect on the motivation and the behaviour of the employees through which we as a organization can understand the skills of the employees in order to place them in effective roles. The main objective of managing a diverse workplace is to stop employees being differentiated at work by other employees and lead to less productivity. In addition to, diversity and inclusion as a result of gender diversity of increase in women and people with disabilities and LGBT people. One of the important functions of the organization is to look for employees with similar motivational and behaviour factors and provide them better opportunities at workplace..

1) Problem Statements

The study considers organizational culture and diversity to be the independent variable, whereas the employee motivation and behaviour to be the dependent variables having organizational effects between the two variables. Organizations see employee engagement as a important factor of diversity management and inclusion initiative, in order to maintain effective and efficient diversity and inclusion policies at workplace.

C. Puurpose

- This research is to look at the organizational culture and diversity of organizations having the policies and its employee commitment and assessing their motivation and effect of their behaviour on the organization culture.
- The key objective of the research is to analyze how motivational factors that employee adhere to in their corporate journey. The motivation which is needed to work in a diverse workplace away from all the comfort zone and meeting people and

exchanging of thoughts and words it is a bit difficult for some of the employee to adjust to the workplace as they join the organization.

- The employee needs to be motivated while working for their success and even the organizations success. The employee and the manager both need to understand the diversity of the each company which varies from each other that the employee is comfortable at the workplace while working and has no problem with the diverse environment they work in.
- Each employee must be motivated while working and be satisfied so this is the main objective instead of being from various backgrounds how managers keep their employee motivated and understand their behaviour needs. The role of diversity at workplace is very important aspect of the function. Inclusion of various people all around from different backgrounds can be seen as key factor to the organization which have a new ideology to the company.

RESEARCH METHODOLOGY

D. Approach

The motivational factors and behaviour of the employees on job satisfaction and needs of performance and culture in the workplace between different groups of ages and motivational need at workplace, both qualitative and quantitative research was carried out to study the need of the employees from diversity and inclusion polices. MCLAUREN, D. (2012) Research was defined as analyzing data to acquire the survey which was carried out and the percentages of each need of a particular field of the diversity and inclusion polices in different diversity and inclusion policies and techniques used in organizations. Moreover this research explains that research can also be seen useful that contributes to the managers in the company to build diverse work force. The approach of this research is to analyze the date and use simple regression and correlation technique to it. Mostly the focus was on large and medium sized organizations. The survey which was conducted had 270 responses from both from the mid level employees and managers considering the age groups.

The research conducted the survey in 10 companies in which almost all the employees filled out the survey. The employees were divided into three different types:

1. Younger employees
2. Older employees
3. Boomers

We conducted the survey private; IT selected companies in the city. We used the survey and the cold calling as a primary survey and research from the market as a secondary research. With the primary source, an survey was conducted of middle level employees in the IT Sector and their scores were calculated Buckingham, D. E., (2009). The secondary research was conducted through cold calling with HR of various companies through which they shared their information on the various techniques used in the organization used for in their diversity and inclusion policies for the employees of their organization.

When applying qualitative methods, the main aim was to understand and analyze as much data we can and find out the motivational factors that affect the employee at workplace. The data was collected by conducting a survey in IT sector by floating questionnaires and cold calling. As this study focuses its aim on knowing the behaviour and the motivational factors that affects employees in organization with numerous people from diverse backgrounds.

E. Methods

- The questions were focused on understanding how employees and their managers in the organization have a view on workplace diversity and inclusion new inclusion polices in the company, the key challenges in managing a multicultural and a diverse workforce in the company and employees from various backgrounds and cultures all together to form a efficient workforce on the organization.
- The survey questions set for the interview
Identify applicable funding agency here. If none, delete this text box.
were framed properly to understand the motivational needs of the employees making. Some measures were put in such as voice

recording so that process did not contain any biases.

- And also questions that are more regarding the culture and diversity policies were asked in the second half of the survey so that the employees had enough time be comfortable and share the data
- .The research process went smoothly and the originality of data was checked. Al-Jenaibi, B. (2011) the use of structured questions in cold calling and surveys interviews in the qualitative research found that:
- The questions and the survey which was done for the employee showed us that how the employees have a view about the diversity and inclusion practices in their organization. The survey which was conducted for the employees, they were asked about their Age Group, Work experience, diversity and inclusion practices in their company, job Satisfaction, Motivational factors, behavioural needs, learning and development programs, awareness about diversity and inclusion polices, gender diversity ratio, leadership inclusion polices, recognition (considering diversity and inclusion), LGBT inclusion policies, up-skilling opportunities, inclusion of new perspective of employees.
- This was also done with the mangers and HR heads of the companies. The mangers were also floated the same survey but with a different set of question for them so they could give us a proper overview of the employees and the diversity and inclusion practices of their organization. They were asked about their Age Group, Work experience, diversity and inclusion practices in their company, how well do people from various backgrounds blend into the culture of the organization.
- The guidelines of workplace diversity and inclusion polices will differ from sector to sector of organizations as there are many different organization that have set rules and guideline for effective diversity and inclusion management at workplace. A organization that always keep their diversity and inclusion polices updated and work with them keep their employees motivated in workplace.

When considering the survey and the research the main factors which have been seen as: Diversity, Motivational Factors, Organizational culture

- The concept of understanding and implementing a good and diverse workforce at the company is useful for the company to meet business objectives. After this study we tried to understand what actually affects the satisfaction of the employees at workplace though the motivational need affect it.

F. Analysis

After the help of IBM SPSS we used various different and statistical concepts and research and analyze for measuring the motivation and behavior of employee and job satisfaction employees in the workplace, the employees showed their agreement on the survey filled by them on 5 point scale 1 to be Strongly agree and 5 to be disagree. All the questions in survey were related to understand the motivational factors of the employees in accordance to diversity and inclusion at workplace.

Characteristic of respondents		Number of respondents
	23-30 years	170
	30-40 years	80
	40 above	20
	Total no of respondents	270

[1]

The use of means and medians and the statistical data and the simple regression which will be used and helps us to determine the motivational factors and the satisfaction of employees doing a simple regression and correlation analysis with the help of IBM SPSS of the employees. To check the originality of the data these tests were used. We can say that the groups are used to compare the tests between them and understand which factors are important.

Table 1: Descriptive Correlation analysis if the groups of employees

Motivational factors at workplace	Correlation Sig.(2-tailed)	23-29 years		30- 40 years		40-45 years	Total
		Median	Mean	Median	Mean	Median	Mean
	.023	4.97	5.00	3.66	4.00	4.23	4.00
1.Motivation	.045	4.35	4.00	4.76	5.00	4.58	5.00
2:Job satisfaction	.376	4.476	4.00	4.11	4.40	5.9	4.00
3:Behavior	.067	5.82	4.00	4.83	5.00	4.31	5.00
4:Increase in performance	.235	3.57	5.00	3.20	3.00	3.86	4.00
5:Stability	.984	2.78	5.00	4.76	5.00	4.64	5.00
6:Sustainability	.345	3.47	5.00	4.73	5.00	4.54	4.00
7:Approach towards Work	.057	3.82	3.00	4.04	4.00	3.23	3.00
8:Awareness	.006	3.22	4.00	3.00	3.00	3.56	4.00
9:: respect between employees.	.096	4.36	4.00	4.73	5.00	4.22	5.00

[2] Table 1 indicates the mean and the medians of the different motivational factors which were calculated and shown in the table shows that the motivational factors and satisfaction of young and older employees are significantly different and show a difference between them. The results after analyzing show that, older employees, work for better quality of work and role play work which make them satisfied and helps to up skill them (Mean: 3.89); the possibility of efficient work (Mean: 4.76 relation with other employees (Mean: 4.98); the satisfaction of working at own ability (Mean: 4.52); respect each other workplace (Mean: 4.53); equal treatment for all the different aged

employees (Mean: 4.27). The means for the answers considering these motivating factors are higher for younger employees than for older ones. Younger employees, showed more motivational need in the good salary and work life balance (Mean: 4.35); the learning and up skilling advances (Mean: 4.65); and the possibility for learning and development (Mean: 4.53).

Table 2 indicates that the means and medians of the survey that was carried out about the satisfaction and motivation levels of young and older employees show that they are motivated more than the young employee as their means

are significantly different on average, older employees have the highest agreement on job satisfaction: older employees satisfied with the interpersonal relationships in the company with other employees and management (Mean: 3.34) and satisfied with the work life balance at workplace(Mean: 3.75).

1: Behavior	.552	3.234.45	3.784.00	3.73	4.00
2: Job Satisfaction	.002	3.344.32	3.564.00	3.77	4.00
3: High Motivation	.175	3.443.22	3.353.00	3.28	3.00
4: Job Satisfaction	.000	3.243.00	2.833.00	3.09	3.00
5: With flexible work.	.653	3.543.43	3.433.00	3.23	3.00

[3] Younger employees show that they have the highest agreement on average with the following:

1. Younger employees are satisfied proficiency of work they do and the type of work they do (Mean: 3.90);
2. Younger employees are satisfied and motivated with working hours and efficiency of work they do because they are interested in quality of work(Mean:45);
3. They are satisfied with the working conditions at workplace.(Mean: 3.77).

CONCLUSION

Diversity and inclusion at workplace is an important factor in every business that can help the employees to boost their self and be motivated. It is important for the organization to bring in new employees from various backgrounds and culture that bring in new ideas and new perspectives to the organization and helping in increase the productivity of the employees. Although there are some disadvantages, the impact of diversity and inclusion in every organization is more beneficial for the company so that the polices can be used for the employees to keep them satisfies at workplace and motivated to do the work. Diversity and inclusion polices in the organization will soon be an important and main function in the organization work environment.

The use of the various techniques that are used in the companies that used to build a diverse workforce to help the organization succeed and give them a boost in the work they do and bring in new ideas that help them reach business objectives. It will be bad to keep back the traditional diversity and inclusion techniques in the company but not everything works for all. Therefore diversity and inclusion polices should be used in every organizations and each organizations should promote these techniques in their company. In this research we understand that the employees should be motivated at workplace and be satisfied with work they do. Employees feel motivated and have a certain level of job satisfaction at workplace, which helps them succeed in the corporate journey. These polices bring a new sense of behaviour in the employees at workplace by which there are always motivated to do their work and meet business objectives in the given deadlines. These employee have a complete motivation and a positive behavior towards their work and they are satisfied by the quality of work they do in the organization. In order to have these techniques in working and the diversity management is done effectively and efficiently. Each company will have to create a diversity and inclusion management plan that will fit their organization and help their employees to be motivated all the time at work. It is challenging in the beginning businesses will realize that they have made a correct decision in making diversity and inclusion polices more strong in the company. Implementing a strong framework of diversity management and inclusion should be done to build a strong and efficient workforce. With the help of the employees and the managers in the organization the company can implement diversity and inclusion plans effectively in the company. The mangers have a plus point on having a diverse workforce so that they can keep employees similar of background with each other so that can they can have good team and people can work efficiently. A diversity management plan needs to prepare by the organization that will help the managers to look upon the employees in making teams in the organization by mixing employees from different cultures and backgrounds having same motivational factors to work for the organization efficiently.

Training should be organized by the company to promote diversity and inclusion policies at workplace. Employees of the organization should take diversity and inclusion policies as a change that should be regularly made in the company to keep exceeding in the corporate world. Managers should also bring in techniques for the employees to understand and analyze their motivational factors and need in the company. Therefore all the organizations must have good diversity and inclusion policies in their workforce. The organizations which has good diverse workforce always understands it employees needs and motivations at workplace. Looking at the past techniques that were been used in the organization for the employees that were from diverse background and didn't sense a feeling of satisfaction at workplace. There have been new diversity and inclusion practices that been incorporated in the companies nowadays. Keeping in mind that employees belong from various backgrounds have to be included in a new culture of the workplace. This research paper we analyzed the relationship between the younger older and the boomers employees of the organization how are they motivated their motivational factor and their need in job satisfaction at workplace all the results were different and everyone had differences their motivational need at workplace. Based on their analysis we did and the results, we assorted out the motivational factors of the groups and generations. After the reliability test was done scores for both the

employees and managers there was a score of 0.8 which is a acceptable score between the two groups. This paper gives us unique perspective through which can understand the different practices that were carried out in early times are different then what now employees expect from diversity and inclusion practices at workplace. After we analyzed the data from the surveys and the cold calling that was done in the research we understood that how the managerial perspective has a different lookout towards the employees and what affects the employees most at workplace. As we see there are employees from different cultures and backgrounds. These employees value the practices that carried out their organization and have sense of motivation and satisfaction towards their work and the managers of the company. The tests that were done in the study state that the managers and the employees sense a feeling towards organizational behavior and believe that their skills and differences are accepted in every organization with the help of various diversity and inclusion practices in the company. Through this we can understand that the both the organization and the employees are on the same level and are satisfied with the practices carried out in their company. Therefore the study shows that these are some of the motivational factors that a employees expects from the organization so that they are motivated and satisfied at workplace. Both the young and the older employees share some factors in common.

REFERENCES

1. Ashton 2010, the dimensions of diversity. 18 May 2010. Ashton Fourie: Blog. <http://ashtonfourie.com/blog1/2010/05/18/the-dimensions-of-diversity/> (Accessed on 5 November 2012). J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2. Oxford: Clarendon, 1892, pp.68–73.
2. Dike, P. (2013). The impact of workplace diversity on organisations.
3. Dike, P. (2013). The impact of workplace diversity on organisations.
4. Dike, P. (2013). The impact of workplace diversity on organisations.
5. Kelli, G., Mayra, L., Allen, W., Karl, K., Derek, F., & Jennifer, L. C. (2015). Diversity in the workplace: benefits, challenges, and the required managerial tools. IFAS Extension, HR, 22.
6. Mazur, B. (2010). Cultural diversity in organisational theory and practice. Journal of intercultural management, 2(2), 5-15.
7. Kamal, Y., & Ferdousi, M. (2009). Managing diversity at workplace: A case study of hp.
8. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. International Journal of

- Innovative Technology and Creative Engineering (ISSN: 2045)
9. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.
 10. Aghazadeh, S. M. (2004). Managing workforce diversity as an essential resource for improving organizational performance. *International Journal of Productivity and Performance Management*.
 11. Artz, B. (2010). Fringe benefits and job satisfaction. *International journal of manpower*.
 12. Kunze, F., Boehm, S. A., & Bruch, H. (2011). Age diversity, age discrimination climate and performance consequences—a cross organizational study. *Journal of organizational behavior*, 32(2), 264-290.

HOW FLIPKART BROUGHT A REVOLUTION IN THE E-COMMERCE INDUSTRY IN INDIA A CASE STUDY

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ABSTRACT

E-commerce has changed the way business is done in India. The Indian e-commerce market is expected to grow multi-fold in the coming decades. Much growth in the industry has been triggered by increasing internet and smartphone penetration. But in these uncertain times analyzing the growth drivers is crucial in an emerging market like India. The paper will do an analysis of the growing e-commerce in India. It will focus on various factors that led to the growth of market leader Flipkart in India. Various marketing, branding, channel strategy adopted along with mergers and acquisitions. The analysis of Flipkart's journey will be done primarily using secondary research and qualitative analysis of research papers, journals, articles, blogs, etc. Primary research would be conducted via interviews of online shoppers and non-shoppers to get in-depth insights about the customer and the working of the industry. The objective is to understand what worked for online retailers in the past and what will drive growth in emerging markets in India. The paper will also focus on various global and local challenges like increasing protectionism, nationalism amid climate change faced by the e-retailers in India. It will help in underscoring the importance and the impact of e-commerce on India's growth, its cascading effect on technological development, and various industries.

Keywords— Flipkart, E-commerce, Marketing, M&A, Value-Chain

INTRODUCTION

The Indian e-commerce industry is among the fastest in the world poised to surpass the United States of America to become the second-largest in the world. Form the current 64 billion dollars industry it is forecasted to reach \$200 billion by 2027. The online retail market is one-fourth of the total organized retail sector with the potential to reach 37% by 2030[1]. Growth in e-commerce has trickled down the development of other sectors like logistics, fin-tech, formalization of warehousing, and transportation sector. The future growth is expected to come from tier 2 and tier 3 cities. Smartphone penetration has been crucial to this development with one in every three shoppers using smartphones.

Flipkart has played a pivoting role in the industry accelerating the growth wheels through customer-driven innovation. Started as a bookselling platform in 2007 has today grown into a \$22 billion dollar corporation. Securing funding form the domestic and global investors throughout the world, it has introduced many first in the Indian market from cash on delivery, next day delivery, 30-day return policy, etc. The journey of Flipkart has many ups and downs ranging from fluctuating valuations, change in leadership, massive cash burns to recall the only app decision, strengthening its value proposition along the way. The paper provides a

comprehensive study into the journey of Flipkart and how in the changing times it has transformed itself into a formidable organization. It will highlight the nest of startup ecosystem it developed around it promoting the technological innovations that supported it.

LITERATURE REVIEW

E-commerce is nothing short of the paradigm shift in the way the business is done in India hence it becomes imperative to analyze the issues pertinent to its growth. The market is dominated by key players like Flipkart, Amazon, and Snapdeal but at the same type, there are numerous vertical players creating a niche place for them from the very beginning. One of the major facilitators of e-commerce has been the flow of information on internet and information websites ranging from automobiles, real estate, stocks and shares, travel and tourism, entertainment, employment, matrimony, etc. some hindrances that remain are payment collection methods adoption and logistics in primarily rural India, vendor management and taxation [2]. E-commerce form a part of the larger internet economy of the country.

There are various factors that affect the adoption of these technologies by the masses and still remain personalized enough for adoption. The economic and infrastructure-

related issues like GDP per capita, availability of credit, and payment system in remote areas of the country, delivery infrastructure. The political-legal issues of the tariff, barriers, Foreign Direct Investment(FDI), business structure, Intellectual Property Rights(IPR), immigration to digital literacy. E-commerce is expanding to financial markets like stocks, mutual funds to real estate. This will have far-reaching implications on the economy and every issue needs to be addressed for the homogeneous inclusion [3].

The study talks of consumer perception about online shopping that is of great significance for online retailers to remain ahead of their competitors. Price forms the most important factor followed by security of the products, guarantees, and warranties, delivery time followed by the reputation of the company. Various factors that encourage consumers to shop online are easy availability of product information, ease of payment, convenience, accessibility, and flexibility. Consumer attitude forms a crucial factor. Some people shop online because of the perception of prestige in online shopping to be part of the group [4].

Flipkart started this journey in 2007, founded by two IIT graduates Sachin Bansal and Binny Bansal. Hailed as the Amazon of India, it started as an online bookselling platform that captured more than 80% of the online books market. Guided by intelligent marketing practices and customer-centric policies, they received multiple rounds of funding from Accel Partners, Tiger Global, Softbank, etc. In order to grow rapidly Flipkart was burning a large amount of cash and though their individual transaction was profitable but overall profitability was yet to be achieved. They increased their portfolio every year, forayed into new territories by setting up their own logistics arm, Payment arm, etc. [5].

Flipkart from the start focused on digital marketing to reach its customers and showcase their value offering. It created integrated, digital and measurable communications. It used an integrated marketing communication ranging from SEO strategy, content marketing, viral video marketing, personalization, and micro-targeting, etc. these strategies contribute towards brand equity, brand recall and increase sales [6].

Mergers and acquisitions come with their own set of prospects and challenges. It can help firms to gain a competitive advantage in the market, accelerate growth during times when there is a scarcity of capital. The acquisition of Myntra was the decision taken in a similar direction. It provided synergy in terms of increased revenues, technological advancement and greater control over the market as Flipkart led in electronics gadgets with a target group of middle and upper income online shoppers and Myntra in high fashion brands with affordable fashion group. [8]. It was good for the bottom line as the fashion segment offers high margins of 35-40 % even as high as 60%. It also strengthened the startup ecosystem with job creation [9].

When Walmart acquired Flipkart Amazon was also in talks to do the same but it was not possible due to the anti-competition policies of India [10]. This deal brought two rivals in direct competition in an emerging market. Walmart has been aggressively expanding its online business with multiple acquisitions. It was facilitated by shifting Indian consumer choices and the technological advancement that followed. The Flipkart will get a boost to expand its offline presence with Walmart's expertise in brick and mortar retail. It will transform Flipkart from a start-up to a giant with readiness to expand to other economies. Various private labels of Walmart will enhance Flipkart's portfolio. [11].

A good supply chain management forms the backbone of any e-commerce platform. With the growing business, changing paradigm, and entry of Amazon in the early 2010s it became imperative for Flipkart to evolve from the consignment model to inventory model to marketplace model. Flipkart developed its in house logistics arm E-kart to serve WS retail-its major seller along with 100s of others [12].

With the increase in smartphone usage and internet penetration in India, online retailers have and are realizing the need for mobile commerce not just as an extension but a separate division. M-commerce and laptop and computers will co-exist. Studies have shown that an Omni-channel strategy is a future course. Perceived usefulness, trust, privacy, and security remain the biggest concerns for users

with shoppers preferring mobiles for fashion purchases due to on the go option, easy communication with peers, and low merchandise value. They prefer laptops and computers for electronics and other expensive items due to a higher impact on the pocket and perceive risk. These results have implications on the future course of marketing strategies for online retailers [13].

RESEARCH METHODOLOGY

The research methodology includes an explanatory case study method to research how Flipkart transformed the e-commerce industry in India breaking the shackles of online shopping. The secondary sources include research papers, journals, websites, blogs, national and international newspapers, magazines, etc.

To analyze the evolving behaviors of Indian consumers, primary research is conducted via structured interviews of both online and non-online shoppers. Convenience sampling is used to gather responses. The respondents are from the millennials age group from 23-38 years of both male and female gender. A qualitative analysis would be conducted on the data of online and traditional shoppers.

CURRENT SCENARIO

A. The market size of E-commerce in India

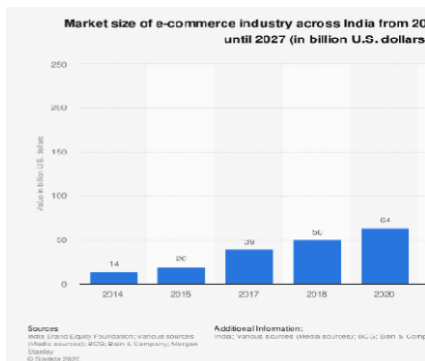


Fig. 1. The market size of E-commerce in India

The Indian e-commerce market has grown from \$14 billion in 2014 to \$50 billion in 2019 and has the potential to reach 200 billion dollars in the coming decade.

B. Share of E-commerce Retail Market



Fig. 2. Share of E-commerce Retail Market

The electronics had a share of 48% across e-commerce retail in 2018 with 55-60 million online transactions per month, that's a significant increase from the decade earlier when books and travel and tourism formed a major chunk of e-retail. This shows increase confidence in e-commerce by the Indian shoppers [14].

C. Internet Penetration Rate in India

Internet penetration rate in India from 2007 to 2020

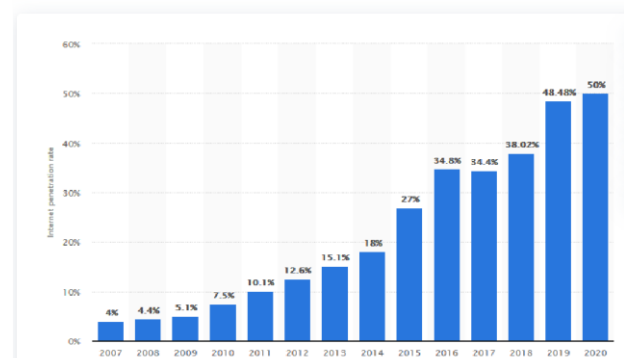


Fig. 3. Internet penetration in India

Internet penetration has reached almost 50% in the last decade that indicates almost half of the country has access to the internet making the world's 2nd largest internet user base. It is expected to rise to 835 million by 2023. Each month India is adding 10 million active internet users [1]. This has facilitated the use of e-commerce, social media, and e-education among others. But there is significant disparity based on gender and rural-urban divide. Despite 62% of the populace living the rural areas their share in internet users is much less than urban users. At the same time, female internet users form a mere 33% of the total [15].

VALUE CHAIN ANALYSIS OF E-COMMERCE PLATFORM

Porter's value chain for the e-commerce site includes 5 primary activities and 4 support activities. Each and every activity is essential for the running and sustainable competitive advantage for the firm [16].

D. Primary activities

1) *Inbound logistics and Outbound logistics:*

Inbound refers to bringing raw materials, goods, and items ordered from the suppliers, retailers to the company whereas outbound refers to the delivery of goods and services to the buyers. It includes safe handling, transportation and storage of goods. The logistics also has to oversee the returns and the postpaid payment of orders.

It uses both in-house logistics arm Ekart and 3PL for fulfilling its order.

To cater to the increasing demand and establish itself as self-sufficient in warehousing, Flipkart is continuously increasing its warehousing space across major consumption centers [17].

2) *Operations:* It refers to the management of the firm core activities. Using the latest technology and the synergy among various departments to fulfill the orders. It includes the user interface, the customer experience, order cycle, payment options, tracking orders, etc. All those activities ranging from sorting, packaging and sending out orders for delivery. The time customer spends on the website should be well utilized, optimum, and fully rewarding [18]. Revenue streams of the Flipkart primarily include Seller's commission, convenience fees, logistics charges, and advertisement revenue [19].

3) *Marketing and Sales:* It refers to the branding, marketing activities of the firm. The push or pull strategy. It includes the 4P/7P- price, discounts and offers, the product assortment, the collaborations, deals with retailers across the categories, the channel strategy- online or Omni-channel. The promotional activities like advertisement campaigns, celebrity endorsements, all sorts of Integrated Marketing Communication.

Flipkart marketing strength comes from its ability to understand the evolving customer

choices and categorically addressing them. In the initial days Flipkart used to run its ad campaigns in the newspaper, print fliers, billboards then moved toward television and then social media platforms Facebook, Twitter, etc. and with changing times has shifted its focus towards a holistic approach with a primary focus on mobiles i.e. smartphones.

Flipkart uses star power and influencer marketing roping in bigwigs like Amitabh Bachchan, Alia Bhatt, Ranbir Kapoor, and Shraddha Kapoor among others to promote and create brand awareness among consumers [20].

Flipkart exclusive deals with various companies like Xiaomi and Motorola were the head turns in the industry. It increased brand visibility, revived the Motorola brand in India, gave a grand opening to a then relatively new company Xiaomi. It skyrocketed footfalls to the websites and contributed significantly to the revenues [21].

Its "Big billion days" is the most successful campaign until now that has helped the company in increasing its sales during the festival season.

As Flipkart's business grew, and expanded in different categories, Flipkart wanted to be seen as the optimum destination for apparels, it launched "India ka Fashion Capital" campaign to be seen as a hub for fashion category [20].

Flipkart Kidults campaign where kids dressed as kids engaged in adult conversation on everyday life situation has been one the best campaign by Flipkart that enhanced Flipkart brand equity among fashion targeted audience.

Its GenE campaign promoting gender equality where girls and boys were doing tasks stereotypically not associated with the gender roles, remained with the audience [22].

4) *Service:* The e-commerce firms have to provide an active customer care service. Answering every query, order status, overseeing returns and refunds, payment related issues, etc. The resolution of complaints of any forms.

E. Support activities

These activities form the base of the organization acting as the pillars of the organization.

1) *Firm Infrastructure*: It refers to the firm's legal, financial, accounting, and the general management of the firm overseeing the smooth functioning of every other department and organization as a whole.

2) *Human Resource Management*: It is the people that make up the organization. It includes recruitment, training, motivation, rewards etc. to attract the most suitable professionals for the organization.

Today Flipkart employs more than 30000 people and supports many more indirectly. Flipkart has always aimed towards creating the best work culture focusing on inclusiveness and flexibility.

3) *Technology Development*: Development and application of the latest and appropriate technology are at the core of an e-commerce organization. Maintaining information and records for millions for products, customers, sellers, retailers, etc. keeping the privacy and security at the forefront is a must for the success of the organization. The cost reduction in other departments is facilitated by the utilization of the robust technology infrastructure.

It is using artificial intelligence, machine learning data science, the internet of things, and robotics to create a differentiated experience [23]. Supply chain management of Flipkart uses IoT to optimize the process and integrate software and hardware. Use of ML to provide a curated user experience. Flipkart introduced an automated guided vehicle in its Bengaluru sorting center for sorting deliveries according to the pin code. This is believed to increase the plant efficiency, help in upskilling the facility staff, enhance the value drive process, and lower costs [24].

Flipkart has also created a separate fund for investing in a startup in fintech, e-commerce, payment systems, and logistics to gain quick access to new technologies [25][26].

4) *Procurement*: Procurement involves finding the right sellers, retailers for the products, obtaining them at the lowest cost possible with the assurance of timely delivery

of the right quality and quantity of products [27].

Online retailers are able to offer a wide variety of products with deep discounts and offers because of the right procurement policies. Flipkart has gained a competitive advantage by making deals or strategic partnerships with various sellers across the country and abroad offering products at highly competitive prices.

FLIPKART'S STRATEGY

The Flipkart business model is a complex one with meticulous attention given to all the stakeholders from sellers, logistics partners, hundreds of cross-platform online and offline partners, investors around the globe, with a customer-first approach [19].

Flipkart uses behavioral and psychographic segmentation strategies to cater to consumer evolving needs and demand. To attract customers from every segment it uses undifferentiated targeting to position itself as a trustworthy and reliable brand.

The consumer's apparel and electronics segment form the star in Flipkart's BCG matrix whereas every other segment is still in the question mark segment owing to the cutthroat competition.

To compete with the paid Amazon prime, Flipkart came up with the Free Flipkart Plus membership. The membership included free and early delivery, better discounts and offers, and early access to new launches which can be availed on the basis of the number of Plus coins one accumulated [28].

For a better customer experience and to add an entertainment feature, Flipkart launched Flipkart Video on its App Platform. It tied up with multiple content creators like TVF, Voot, Arre, Viu, etc. to provide a diversified content. It also launched various original content with [30].

In the market filled with unlimited choices, to help their customer shop well and to provide a new experience Flipkart launched Flipkart Ideas. It featured content from influencers and brands to guide customers in their product choices [31].

F. Expanding Product Portfolio:

Amazon has greatly benefited by the success of its private brands like Amazon Basics, Solimo, Presto, and many more. To gain competitive advantage Flipkart over time has launched its own line of private labels. Private labels have numerous advantages namely, increase in the product offering, better control over inventory management, and higher margins that ultimately help profitability.

It launched Smartbuy in consumer electronics targeting customers in tier 2 and tier 3 looking for good quality value for money options. MarQ for large appliances and highly marketed smartphone brand Billions. Cara Mia and Ann springs in women fashion and many more. Taking note of the growing gym and sports equipment industry, it launched Adrenex, offering cricket and tennis gear, footballs, gyms and yoga mats, dumbbells, etc. [32].

Flipkart launched in-house brand Perfect Homes Studio offering stylish, sturdy furniture. To tap the young market, it introduced the Perfect Homes Junior range for Kids of age 2-16 years offering study table, beds, desk, etc. [33].

G. Flipkart's penchant for making deals with various retailers

Over the years Flipkart has partnered with numerous multi-chain retailers to spruce up its product offering to the customers. Flipkart has partnered with more than 14000 fashion brands to up its value proposition. It has more than 200 million registered users and 80+ categories through its thousands of sellers. Some of the prominent ones in recent times are:

Flipkart partnered with brick and mortar giant Lifestyle. Lifestyle has a current network of more than 70 stores and such a deal will increase its brand presence pan-India. It was an Omni-channel initiative including store pick-ups for online order, alternations, loyalty programs, etc. [34].

In order to promote its independent value platform, it struck a deal with Japanese designer consumer brand MINISO India that will give 2GUD access to curated products of MINISO and MINISO access to a million-plus consumer base of 2GUD [35].

In 2020 Flipkart entered into a deal with Spencer's retail to provide its customer base with special packs of staples and FMCG products[36].

Flipkart made a strategic partnership with MakeMyTrip.com including offering fromGoibibo and Redbus entering into travel and tourism vertical.

Keeping with its innovative decision, Flipkart brought CenturyPly-a building material company into an online platform to up its portfolio [37].

Horizontal players like Flipkart, Amazon, Snapdeal, ShopClues are making such deals and entering new categories to compete with a rising market share of verticals like Nykaa, Grofers, BigBasket, PepperFry, etc. These verticals are creating a niche position for themselves in their respective categories providing a curated personalized experience for customers. Such a website can offer a larger selection of products, differentiated experience, and customer engagement as work is streamlined [38].

Flipkart has also undertaken various social initiatives under Project Smarth for the upliftment of the society. It entered into a partnership with Punjab Government to provide pan-India market access, training, and support to the sellers, artisan, and weavers to support the art and culture of the Punjab government. Such a move will help in the formalization of the highly fragmented MSME sector of the country [39].

MERGERS AND ACQUISITIONS

Flipkart has used both organic and inorganic strategies for sustainable competitive advantages.

In 2010 Flipkart acquired an online book recommendation platform WeRead and expanded its categories to include music, movies, mobile, and games [40].

To get a strong infrastructure for digital distribution technology Flipkart acquired Mumbai based digital media distribution firm MIME360 in 2011. It provided them with numerous content developers and technology architecture [41].

By acquiring Chapak.com the same year, Flipkart got in their kitty a multi-lingual content portal centered on films, news, reviews, etc. Customer-generated content for a large number of Indian movies [41].

To expand its offering in electronics goods, communication and computer goods, toys, watches, stationery, and healthcare goods, in 2012 it bought Letsbuy.com for around 25 Million dollars.

But one of the biggest catch for Flipkart was one of the emerging fashion portal Myntra.com that strengthened Flipkart apparel business. This acquisition helped reduce cost, expanded customer base, spruced up value proposition. In order to cement its position as a one-stop fashion destination, Flipkart acquired Jabong.com through Myntra[40][41].

In 2015, when India was going through a rapid increase in mobile penetration and the focus was towards mobile-first, mobile-friendly applications and websites, etc. Flipkart acquired AdlQuity- a global mobile ad network and with it came thousands of app developers and publishers [41].

With an aim to send personalized push notifications and in-app messaging service, Flipkart acquired a mobile engagement and automation company Appiterate that was already working with various online shopping platforms to automate their marketing activities [41].

Flipkart acquired FX Mart that electronic payment services, remittances, travel, and related services. With this, it could save a portion to outside digital wallets as FX Mart had obtained the license and hence moved a step forward in vertical integration [40].

Moving forward on digital payment front when India was moving towards a less-cash economy, PhonePe was launched built on Unified Payment Interface and provided an account to account transfer using the virtual address on mobile phones. With this acquisition, Flipkart offered easy payment services that helped it to increase customer convenience, accessibility, and in turn revenues [41].

To maintain its leadership position, Flipkart acquired the struggling Indian arm of ebay.com.

eBay operates as an independent entity and both take advantage of each other's inventory to boost up sales. Flipkart also benefits from eBay's global presence [41].

ANALYSIS OF PRIMARY DATA

To analyze the motivation for consumers to shop or not to shop online, upon interviews, the parameters found are classified on the basis of encouraging and discouraging factors.

There are various benefits to online shopping that might encourage a person to shop online. At the same time, there is some perceived risk that discourages shoppers. The impact of every factor varies from individual to individual.

H. Encouraging factors

1) *Convenience*: Online platforms offer a large assortment of products, a wider range than available at local shops primarily in tier-II and tier-III cities. It makes it easier to compare products from different brands, sizes, prices thereby helping consumers to make informed choices. Online platforms offer good discounts and offer over a longer period of time.

2) *Accessibility*: The shopping time is not limited to store hours. It can be done anytime, anywhere on multiple devices with a seamless experience across platforms. The firms are working towards creating an Omni-channel experience integrating all the past shopping history, choices made, cart items to recommend content, and product in a customized manner.

3) *Flexibility*: Online shopping reduces the cost of and time for shopping. Saves time in finding and traveling to different shops.

4) *Customer Loyalty Programs*: Online platforms come up with attractive customer loyalty programs like Flipkart Plus, Supercoin, and Amazon Prime to increase the frequency and repeat purchases. These kinds of programs often result in cross-sell and up-sell, benefitting the consumers

5) *Cross-platform Benefit*: As part of their value propositions, online platforms offer cashback, benefits, vouchers, coupons on partnered platforms services like hotel booking, cab riding, food delivery, movie booking, and OTT services amongst others. But the acceptance of such benefits is low and customers often are not able to perceive them

as real benefits as they come with a lot of riding conditions.

6) *Horizontal vs Verticals*: Amazon, Flipkart, Snapdeal are Horizontal players offering almost every category of products but there are websites like Nykaa, Grofers, BigBasket, Pepperfry, etc that specializes in a particular category. Hence there's always a debate between the two. Opinion differs in this matter as some prefer the big names like Amazon, Flipkart due to their brand value and trust developed over a long period of time. Others look for the best option available anywhere.

1. Discouraging Factors

1) *Financial Risk*: Despite companies and Governments taking sincere steps to make online monetary transactions as safe as possible, still a large portion of payment occurs via COD indicating a high risk of financial fraud among Indian consumers. Even people who are avid online shoppers feel uncomfortable doing so.

2) *Product risk*: The trust in the quality of the product displayed, the veracity of the information displayed, and the satisfaction instilled by the physical touch and feel of the products. This happens a lot in certain categories of apparel like ethnic wear, sound systems, etc.

3) *Non-delivery*: There is always a risk of delayed delivery, odd delivery time, cancellation of items due to inventory or logistics issues. This becomes particularly important in case of urgency in the matter and for people who are living away from hometown, alone to balance the time.

4) *Return Policy*: Companies often limit the time and days for picking up products to be returned. The conditions imposed on the item returned. Longer times for return payment, this means the money gets stuck in case of high priced items.

5) *Privacy risk*: A large number of people are wary of sharing their personal details. The opinion is divided upon this with people on both sides of the argument.

6) *Cultural Differences*: Sometimes a person starts or stops shopping owing to peer pressure, to conform to the group norms.

CHALLENGES FACED BY THE E-COMMERCE INDUSTRY

All said and done, there are still many constraints holding the e-commerce industry to reach its full potential. Some of the factors inhibiting the growth are

7) *Lack of awareness*: A large section of the Indian population primarily in rural India lacks awareness of the internet and online shopping. Despite a large internet-based, the penetration is just at 50% with huge gender and socio-economic disparities. Online e retail makes a meager 4-5 % of the retail industry as compared to around 15% in the USA [42].

8) *Inadequate Plastic Money holders*: The credit card penetration in India is less than 5% that is quite low as compared to other emerging economies. This is becoming a big hindrance in the internet economy of India. The GOI is taking many initiatives from UPI, demonetization, digital India, etc. to lead India towards a less-cash economy [42].

India Way Behind

Credit card penetration per capita (%)

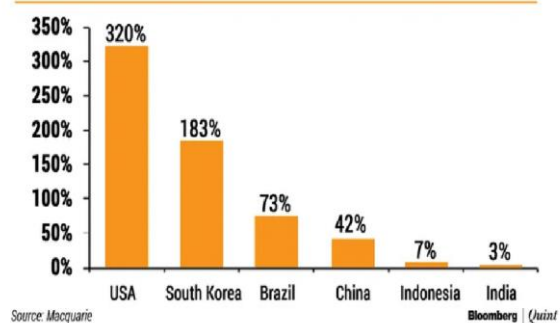


Fig. 4. Credit card penetration per capita (%)

9) *Cash on delivery Issues*: With an option to shop and order first and pay later at the time of delivery was the boon for the e-commerce companies and online shoppers but increase in the refusal of payment, return deliveries are becoming a menace for companies with increasing reverse logistics costs making a dent in profitability.

10) *Online Security*: There has been an increase in online, credit card fraud in recent years in the country that has made people doubt the safety and security of online shopping. The companies are doing their best to offer their best services but there is a need for standardization of security measures.

11) *Touch and Feel Constraint*: Indian consumers feel that there are certain categories

like furniture, cosmetics, accessories that require a physical appeal to be bought, that's why many online platforms are going Omnichannel and entering into brick and mortar domain [42].

12) *Language Barriers*: The use of the English language as the communication interface has kept a large number of consumers at bay from online shopping. A study conducted by Google, Bain & Company and others said that 54 million shoppers stopped after the first time the primary reason being the language barrier. The consumer feels a better connection and convenience in their mother tongue and the companies realizing this are working aggressively to launch almost all major regional languages on their platform to cover a larger audience.

13) *Logistics Issues*: With the future growth coming from tier 2 and tier 3 cities it is necessary to build necessary transportation and warehousing infrastructure across the breadth and length of the country to cater to the millennial population. There is a need for an increase in formalization of the sector

14) *Privacy issues*: For a greater personalized shopping experience, to avail discounts and coupons, online platforms ask a lot of information from the users, this has raised concern about data security, invasion of privacy, sharing of data across countries and companies. The government is working on addressing these issues rapidly with indigenous servers and data protection laws[43].

ENVIRONMENTAL AND NATIONALISM CHALLENGES

On one hand increase in online shopping has reduced the number of cars plying on the road but the studies show that shorter delivery times, shopping in small units of items, instant buying has in-fact increased the load on traffic due to freight vans, delivery vehicles, the imposition of loading zones, etc. Indian cities' roads are not designed to handle such kind of traffic. The land utilization in urban areas will also change with a decrease in retail space demand and increase in storage spaces, warehouses, etc. the new city planning needs to take this into consideration [44].

To curb this, online shopping companies have opted for hybrid or electric vehicles, but

the adoption rate could be better. The traditional and online shopping will co-exist in the coming times so pickup of multiple deliveries by a single customer at convenient points is also a thoughtful option [45]. Both Amazon and Flipkart has committed to replacing their existing fossil fuel sunning vehicles by EV. Amazon to introduce thousands of EVs by 2025 in India and Flipkart to replace 40% of their current fleet [46].

Plastic, bubble wrap used as packaging material used for shipping and protection of goods is adding to the plastic menace of the country. These end up in the landfills find their way into the rivers and oceans polluting water bodies. The onus of such solid waste management also falls on these companies to work in collaboration with the government to provide innovative solutions. Flipkart has committed to eliminating the single-use plastics in all its packaging. Flipkart is constantly working on solutions like recycle paper bags, shredded carton material as alternatives and at the same time keeping the safety of products for thousands of km in mind [47].

The political-legal issue is also taking the center stage regarding e-commerce companies. Recently India amended the FDI rules to ensure a level playing field for the local Kirana shops and retailers. It barred online firms to list products sold by retailers in which they hold stakes. New rules also prevented online retailers to have more than 25% of their inventory from a single retailer, sold in a fiscal year. The move was aimed to increase the number of retailers on the platforms as the companies will have to increase the third parties sellers. The government claimed that the move will increase options for the customers [48].

The government also put up an order to curb the predatory pricing and deep discounts offered by online retailers as viewed by the standalone & small retailer and shop owner to protect them. It also directed that the firms cannot have exclusive deals with the brands which allow the brand to sell their products only on a particular platform. These actions will certainly lead to an increase in the offline presence by online retailers as can be witnessed.

CONCLUSION AND RECOMMENDATIONS

The Indian startup ecosystem funded by Private Equity and Venture capitalist has achieved this e-commerce growth in 15 years which took decades for many developed economies. This carries an important lesson for the students, managers and budding entrepreneurs that Indian market and business environment is unique and require different understanding from that of developed economies. Mergers and acquisitions play a major role in the expansion. Instead of developing every innovation in-house, inorganic growth many times reduces cost, delivering a competitive advantage to the firm. The innovating product portfolio, robust supply chain, seamless payment interface and a dedicated workforce forms the pillars of an e-commerce organization. The rise of e-commerce has resulted in the accelerated growth of logistics and warehousing infrastructure in India. It has propelled the growth of online payment systems like e-wallets, online banks, and plastic money.

The drivers of growth are policy support by the Government of India with initiatives like Digital India, BharatNet, E-governance, ease of doing business in collaboration with private players, rising middle class, increasing household income, smartphone penetration, m-commerce, the rise of content in regional languages, increasing FDI etc. Flipkart is working towards catering next 200 million online shoppers. It will require adopting an Omni-channel approach by creating multiple touchpoints for consumers. Flipkart's strategic decision to change its model, exclusive deals, various mergers and acquisitions, going Omni-channel, independent payment platform, in-house logistics arms, etc. has catapulted to gain sustainable competitive advantage. The

combined strength and expertise of Flipkart and Walmart will catapult it to become a great organization driving India's internet economy.

But still there remain many challenges for the e-commerce industry. The current share of online retail in the \$600 billion retail industry in India is a mere 5% and expected to remain much less than 10% in the coming decade. [1]. The online retailers have to work around the consumers' apprehensions like privacy, security, language barrier, personalization issues. E-commerce platforms have to adapt to changing government policies. Future growth strategies have to keep in mind the effect of global warming, climate change, and sustainable development.

LIMITATIONS

An effort has been to analyze a part of the large multi-faced e-commerce industry and its impact on the Indian economy. The rise of niche horizontal players is rapidly changing consumer behavior that needs to be further studied. Only certain aspects of the Flipkart's long journey has been covered upon. Greater and more diverse sample size would have resulted in more accurate analysis of consumer behavior.

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REFERENCES

1. Mitra, A. (2013). E-commerce in India-A Review. *International journal of marketing, financial services & management research*, 2(2), 126-132.
2. Shanthi, R., & Desti, K. (2015). Consumers' perception on online shopping. *Journal of Marketing and Consumer Research*, 13, 14-21.
3. Dutta, N., & Bhat, A. K. (2014). Flipkart: journey of an Indian e-commerce start-up. *Emerald Emerging Markets Case Studies*.

4. Jeevan, P. (2015, January). A Study on Digital Marketing-A Case Study with Special Reference to Flipkart. In *National conference on E-Learning, E business and E Governance, SIMS*.
5. Malhotra, G., & Aggarwal, R. (2019). Growth prospects of e-retailing in electronic goods markets. *International Journal of Management & Entrepreneurship Research*, 1(2), 71-88.
6. C. Dr.D. RAJAKUMARI, "Swot Analysis on Post Acquisition on Flipkart and Myntra," *Studies in Indian Place Names*, 2020.
7. Fatima, F. (2014). Flipkart-Myntra; from a merger to an acquisition. *International Journal of Management and International Business Studies*, 4(1), 71-84.
8. Polisetty, A., Manda, V. K., & RV, N. (2019). Indian Online Retail Ecosystem-a Study on Flipkart Deal with Walmart. *International Journal of Research and Analytical Reviews (IJRAR)*.
9. P. Kalyani, "Walmart and Flipkart: The Biggest Deal in Indian E-com Starup Market," *Journal of Management Engineering and Information Technology (JMEIT)*, 2018.
10. N. Kapoor, "A CASE STUDY ON SUPPLY CHAIN MANAGEMENT BY FLIPKART," *Episteme: an online interdisciplinary, multidisciplinary & multi-cultural journal*, vol. 5, no. 3, pp. 92-106, 2016.
11. Singh, S., & Srivastava, S. (2019). Engaging consumers in multichannel online retail environment: A moderation study of platform type on interaction of e-commerce and m-commerce. *Journal of Modelling in Management*.
12. M. Jaganmohan, "E-commerce retail market value share in India 2018 by segment," March 2020. [Online]. Available: <https://www.statista.com/statistics/792629/india-share-of-e-commerce-value-retail-market-by-segment/>.
13. Narang, M. B., Mathew, M., Dubey, M. K., & Mathew, M. (2020). The Technological Innovation Using Blockchain And Social Media Analytics In Employee Recruitment.
14. kumar Sharma, J. (2019). Role of Technology in Tourism Management. *Journal of Industrial Relationship, Corporate Governance & Management Explorer (e ISSN 2456-9461)*, 2(3), 41-54.
15. K. B. Sobia Khan, "Amazon, Flipkart to increase warehouses," May 2020. [Online]. Available: <https://economictimes.indiatimes.com/industry/services/retail/amazon-flipkart-to-increase-warehouses/articleshow/75523490.cms>.
16. Floship, "The eCommerce Logistics Value Chain: What You Need To Know," 2016. [Online]. Available: <https://www.floship.com/e-commerce-logistics-value-chain-need-know/>.
17. SG, "Flipkart Business Model | How does Flipkart make money?," jan 2019. [Online]. Available: <https://bstrategyhub.com/flipkart-business-model-how-does-flipkart-make-money/>.
18. Pragati, "Flipkart's marketing strategy & why it works," may 2020. [Online]. Available: <https://www.talkwalker.com/blog/flipkart-marketing-strategy>.
19. G. Seetharaman, "How exclusive alliances with online retailers help brands like Xiaomi and Motorola," Aug 2014. [Online]. Available: <https://economictimes.indiatimes.com/tech/internet/how-exclusive-alliances-with-online-retailers-help-brands-like-xiaomi-and-motorola/articleshow/39959157.cms?from=mdr>.
20. S. Tewari, "Flipkart highlights gender equality in new digital campaign," Nov 2018. [Online]. Available: <https://www.livemint.com/Consumer/nFVEuCRnUsHjjabKy9I0CO/Flipkart-highlights-gender-equality-in-new-digital-campaign.html>.
21. T. YS, "These technologies are leading innovation at Flipkart," April 2019. [Online]. Available: <https://yourstory.com/2019/04/iit-kanpur-flipkart-tech-kalyan-krishnamurthy-utkarsh>.
22. D. Biswas, "Flipkart introduces Automated Guided Vehicles in its Bengaluru sortation centre," march 2019. [Online]. Available: <https://yourstory.com/2019/03/flipkart->

- automated-guided-vehicles-bengaluru-blet4u6e4d.
23. V. Bansal, "Flipkart launches fund to back early-stage startups," march 2019. [Online]. Available: <https://www.livemint.com/companies/news/flipkart-launches-fund-to-back-early-stage-startups-1553602864180.html>
 24. A. Shrivastava, "Flipkart leads \$60 million round in logistics startup Shadowfax," Dec 2019. [Online]. Available: <https://economictimes.indiatimes.com/small-biz/startups/newsbuzz/flipkart-leads-60-million-round-in-logistics-startup-shadowfax/articleshow/72382017.cms>.
 25. M. T. C. Team, "Porter's Value Chain Understanding How Value Is Created Within Organizations," 2018. [Online]. Available: https://www.mindtools.com/pages/article/newSTR_66.htm.
 26. S. Chakraborty, "Flipkart Plus Programme With Free Delivery, Early Access to Sale Events, More Benefits Announced," August 2018. [Online]. Available: <https://gadgets.ndtv.com/apps/news/flipkart-plus-how-to-join-benefits-free-delivery-plus-coins-no-fee-membership-amazon-prime-1893361>.
 27. T. F. Stories, "Flipkart SuperCoins: Everything you need to know about the multi-brand reward ecosystem," July 2019. [Online]. Available: <https://stories.flipkart.com/flipkart-supercoins/>.
 28. B. Standard, "Flipkart joins OTT race: Launches video streaming service," 2019. [Online]. Available: <https://www.business-standard.com/multimedia/video-gallery/general/flipkart-joins-ott-race-launches-video-streaming-service-92704.htm>.
 29. T. Desk, "Flipkart Ideas launched, will help consumers with their daily shopping needs," 2019. [Online]. Available: <https://indianexpress.com/article/technology/social/flipkart-ideas-launched-will-help-consumers-with-their-daily-shopping-needs-5911080/>.
 30. Y. Malik, "Flipkart puts focus back on private labels, launches in-house sports brand," 2019. [Online]. Available: https://www.business-standard.com/article/companies/flipkart-puts-focus-back-on-private-labels-launches-in-house-sports-brand-119053000338_1.html.
 31. B. Bureau, "Flipkart forays into kids furniture with Perfect Homes Junior range," 2020. [Online]. Available: <https://www.thehindubusinessline.com/companies/flipkart-forays-into-kids-furniture-with-perfect-homes-junior-range/article31835299.ece>.
 32. S. SH, "Lifestyle to list its private-label brands on Flipkart," Aug 2019. [Online]. Available: <https://www.livemint.com/industry/retail/lifestyle-to-list-its-private-label-brands-on-flipkart-1565267067290.html>.
 33. PTI, Sep 2019. [Online]. Available: <https://economictimes.indiatimes.com/industry/services/retail/flipkarts-2gud-japanese-brand-miniso-announce-partnership/articleshow/71147165.cms>.
 34. W. Mukherjee, "Flipkart-Spencer's Retail confirms partnership; Flipkart exploring more alliances," April 2020. [Online]. Available: <https://economictimes.indiatimes.com/industry/services/retail/flipkart-spencers-retail-confirms-partnership-flipkart-exploring-more-alliances/articleshow/75070820.cms>.
 35. A. Himatsingka, "CenturyPly forays into Indian e-commerce market by joining hands with Flipkart," Jun 2020. [Online]. Available: <https://economictimes.indiatimes.com/industry/services/retail/centuryply-forays-into-indian-e-commerce-market-by-joining-hands-with-flipkart/articleshow/76329363.cms>.
 36. S. Soni, "Amazon, Flipkart, other e-commerce portals to lose market share to these online retail startups," Dec 2019. [Online]. Available: <https://www.financialexpress.com/industry/sme/amazon-flipkart-ecommerce-market-share-marketplaces-redseer-verticals-players-horizontal-marketplaces-zomato-swiggy-oyo-myntra-online-retail/1804520/>.
 37. E. Online, "Flipkart, Government of Punjab come together to create opportunities for MSMEs," 2019. [Online]. Available:

- <https://economictimes.indiatimes.com/small-biz/sme-sector/flipkart-government-of-punjab-come-together-to-create-opportunities-for-msmes/articleshow/72383056.cms?from=mdr>.
38. T. Bureau, "A timeline of Flipkart's acquisitions," April 2017. [Online]. Available: <https://techseen.com/2017/04/10/flipkart-acquisition-ebay-weread/>.
39. N. Bhatia, "These Are The Startups Acquired By Flipkart," April 2017. [Online]. Available: <https://officechai.com/startups/startups-acquired-by-flipkart/>.
40. auxesisinfotech, "Biggest Challenges Faced by E-commerce Industry in India," December 2018. [Online]. Available: <https://auxesisinfotech.com/E-commerce-Industry-Challenges>.
41. E. CONTRIBUTORS, "View: The biggest challenge facing e-commerce sector in India & how to overcome it," 2020. [Online]. Available: <https://economictimes.indiatimes.com/industry/services/retail/view-the-biggest-challenge-facing-ecommerce-sector-in-india-how-to-overcome-it/articleshow/73076390.cms>.
42. R. Jha, "Online shopping: Impact on city planning and infrastructure," Jan 2019. [Online]. Available: <https://www.orfonline.org/expert-speak/online-shopping-impact-city-planning-infrastructure-46937/>.
43. H. Farmbrough, "Why Internet Shopping Isn't Always Better For the Environment," october 2019. [Online]. Available: <https://www.forbes.com/sites/heatherfarmbrough/2019/10/14/why-internet-shopping-isnt-always-better-for-the-environment/#62f59c125c18>.
44. E. D. Desk, "Jeff Bezos introduces electric delivery vehicle for India: 10,000 EVs in Amazon fleet by 2025," Jan 2020. [Online]. Available: <https://www.financialexpress.com/auto/car-news/amazon-prime-india-jeff-bezos-electric-rickshaws-delivery-vehicle-india-10000-evs-amazon-fleet-by-2025/1828656/>.
45. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. International Journal of Innovative Technology and Creative Engineering (ISSN: 2045
46. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. Advanced Composite Materials, [https://doi.org/10.1080/09243046.2021, 1918608](https://doi.org/10.1080/09243046.2021.1918608).
47. .PTI, "Flipkart enters online travel space, ties up with MakeMyTrip; flight bookings to be kicked off first," April 2018. [Online]. Available: <https://www.firstpost.com/business/flipkart-enters-online-travel-space-ties-up-with-makemytrip-flight-bookings-to-be-kicked-off-first-4419159.html>.

GENDER GAP IN WAGE DISTRIBUTION IN INDIA: BIGGEST CHALLENGE FOR ANY INDUSTRY

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ABSTRACT

The purpose of this paper is to examine the gender gap in wage distribution in India and also to find out the reasons why gender bias exists even in 2020. Women play an important role in the socio-economic development of a country. Many studies have shown that women in India earn 19% less than men, reflecting the high gender pay gap in the country despite the constitutional and legislative arrangements to reduce gender gap. India is progressing but are Indians progressing? This is a quantitative cum explorative research based on a survey consisting of structured questionnaire to find out the real reasons behind this gender bias. The findings of the study would give a list of processes & the reasons for the discrimination in wage distribution which can be used by other industries to reduce gender bias. Also, this paper focusses on gaining perspectives on how willing are people to change their mind sets to reduce gender bias. This analysis will help the industries to empower women and eventually help to increase their contribution in the economic growth of the country.

Keywords—gender gap, gender bias, equal pay, wage distribution, wages

INTRODUCTION

The gender gap in wage distribution is the difference between a man's and a woman's salary on an average. Generally, it is observed that women are paid less than men. The gender pay gap or the gender wage gap widens as people move up the career ladder. But is it true? In which areas is this prevalent? Is this only in rural areas where girls or women have less access to education or opportunities and resources. Some reports say that gender wage gap is equally present in urban areas as a result of the patriarchal mind set, while some say that it is more in the well-to-do & educated families with patriarchal mind sets. These are the areas where women belong to well-to-do families but they think that it is not their job to earn money, rather they are supposed to take care of their children and family. Who told them this? Why this mind set still exists in the 20th century where men will earn and women will take care of the family is considered ideal. People follow this type of social structure religiously and it's really hard to change their mind sets as they have this wiring in their brains since ages. There is a question that we want to ask," why can't there be a society where men and women are free to choose their job or the type of work they want to do? Why can't men take care of the family and children while women go to work?" This practice exists in only a handful of families in today's world. Why this can't be the

norm where women and men can do their jobs on the basis of their interest?

Patriarchal society is a society where man is the bread-winner and woman takes care of the families without having a say in any decision that is made or taken for the welfare of the family. In such a society, men are always considered superior to women. In most of the families, where parents have to choose one from their son and daughter for higher studies, it is always the son who gets the opportunity, because what a girl will do after studying are their thoughts. She has to leave her job eventually once she gets married. Her husband will take care of the expenses is the root of this patriarchal society.

In our view, the one who earns bread is the head of the family and is given the utmost respect and care in the family. Whole family is dependent on him or her for their financial needs. If a woman becomes the head, she will be given the respect and care which the conservative patriarchal monsters don't want. They want their women to be always their slaves and mere take care of the whole family instead of doing any job. But even after the care and doing the tiresome household chores, they are not given any respect or care in most of the Indian families rather they receive domestic violence as a gift. When men are asked what type of girl they want, their response is usually slim and beautiful, very few people want girls who are educated and don't meet the

expectations of the beauty standards set by the society. Because if they get an educated girl, she will break their joint family into a nuclear family is the norm that still exists in our society even in 2020.

A striking argument here is that parents who give freedom to their daughters, treat them equally as their sons, are sometimes reluctant to send out their daughters for higher studies. "It will be difficult for us to find a suitable match for you my daughter" is their concern. They want their daughters to be independent but they should not earn more than their husbands as it is not accepted by the so-called norms of this patriarchal society.

It is evident that there isn't a single industry where gender gap in wage distribution doesn't exist. In an industry like film industry, where parents & husbands support their girls & want them to be successful in their careers, gender pay gap still exists as it is run by the patriarchal society as stated by 'Aamir Khan', one of the three Khans of the Indian movie industry. Gender pay gap is equally present in this industry as nepotism. These two have been in the roots of this film industry. Women have been used as an object in the films since many years. Their talent is also not recognized but instead they are labelled as dumb and beautiful in spite of the knowledge they possess. If they speak for themselves or raise a voice against some unethical practices, they are labelled as "feminists". Men are never labelled as dumb and stupid even after possessing zero knowledge or skills. Women are paid less only because of their gender in this industry & not on the basis of their talent. Whom they should approach to complain about this? There is no rule book which has these norms. There are always laws for crimes but not for inequalities. Even if such laws exist, they are not strictly implemented and often people don't know about these laws.

In 1976, Equal Remuneration Act was implemented by the (Government of India, 2015) at 2 levels- state sphere and the central sphere. The Act was passed to provide equal pay for equal work, and to stop the discrimination on the grounds of sex, against women in any type of employment and the matters connected with it. This act extends to

the whole of India. It also states that, "no discrimination shall be made on the basis of gender while recruiting any person." It is sad to know that many industries or organizations do not follow this law while recruiting. Also, many people are not aware about any such laws.

This research is carried out to study the mind sets of people in context to the gender pay gap & find out the reasons why it still exists in our country and to make people aware that there is a law for equal pay. We have also tried to find out the rules that can be changed at ground levels to stop this discrimination of compensating people by being biased towards their gender.

LITERATURE REVIEW

There have been a number of studies regarding gender bias in wage distribution in India. But is there any wage disparity really on the basis of gender when it comes to developing countries like India? A quantitative research was carried out to analyze the wage rate differentials among men and women in both the rural and urban areas (Javeed & Manuhaar, 2013). They found out that an average woman's pay is less than one-third of the average man's pay in India.

(Khanna, 2012) used the exploratory research to answer the question of whether there is a "glass ceiling" or a "sticky floor", i.e. whether wage gaps are higher at the upper or lower ends of the wage distribution and examined the wage gaps across different quantiles of the wage distribution. His paper concluded with a discussion on the possible reasons for observing a sticky floor phenomenon in India i.e., the low wage earners face higher wage gap.

(Grey-Bowen & McFarlane, 2010) did a quantitative research to examine the gender gap and the potential factors that contribute to income inequality and also examined the trends in history regarding differences in pay and the several causes that were considered to reduce the gender gap in compensation. Based on the research, most of the gender gap was due to the tenure of men and women in the organizations and not the skills. More the tenure of a person, more he was paid and also, men were favoured more than women.

Sometimes the gender wage gap is determined by taking the normal compensation for all females in an association, paying little mind to job or duties. But what is the reason behind this? (Önday, 2020) did a qualitative research that focused on understanding the trends in gender wage gaps across countries using the data and analysing it to give some useful information.

What could be the potential reasons behind this gender pay gap? Why women from patriarchal families are earning less than men? (Sarkhel, 2014) did an explanatory research to understand the issue of lower female wage than their male counterpart from the perspective of family decision making by using decomposition analysis of Oaxaca (1973) and Blinder (1973). They discovered that patriarchy mind set plays an important role in all the industrial jobs as compared to the agricultural jobs in India.

Why is the concept of equal pay still ambiguous in many organizations? Is there any advancement in women's pay? Is there any culture which supports diversity and inclusion? The purpose of the research conducted by (McElhaney & Smith, 2017) was to (1) clarify the ambiguity of "paying equally" and outlining pay state, (2) inform other companies that are interested in paying equally (3) standardize the private sector so that income is paid equally. They found out that female-dominated sectors had higher wage disparities. Hence, equal pay and gender equality would never be perfectly achieved, but rather both require ongoing effort and consistent monitoring. This was the research where women were preferred over men.

(Kahn & Lawrence, 2015) did a basic research to understand the different average levels of education and experience and commonly work in different industries and occupations and to understand multiple factors that can influence the gender pay gap. There was evidence that systems of wage compression can narrow the gender pay gap. However, there was some evidence that these interventions in the labour market had adverse employment consequences for women, which policymakers must balance against the effects on narrowing the gender pay gap, an assumed goal of most of the countries.

(Klasen & Lamanna, 2008) did a quantitative research using the data and investigating a long time period (1960-2000) to find out the extent to which gender gaps in education and employment were reducing economic growth. Why earlier studies had found that more careful econometric techniques yielded the new finding that gender inequality in education reduces economic growth? They found that gender gaps in education and employment significantly reduce economic growth. Gender pay gap is responsible for an increase in the difference in the economy of different areas like South Asia (India, Bhutan, Nepal, Bangladesh, Pakistan, Afghanistan, Maldives & Sri Lanka) suffering from slower growth in female employment.

(Tewari, Chouhan, & Sanjeev, 2017) tried to find out the reason to "why women in India are facing discrimination at work place and suffer from harassment despite the constitutional and legislative arrangements to reduce gender gap?" using quantitative research. They found that unemployment rate and wages had larger gender gaps than before. There was an increase in the formalisation of women labour making it difficult to do effective tracking.

The GPG (Gender Pay Gap) report suggests that women's participation to the labour market depends on education levels; in recent years it has declined the most among the illiterates and those with lower education level and has increased among those with the higher education levels (Medas, Kostolný, Varkkey, & Korde, 2018). So, can this be said, "Gender gap is increasing in well-educated societies and families". This may or may not be the correct statement. Let us try to find out the truth and the real reasons behind the gender pay gap.

RESEARCH METHODOLOGY

The research is a mix of quantitative as well as exploratory research. Primary data was collected to know the perspectives of the people who are working. How they perceive the gap in payment of wages? This was done by circulating a survey in the form of a structured questionnaire consisting of 18 questions. The questionnaire was designed in such a way that people respond to it more openly. This online questionnaire was sent to the participants by contacting them via phone calls, WhatsApp

texts, LinkedIn etc. Simple Random Sampling method was used to collect the responses from the participants. The survey was conducted via google form in the months of May and June 2020.

A. Sample Specification

The target sample size was 270 out of which 180 participants had responded. Hence, the response rate was 66.67%. The survey was conducted on a population consisting of both males as well as females in different age groups, tenure as well as income groups. The average age of the participants was 27 years.

Once the responses were collected from the target audience, some of the participants were reached out for further collection of information. The participants who had faced gender discrimination in payment of wages while working were reached out. They were asked about the various scenarios where they faced gender pay gap. They were asked the real reasons which are not known to outsiders when it comes to gender bias in wage distribution. These short interviews lasted for only about ten minutes. Answers were recorded by note-taking with the consent of the participants. The interviews were unstructured but they gave a deeper insight regarding the gender bias in wage distribution in various sectors of the society. They provided an in-depth understanding about the reasons and also the emotions and perceptions along with the mindsets of the employees.

Secondary data was collected about the organizations from various surveys, reports and authentic sites which would help to identify the issues prevailing with respect to gender pay gap in the organizations. Basically, the data was collected from various surveys and reports issued. The data was collected from the sites where people used to calculate wages. Also, various reviewer and feedback sites were considered for collection of data. Sites like Glassdoor had been visited to develop the insights about the place of work from the participant's point of view.

After the data was collected from various sources, the data has been analysed to look for any trends in the industry or gender pay

discrimination in distribution of wages. Before analyzing the data, content analysis had been done i.e. the data was categorized and meaning of the words and phrases were found out.

With the help of thematic analysis, codes had been developed by closely examining the data in order to identify broad themes and patterns. Each code was developed in order to create results from the responses efficiently. Also, an exploratory research had been done on the secondary data so that the trends which were not discovered earlier in the gender pay gap are found. The key common practices of distribution of wages across all the organisations were then picked up and a common insight from that practice was then focussed upon to find out the reasons behind the gender gap in wage distribution in India.

DATA ANALYSIS AND FINDINGS

A. Demographics of the participants

The questionnaire was circulated to 270 working people of different genders and age-groups out of which 180 participants have responded. Out of these 180 participants, 102 were males and 78 were females as shown in Fig.1.

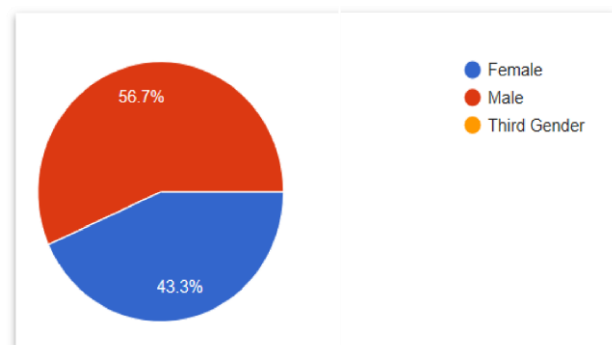


Fig.1. -Figure showing % of participants gender-wise

The participant's age ranged from 20 years to 73 years and the average age was 27 years. The questionnaire was sent to the participants residing in the cities belonging to each tier i.e. Tier 1(126participants), Tier 2(36 participants)

& Tier 3(18participants) as shown in Fig.2.

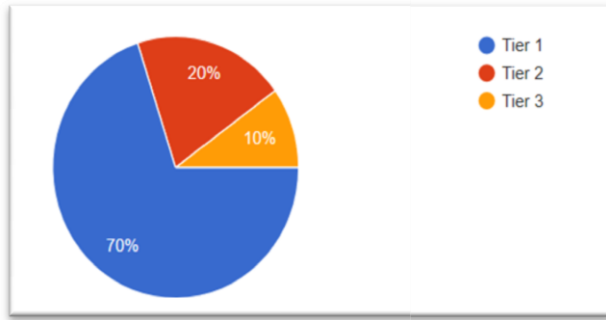


Fig.2 – Figure showing the city of work of participants tier-wise

The designation of the participants ranged from Interns (9 i.e. 5%), Level 3: employees & trainees (134 i.e. 74.4%), Level 2: mid-level managers, senior managers or functional heads (23 i.e. 12.8%) & Level 1: Head of the organizations, CEOs, Entrepreneurs (6 i.e. 3.3%) and others: staff consultant, nurse etc(8 i.e. 4.4%) as shown in Fig.3.

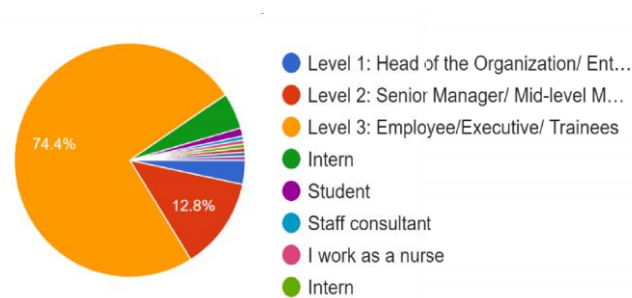


Fig.3– Figure showing the designation of the participants

The major sectors where the participants are currently working comprised of IT/ITES industry, FMCG (fast moving consumer goods), BFSI (Banking, Financial Services and Insurance), Manufacturing, Education and HR consultancy.

B. Analysis

Out of these 180 respondents, only 31(17.2%) felt that there was a gender inequality in wage distribution at their workplace, 130 (72.2%) people didn't feel while 19 (10.6%) didn't know about gender inequality in wage distribution. The breakup is shown in Table I.

Gender	Yes	No	Don't know
Female (78)	13	53	12
Male (102)	18	77	19

TABLE I - Showing gender pay gap felt by participants gender-wise

There was a need to know that how many respective organizations. Only 43(23.9%) respondents or their colleagues faced gender discrimination in the form of wage inequality or wage discrimination at their workplace while 137(76.1%) respondents or their friends didn't face any gender pay gap in their organizations as shown in Fig.4.

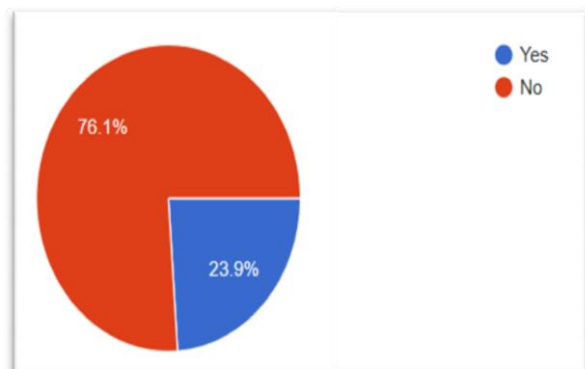


Fig.4 – Figure showing the gender pay gap experienced by the respondents

The below Table II shows that more females (29.4%), have faced gender pay gap as compared to males (19.6%). Most of the participants belonged to designation level 2 & 3 i.e. junior trainee, trainee, mid-level managers, senior managers, analyst, accountant, junior teacher etc. when they faced gender discrimination in wages. Some of them faced gender pay gap during promotions and others while getting recruited digitally.

Gender	Yes (43)	No (137)
Female (78)	23 (29.4%)	55 (70.6%)
Male (102)	20 (19.6%)	82 (80.4%)

TABLE II - Showing gender pay gap experienced by participants (gender-wise)

Only 23 participants (12.8%) felt that they or their colleagues were getting paid less because of their gender. 23 % of the females were getting paid less while only 4.9% of the males were paid less. This showed that the women faced more gender inequality in wage distribution. 66.67% of the women who faced gender inequality belonged to Tier1 city, 27.7% to Tier 2 city and only 5.55% to Tier 3 city. The women who worked in top tier cities i.e. metro and well-developed cities faced more gender discrimination in wage distribution.

Only 2 out of these 23 people who faced gender discrimination in wage distribution raised their voice against it. Others were not able to raise it because they were scared of the authorities, they might have lost their jobs if they had raised their voice against the gender pay gap. Some of them thought that their future will be screwed if they will raise their voice. Some felt that it was the way that all organizations work, they were unaware about any law for equal wages or any legislation in this regard. 41.1% of the respondents were unaware of the Indian Act that was made to ensure gender equality in distribution of wages.

Gender of the people who were paid less	Yes (2)	No (21)
Female (18)	1	17
Male (5)	1	4

TABLE III - Table showing participants who raised their voice against gender discrimination in wage distribution (gender-wise)

While 97.8% of the respondents thought that it was wrong that women should be paid less men for doing the same job, 2.2% felt that it was right and they were males as shown in Fig.5. They gave reasons such as, “because

they are less efficient”, “because they have to take career breaks”, “I think

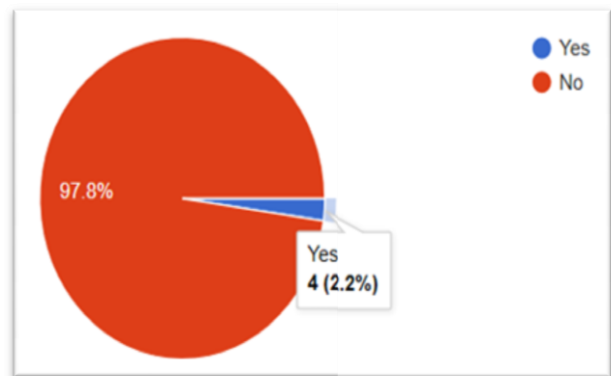


Fig.5 – Figure showing thinking of the participants about women getting paid same as men (in %)

some women don't want to work”, “Women are supposed to do household chores and raise family”. This shows that just because women take career breaks, they should be paid less and not on the basis of their skills according to some respondents.

57.8% of the participants felt that men should be given paternal leaves and they feel bad when women are given maternal leaves and men are not given paternal leaves. Out of these 57.8% participants, 22.7% were females and 35.1% were males. This shows that it’s women most of the times who cares not only about themselves but men too.

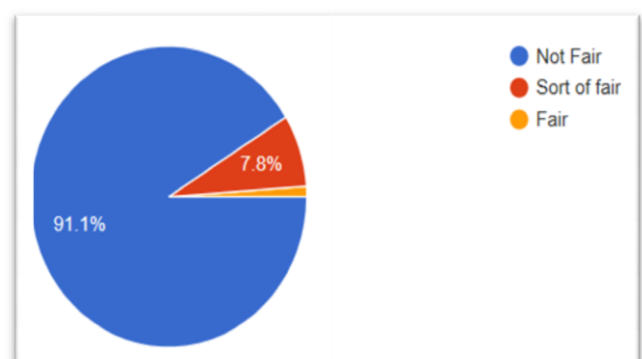


Fig.6 – Figure showing how fair the participants consider women getting paid less than men

91.1% of the participants responded as “not fair” about the existing gender pay gap, 7.8% felt “sort of fair” and only 1.1% felt “fair” that women should be paid less than men as shown in Chart 6. The people who chose “fair” said that women are less dedicated to the

organizations because of their family responsibilities, they couldn't even stay late at night if there is extra work as they didn't feel safe. Some said that women are less efficient than men and others said that women couldn't do construction site work or mechanical work like men. Hence, paying them less than men is justified. Contrary to the above reasons stated by some of the respondents, 91.1% of the respondents felt that women could do field-based jobs or could work at a construction site or any mechanical work.

67.2% of the respondents thought that there is not any country that protects both men and women equally. While in reality, there are six countries that protect the laws of both men and women equally. These six countries are Belgium, Denmark, France, Latvia, Luxembourg and Sweden. This shows that people are unaware of the laws that are made and followed in the world. There is a huge lack of awareness when it comes to gender pay gap and the issues related to it in our country.

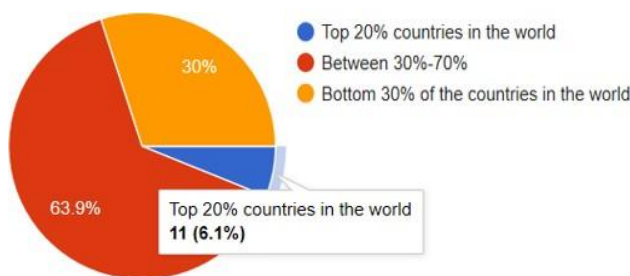


Fig.7– Figure showing what the participants think where India stands in terms of equal pay for both men and women

Of the 153 countries studied for the report, India ranks 112th on the overall Global Gender Gap Index. Hence, it is in the bottom 30% of the countries in the world. 6.1% of the participants thought that India comes in the top 20% countries in the world, while 63.9% of the respondents thought that India comes between 30-70% and only 30% responded correctly as India comes in bottom 30% of the countries in the world (Fig.7). Majority of the people are unaware of the reality, that gender pay gap exists in India. Many people are ignorant of this fact as they have not faced gender pay gap till now and this is the wake-up call for them as the reality is that India comes in bottom 30% of the

countries and men are surely preferred over women in India and are paid more.

88.3% of the participants felt that women should be promoted to higher levels in the organization on the basis of their talent while other 11.7% felt that they should not be promoted. These are the people with the patriarchal mindsets who don't want women to achieve more than men. These are the people who want women to succeed but at the same time they want that women should not be superior to men. Some of the participants were of the view that equal opportunities should be provided to both men and women to climb the corporate ladder at the workplace.

91.1% of the respondents said that they would like to change the scenarios of gender pay gaps in their organization if they were the head of the organization. 6.7% of the participants didn't want to change the scenario where women are paid less than men even if they are the heads of the organization. There still exists such mindsets which don't want to promote women as they want that women should always remain inferior to men.

70.6% of the participants responded agreed to marry the person of the opposite gender if he/she earns less than them. They didn't have any problem in marrying such a person. 13.3% of the participants didn't agree, they want their better half to earn more than them, while some argued that they can marry only if there is no ego problem i.e. the one who is earning more should not make the other feel inferior. Some said that it doesn't matter who earns more, but it should be sufficient enough to lead a healthy and happier lifestyle.

43.3% of the participants agreed that men were promoted to higher levels more often than women in their respective organizations. 56.9% felt that women were also given the opportunities to get promoted. Some felt that women were treated with more respect than men and they earn more than men in industries like beauty industry, modelling, tea leaves industry, HR related jobs etc. where women are given more preference over men due to the work type. Some were of the view that men are given more opportunities to handle higher positions as they are better decision makers and

they do well at higher positions. Some felt that as organizations have quota to hire only female candidates to promote gender diversity in the organization, it is unfair for the male candidates. Some participants also said that women are perceived to be less competent or misfits in field-based work and hence, they don't get promoted to higher levels. Corporates feel that women are not flexible enough to be put in any kind of roles, or they have more geographical constraints when it comes to postings. This bias also comes into play when we talk about maternal leaves. Men are also given promotions as their tenure in the organization is more than women as women take career breaks. While many of them return to work, some of them leave their work completely to take care of their children or because of the additional family responsibilities.

The ways by which these gender inequalities can be improved are mentioned below in the Table IV along with the percentage of votes given to each method by both male and female participants combined. The methods include improved implementation of the existing laws to reduce gender pay gaps in the country, action should be taken against employers who are biased towards one gender while distributing the wages, more work should be done by trade unions, forcing employers and companies to close the gender pay gap, mentality towards women's capabilities must be changed.

Method to reduce gender pay gap in India	Number of votes	% of votes
Improved Implementation of the existing laws	117	65%
Action Taken against employers	82	45.60%
More work done by trade unions	29	16%
Forcing Employers and Companies to close	90	50%
Mentality towards Women's capabilities must be changed	109	60.60%
Others	20	11.11%

TABLE IV -Table showing the methods to reduce gender pay gap in India

Others include transparency in payment of wages, unethical practices should be stopped, women should be educated about their rights etc. We find that people want the things to be

changed at ground levels so that every gender can be benefitted from the pool of opportunities that come their way.

The main findings of this study are- A) Men are promoted to higher levels more often than women. B) Women are preferred over men in some of the industries such as modelling and beauty industries. C) Women are considered to be less competent than men and hence they are given less opportunities as compared to men. D) Gender pay gap increases with the increase in tenure. E) Gender pay gap is higher because of career breaks. F) Gender pay gap is present in various industries.

The findings of the research study have given us list of the scenarios for gender pay gap and also the reasons for the discrimination in wage distribution based on gender in the organisations. These results can be used by other companies to stop discrimination for the country to develop in a better way.

DISCUSSIONS

Gender pay gap is calculated as the difference between the median wages of male and female divided by the median wage of male.

$$\text{Pay gap} = \frac{\text{Median wage (male)} - \text{Median wage (female)} * 100}{\text{Median wage (male)}}$$

A. Gender pay gap and Education

Gender pay gap is generally considered to be more in rural areas as compared to urban areas as women in rural areas do not have access to educational opportunities, lack of awareness about women's rights and less knowledge. But the research shows that 66.67% of the women who faced gender inequality belonged to Tier1 city, 27.7% to Tier 2 city and only 5.55% to Tier 3 city which implies that gender pay gap has been reduced in rural areas but has been gradually increasing in urban areas. In urban areas, women are being given opportunities while they are paid less than men.

B. Gender pay gap and Career breaks

Women who take career breaks to take care of their families or to give birth are usually the ones to face gender pay gap when they return to

the organization. There are various loopholes in the system which are not covered by any law. When a woman returns from maternity leave, she is not evaluated on monthly basis rather she is evaluated on an annual basis and this leads to her less contribution and eventually she is not evaluated fairly and is given less ratings than her peers. This results in increasing the gender pay gap as her colleague's wage increases and hers is not increased. When it comes to promotion, the organization don't take into account the maternity leaves but rather it considers the overall output and hence, promotions are given to those who have worked more than these women. Obviously, others have worked more and they are eligible for it, but there should be some changes so that women who take career breaks are not deprived of any promotions or any other opportunities in their career. Due to these reasons, men are promoted to higher levels more often than women. Hence, men earn more than women as they get more opportunities than women.

C. Gender pay gap in various industries

Gender pay gap can be found in almost all industries. No industry is out of its reach. In sports industry, where men are always considered superior to women, gender pay gap is huge. For example, women cricketers are paid very less than men cricketers because of the popularity and favouritism for men's cricket. During primary research, one participant told that one female cricketer was performing very well but at the peak of her career, someone in the management demanded sexual favours from her and she denied. As a result, she had to leave cricket and eventually she went into depression. Another instance is of a Kabaddi player, due to child's premature birth, the female Kabaddi player had to leave Kabaddi to take care of her child although her husband was very supportive. Another participant told that in many villages, where female candidates win the election but their husbands run that village just because females are not educated enough, they just contest elections to win, they are used an object to win elections and their value is nothing more than that in major parts of India. One participant told that just because she was getting married to a businessman in Tier 3 cities where job

opportunity was not available, she had to leave her job but leaving job was never her choice but she was forced to leave as she didn't have any other option. There were several examples where women had no job in hand and they had to agree to work at much lower wages.

People like us think that gender pay gap exists only at higher levels or in rural areas where girls are not educated and they are not given enough opportunities. But the reality is that where women are from well-to-do families, they are doing very well in their careers and still they face gender discrimination in wage distribution.

CONCLUSION

We would like to conclude by saying that women need support from everyone as they have already suffered a lot in the form of gender pay gaps, domestic violence, dropping out of school and honour killings etc. Opportunities should be given equally to men and women but women should be given chances to study like men. Often men complain about that they are not given fair chance in a particular job but they forget to ask themselves that if women were given equal chance to study and pursue their dreams as they got? Things need to change at ground levels starting right away from female foeticides till women getting promoted to top C-suite. Change is the only solution to reduce gender pay gap and gradually remove it from its roots.

The change cannot happen overnight, hence, following are the changes that need to be incorporated in our lives to make this world a better place to live not only for women but for all. Changing the mindsets of the people that girls are not burden, they are equally capable of doing anything like boys. Give them a chance and they will prove. This can be done by stopping dowry strictly so that parents don't feel burdened. Women should be made aware about their rights and everyone should support them so that they are not deprived of any opportunities. Trade unions should work hard in order to improve the labour conditions for both men and women. Strict action should be taken against employers who practice gender pay gap while recruiting or giving promotions. The employers and the employees should be

forced to close the existing gender pay gaps. This can be done by improved implementation of the existing laws. There should be separate governing bodies for the organizations to reduce the gender pay gap in the country. These bodies should be educated and they must not indulge in any form of corruption. The above recommendations must be followed in order to reduce gender pay gap in the country if can't remove it fully.

LIMITATIONS

As the research was done on a handful of people, actual scenarios can be different. Gender pay gaps are much higher than the facts and figures given in this research. Monster Index 2018 report shows that the gender pay gap is as high as 38% in the Information

Technology industry. The pilot run was done to test whether the participants were willing to disclose their salaries or not. We found out that some participants or companies or sites did not want to disclose the data as it is related to compensation and hence it can create a problem in doing the research. Further research can be done by covering a large sample of the population especially focussing on the people at higher levels in certain industries. This could be the relevant area for the further research. Sometimes, limitations can be that people are not willing to participate in surveys like these fearing that they will lose their jobs if they tell us the real scenarios. In these cases, reality can be very different than what we get as a response. These things should be kept in mind while doing further research.

REFERENCES

2. D'Cunha, S. D. (2017, August 30). In India, The Gender Pay Gap Extends Even To Bollywood. Retrieved from [www.forbes.com: https://www.forbes.com/sites/suparnadutt/2017/08/30/in-india-the-gender-pay-gap-extends-even-to-bollywood/#274ff9a8502b](https://www.forbes.com/sites/suparnadutt/2017/08/30/in-india-the-gender-pay-gap-extends-even-to-bollywood/#274ff9a8502b)
3. Government of India. (2015, November 18). EQUAL REMUNERATION ACT, 1976. Retrieved from [labour.gov.in: https://labour.gov.in/sites/default/files/equal_remuneration_act_1976.pdf](https://labour.gov.in/sites/default/files/equal_remuneration_act_1976.pdf)
4. Grey-Bowen, J. E., & McFarlane, D. A. (2010). Gender Compensation Discrimination: An Exploration of Gender Compensation Gap and the Higher Education Connection. *Journal of Business Studies Quarterly*, 2(1), 65-82.
5. Javeed, S., & Manuhaar, A. (2013). Women and Wage Discrimination in India: A Critical Analysis March 19 - 2013. *International Journal of Humanities and Social Science Invention*, 2(4), 06-12.
6. Kahn, & Lawrence, M. (2015). Wage compression and the gender pay gap. *Institute for the Study of Labor (IZA)*(150), 2054-9571.
7. Khanna, S. (2012). GENDER WAGE DISCRIMINATION IN INDIA: GLASS CEILING OR STICKY FLOOR? Delhi: Centre for Development Economics, Department of Economics, Delhi School of Economics.
8. Klasen, S., & Lamanna, F. (2008). The impact of gender inequality in education and employment on economic growth in developing Countries: Updates and extensions. Göttingen: Ibero-America Institute for Economic Research (IAI), University of Goettingen.
9. McElhaney, K., & Smith, G. (2017). *Eliminating the Pay Gap: An Exploration of Gender Equality, Equal Pay, and A Company that Is Leading the Way*. Berkley: Gap Inc., University of California.
10. Medas, G., Kostolný, J., Varkkey, B., & Korde, R. (2018). *WageIndex Report India Indian Gender Pay Gap*. Amsterdam: WageIndex report India, WageIndicator Foundation.
11. Mishra, P., Jimmy, L., Ogunmola, G. A., Phu, T. V., Jayanthiladevi, A., & Latchoumi, T. P. (2020, December). Hydroponics cultivation using real time iot measurement system. In *Journal of Physics: Conference Series* (Vol. 1712, No. 1, p. 012040). IOP Publishing.
12. Sarkhel, S. (2014). Wage gap in labor market, Gender Bias and Socio-Cultural

Influences: A Decomposition Analysis for India. Kolkata: St. Xavier's College.
13. Tewari, S., Chouhan, R., & Sanjeev. (2017). Gender Gap Index for employment

opportunity. International Journal of Engineering Technologies and Management Research, 4(9), 39-48.

DELAYS IN CONSTRUCTION PROJECTS, THEIR TYPES, REASONS AND STRATEGIES TO MITIGATE THE DELAYS.

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ABSTRACT

The study would help to understand the reasons of delays in construction projects, their categories and types, the possible mitigation measures for the same. It will have emphasis on role of government clearances in the occurrence of delays. Methodology/Approach- Two methods are used for writing the paper. Review of different papers on delays in construction projects is given to understand the most common reasons for delay. A survey was conducted with participants mainly from the construction domain. A proper questionnaire regarding reasons and mitigation measures was provided. Practical Implications- It will help to understand the role of quick approval of government clearances in avoiding delays in construction projects. Also it will have an emphasis on role of owner and contractor in timely completion of any construction project. Originality/value - This research fills a need to understand reasons for delays and the respective mitigation strategy for the same.

Keywords - causes of delay, mitigation strategy for delay, approvals, client, contractor

INTRODUCTION

Infrastructure is a major sector that propels overall development of the Indian economy. The Secretariat for Infrastructure in the Planning Commission is involved in initiating policies that would ensure time-bound creation of world class infrastructure in the country. This section focuses on power, bridges, dams, roads and urban infrastructure development. Details of the projects, organizations, policies, timelines, schemes, spending on infrastructure are provided for the users.

Following are the types of Infrastructure projects in India:-

1. Power
2. Bridges
3. Dams
4. Highways
5. Urban Infrastructure

So what is an Infrastructure project:-

An Infrastructure project is basically an impermanent venture with definite time & cost, started to create a sole product, service or result, tend to be limited edition. The project-team comes together to create that unique development on a particular site under circumstances that will never be repeated. They may be complex, demanding high level of co-ordination of permissions, people, goods, plant and materials and construction can begin despite many uncertainties, and as a consequence, delays are common.

Types of Delays in Construction Projects:-

However, it is important to understand the types or categories which a delay falls into before analyzing construction delays. To initiate the further mitigation efforts and to convert it into a merit, a clear understanding of types of delays is necessary. The delays are classified or categorized into four basic ways which are as follows:-

A) Critical or non-critical Delays:

This type of delay causes an extension in the duration of project. Due to changes in project duration cost and time overruns may occur. Few results of critical delay include extended field overhead, unabsorbed home office overhead, liquidated damage, increase in labour & equipment cost.

Non-critical delays are those which do not cause an extension in project duration. Such delays may cause exceeding the deadline for completion of a particular activity but do not cause any delay in the timeline of project.

B) Excusable & non-excusable Delay

This type of delay occurs when the contractor cannot be held responsible for the extension of work or compensation (terms and conditions need to be applied accordingly). The reasons for excusable delays can be considered out of the control of contractor.

The causes may be force majeure, natural calamities, political and social interest, terrorist attacks, extended time from client's side during approvals and decision making about the project and due to delayed government clearances.

A delay where the contractor is fully responsible for the activities getting delayed and which results in extending project duration (responsible for critical delays) are non-excusable delays

Causes of such delays may be delayed mobilization, delayed procurement of required materials and resources, delayed submission of important documents related to project, improper planning and scheduling of activities and critical events that were not highlighted to client on right time etc.

C) Concurrent Delays in Construction Projects
This is kind of situation where more than one type of delays occurs at the same time due to variety of reasons. Concurrent delays affects multiple activities simultaneously or independently, in turn affects the completion of project. Concurrent delays causes total failure of project planning and timelines.

D) Compensable or non-compensable Delays in in Construction Projects
Scenario where contractor is liable for Time Extension & Cost compensation is compensable delays. All compensable delays fall under excusable delays-Whereas, if the contractor is solely at fault for a delay event, it is termed as non-compensable delay.

LITERATURE REVIEW

A. Review 1 - Analysis of Critical causes of delays in Indian Infrastructure Projects

Prof. Siddhesh k. Pai and Mr. J. Raj Bharat

This paper focuses on the study of root cause of delays in Indian Infrastructure Projects. Delay means slowing down of work without stopping it entirely. Delay gives rise to loss of productivity, late completion of project, increased project costs, abandonment and termination of contract etc. It helps in understanding time delays and disputes in construction contracts. It has results of survey conducted amongst 23 contractors, 19 consultants and 15 owners of huge

infrastructure projects. This survey explained causes of delays in large infra projects. Also the reports provides remedies and suggestions for avoiding the delays due to different reasons. The paper also provides deep understanding of causes of delay by categorizing them in 9 groups. The gap which I found in the report is they did not consider the factor of 'delay due to late in producing government clearances in India'. Addition of this factor will surely increase chances of complete reduction of delays in infrastructure projects.

B. Review 2 - Approval Process for Real Estate Projects

Federation of Indian Chambers of Commerce and Industry

This report talks mainly about the real estate sector in India. There are different approvals required for real estate project according to the states in India. The timeline requirements for these approvals is also different state wise. The paper gives a brief idea about the kinds of approvals required for real estate project in the states Maharashtra, Orissa, Gujarat, Tamil Nadu and Haryana. The paper provides comparison of major approvals required in different states according to their time requirements. They have also provided suggestion and recommendations in order to streamline the approval process. A deep understanding is provided on the challenges faced during the approval process in different states. State wise scenarios along with the suggestions to deal with those challenges are also given in the report.

C. Review 3 - Causes of Delays During Construction Phase of Road Projects due to The Failures of Contractor, Consultant, And Employer in Addis Ababa City Road Authority

Yosef Amare, Emer T. Quezon, Mamuye Busier

This study was a done through primary data collection where the set of question were asked to the various stakeholders and experts of the construction industry. Based on that primary data collection, researcher found 65 such factors which affect the timeline of the any construction project. All the factors were than ranked as per the Relative Important Index

(RII). Maximum number of stakeholders consider contractor responsible for delays, whereas the least responsible is the consultant in delay of the project. The researchers also recommend some changes or the step that can minimized the issue related to the delays.

D. Review 4 - Assessing the Factors Causing Project Completion Delays in the Construction Sector of Oman Using Sem-Pls

This research was done to analyze the factors causing delay in construction at Oman and to investigate the effect on the project due to such delay. Primary data collection method were used, where a set of questions were ask to the stakeholders, who were selected on random sampling method. The result show that the factors related to client, equipment and material related factors. The main factor that can reduce this delay significantly is the client related factor. Client cooperation can drive the other factors to timely completion of the project.

E. Review 5 - Causes and Effects of Construction Project Delays: A Local Case Study in Edirne City Centre

D. Aydin and Mihlayanlar

This research was done to identify and analyze the factors which are responsible for delays in the construction activities. This research show a relation between rates of increase in the selling price of house (Trakya region of Edirne City, Turkey) and the delays in construction activity. To find out the causes of delays and their corresponding effects on construction activity, a survey was conducted in the city center region. Participants of the survey were contractors, consultants & clients in city center area. The research used relative importance index for analysis after the survey. According to the research the top 3 causes of delays in Edirne region was delays in getting permits from the municipality, payment of debts and delays arising due to changes in legal regulations & difficulties in financing of the project. On the other side the main effects of these delays were bad reputation & loss of reliability, time overrun and cost overrun. It also explains the need of finding out the factors responsible for the delay so as to take proper precautions to prevent and mitigate the possibility of delays. In the case of province

Edirne the main reason for delay was poor time management on site. The research will help to mitigate and avoid the time and cost overruns in the construction project in Edirne with precautionary measures at early stages of project.

F. Review 6 - Causes and Mitigation Strategies of Delay in Power Construction Projects: Gaps between Owners and Contractors in Successful and Unsuccessful Projects

Edwin Thomas Banobi and Wooyong Jung

This research was done for Tanzanian construction projects. The paper mainly talks about power projects and the delays occurring during their construction. The aim of the research was to find out the causes of delays in construction and give strategies to mitigate them. The researchers did an investigation on 82 experts from the side of owner and 106 experts from the side of contractors to get check two different perspectives. The researchers used the methods of rank analysis and U-test for analysis. The paper put a 10% time extension boundary for differentiating the project as successful & unsuccessful. As per the suggestions from contractors the main reason for delays (unsuccessful projects) were changes in the scope of project, poor supervision by the owner, delays in different approvals, faulty planning and design strategies for the project. The owners suggested support from top management and in-time procurement of materials as the suitable mitigation strategies. This research is helpful in understanding the concerns of contractors as well as owner regarding the delays in construction of power projects.

G. Review 7 – A System Dynamics Model of Client Linked Delay in Construction of Building Projects in India.

Das Dilip Kumar

This study was conducted in the capital region of Odisha with case study of building projects. The objective of this research was to investigate and identify the client related factors which causes client relate uses delay. This was used to develop System Dynamics model to examine the different cases of delay under varied conditions. The methods used for the research were primary research and system dynamics

model. Casual loop diagrams were also used for representation of the linkage between different factors. The outcomes of the research suggests that owner delaying the progress of payments, poor decision making by client, change orders by client in between construction, delay in approval of revised designs are the major client related factors responsible for the delays in projects. The results of the System Dynamics model suggest that clear communication between different stakeholders and proper budgeting by the clients will help to rectify the delays.

H. Review 8 - A Methodology for Ranking of Causes of Delay for Residential Construction Projects in Indian Context

Megha Das, Dr. Rajiv Bhatt

The study works on identification of reasons of delay in residential construction projects in Indian context. The study was conducted in central region of Gujarat. The method of primary research was used. Total 59 causes in a total of 9 groups were identified. To rank these causes of delays two important techniques named Relative Important Index & Importance Index based on degree of severity and degree of frequency. This research bridges the gap in comparison with other literatures is that, this study gives discussion on general & common causes of delays.

RESEARCH METHODOLOGY

This paper derives the causes for delays and their mitigation measures from literature review of 10 papers of different authors. A survey was conducted with the help of a questionnaire related to the delays, its causes and mitigation strategies for the same. All the participants (120) in the survey were from the construction industry. Most of them are having work experience in the field of construction varying from 0 to 25 years. These are government employees, people working in private construction sector and the remaining are the students of infrastructure domain. Depending on their experience in the construction industry they responded to the questionnaires which were related to the delays in infrastructure projects. The survey was conducted with the help of Google forms, as in current pandemic situation approaching people in the industry

and discussing over the questionnaire was not possible.

The following approach is used for data analysis.

1. Relative Importance Index Technique:-

To determine the relative importance of the different causes of delays this method is used. The Relative Importance Index can be denoted by RII or R2. For deciding the ranking of various reasons of delays in different groups, RII method is used in this paper. The scale of 1 to 5 is provided in the questionnaire (1 being the most occurred/ observed cause of delay & 5 being the least occurred / observed cause of delay).

The formula for RII is as follows:-

$$RII = \frac{\sum \text{Weightage given to the reason by the respondents}}{(Y \times N)}$$

Where Y = Highest weightage (in this paper it is 5)

N = Total number of respondents

So as per the RII or R2 the reasons are ranked in each group of delay from 1 to 5 (1 being the most occurred/ observed / important cause of delay & 5 being the least occurred / observed / important cause of delay).

RESULTS AND ANALYSIS

Through the literatures reviewed in the paper we can say that, delays are categorized in 9 groups which contains project team, owner, consultant, contractor, material, equipment, design team, delay due to laborers and external reasons for delays.

The above categories are given below in brief with different reasons for delay:-

J. Delay from the side of project team

- 1) Duration of contract is short
- 2) Incomplete definition of project completion
- 3) Legal disputes between various parties of project
- 4) Variation in types of contracts (Turn-key, Construction).
- 5) Type of bidding and method to award contract.
- 6) Ineffectual penalties for delay

K. Delay from the side of owner

- 1) Owner delays in provide full site access to the contractor
- 2) Owner makes change orders in between construction work
- 3) Delay in giving approvals to the design drawings by owner
- 4) Disputes between joint ownerships of the project
- 5) Owner suspends the construction work
- 6) Poor decision making by the owner
- 7) Owner not following calendar for payments of work completed

L. Delay from the side of Consultants

- 1) Delayed inspections and testing required during construction
- 2) Consultants delaying the approvals required for major changes in the scope of work
- 3) Rigidity and inadaptability of consultant to the changes in project plan, scope etc.
- 4) Communication gap in between consultants and other teams of the project
- 5) Disputes between consultants and the design team of project
- 6) Consultant is unexperienced or less experienced for the work

M. Delays from the side of contractor

- 1) Problems in scheduling of work among sub-contractors
- 2) Need of repeated work due to faulty construction work
- 3) Disputes between contractor and owner/consultant
- 4) Low grade site management & supervision of work
- 5) Delay in work completion from the side of sub-contractors
- 6) Unexperienced and poorly qualified technical staff of contractor
- 7) Inappropriate construction method of contractor
- 8) Lack of communication and coordination between contractor with other parties
- 9) Improper planning & scheduling of work by contractor

N. Delay from the side of design team

- 1) Mistakes and inconsistencies in design documents
- 2) Inadequate and lack of clarity in design drawings of construction work
- 3) The project design being too complex
- 4) Design engineering being not clear about owner's requirements
- 5) Unexperienced design team
- 6) Inadequate preliminary survey and data collection before the start of design work
- 7) Delay in producing design documents
- 8) Less awareness about the advanced engineering design software

O. Delay from the side of material group

- 1) Shortage of materials of construction in the market
- 2) Sudden change of material type and specifications in between construction activity
- 3) Delayed delivery of construction material from supplier
- 4) Delay in procurement of construction materials
- 5) Delay in manufacturing of special building materials
- 6) Damage to the construction materials which are already sorted and are ready to use
- 7) Confusion in choosing the finishing materials because of available variety in materials

P. Delay due to equipment

- 1) Shortage of required construction equipment
- 2) Breaking down of equipment during construction activities
- 3) Unskilled equipment operators having less experience of the equipment handling
- 4) Inefficient and less productivity of the equipment
- 5) Lack of provision of high technology mechanical equipment

Q. Delay from the side of Labour group

- 1) Unqualified and unskilled workforce
- 2) Less number of labour available for construction activities on site

- 3) Problems arising due to nationality of workforce
- 4) Labors being less productive
- 5) Personal conflicts amongst the labors

R. Other Factors responsible for delay

- 1) Delay in obtaining permits from municipality
- 2) Sub-surface conditions causing the delays e.g. Soil, high water table
- 3) Effect of continuous rainfall on construction activity
- 4) Non-availability of basic utilities (water, electricity etc.) on site causes delays
- 5) Traffic control & restrictions due to safety on site causes delays
- 6) Any mishap or accident on construction site delaying the activities
- 7) Delay in final inspection by the third party and consultants
- 8) Unwanted interruption due to cultural and social factors
- 9) Hot summer weather effect on activities on site

During the review of different papers it is found that the delays due to government approvals was a common reason in may projects. So from the construction industry a timeline required for getting all the approvals for a residential project is given below in tabular form.

Findings through the Survey conducted are as follows:-

S. Variety in occupation of respondents

- Student of Infrastructure Domain – 40
- Worked in private construction sector – 30
- Government Employee in PWD & WRD – 18
- Contractor or Consultant – 16
- Worked in Public Infrastructure Sector – 14
- Property Valuation Firm – 2

T. The variation in the years of experience is as follows:-

- 0 to 5 years – 106
- 5 To 10 years – 6
- More than 15 years - 8

U. As per results of the survey, we can rank the different groups of delays as follows:-

After the calculations the following results were obtained.

Rank	Group of Delay	No of Votes
1	Delay due to slow approval process of different documents	98
2	Contractor Group	84
3	Delay Due to External Factors such as Labour Strike, force Majeure (Factors which are not in our control)	60
4	Client Group	52
5	Equipment Group	46
6	Consultant Group	40
7	Designer Group	32

V. The RII (Relative Importance Index) for the different groups of delays:-

After the calculations the following results were obtained.

Rank	Group of Delay	Relative Importance Index
1	Contractor Group	0.760
2	Owner Group	0.700
3	Equipment Group	0.604
4	Designer Group	0.600
5	External factors	0.582
6	Consultant Group	0.580

W. The RII for different reasons which causes delay from the side of Project Team are as follows:-

After the calculations the following results were obtained.

Rank	Group of Delay	Relative Importance Index
1	Legal disputes between various parties of project	0.716
2	Ineffectual penalties for delay	0.656
3	Incomplete definition of project completion	0.630
4	Variation in types of contracts (Turn-key, Construction).	0.616
5	Type of bidding and method to award contract.	0.530

X. The RII for different reasons which causes delay from the side of owners are as follows:-

Rank	Group of Delay	Relative Importance Index
1	Delay in giving approvals to the design drawings by owner	0.673
2	Owner makes change orders in between construction work	0.650
3	Poor decision making by the owner	0.640
4	Owner not following calendar for payments of work completed	0.630
5	Owner delays in provide full site access to the contractor	0.580

Y. The RII for different reasons which causes delay from the side of contractor are as follows:-

Rank	Group of Delay	Relative Importance Index
1	Lack of communication and coordination between contractors with other parties	0.740
2	Problems in scheduling of work among sub-contractors	0.710
3	Disputes between contractor and owner/consultant	0.660
4	Delay in work completion from the side of sub-contractors	0.620
5	Inappropriate construction method of contractor	0.560

Z. The RII for different reasons which causes delay from the side of Consultant are as follows:-

Rank	Group of Delay	Relative Importance Index
1	Rigidity and inadaptability of consultant to the changes in project plan, scope etc	0.690
2	Communication gap in between consultants and other teams of the project	0.630
3	Disputes between consultants and the design team of project	0.623
4	Consultants delaying the approvals required for major	0.603

	changes in the scope of work	
5	Delayed inspections and testing required during construction	0.590

AA. The RII for different reasons which causes delay from the side of Designer are as follows:-

Rank	Group of Delay	Relative Importance Index
1	Inadequate preliminary survey and data collection before the start of design work	0.650
2	Design team being not clear about owner's requirements	0.620
3	Mistakes and inconsistencies in design documents	0.616
4	The project design being too complex	0.596
5	Delay in producing design documents	0.556

BB. The RII for different reasons which causes delay from the side of Labour's are as follows:-

Rank	Group of Delay	Relative Importance Index
1	Less number of labour available for construction activities on site	0.766
2	Unqualified and unskilled workforce	0.716
3	Labours being less productive	0.703
4	Problems arising due to nationality of workforce	0.603
5	Personal conflicts amongst the labours	0.506

The RII for different reasons which causes delay from the side of Equipment are as follows:-

Rank	Reasons of delay	Relative Importance Index
1	Breaking down of equipment during construction activities	0.656
2	Unskilled equipment operators having less experience of the equipment handling	0.650
3	Shortage of required construction equipment	0.640
4	Inefficient and less productivity of the equipment	0.623
5	Lack of provision of high technology mechanical equipment	0.583

DISCUSSIONS

From the literature review a total of 72 reasons were found to be the cause of delays in construction projects. These reasons are divided in 9 groups as mentioned earlier. Each group contains minimum of 5 reasons observed on a regular basis. As per the results of the analysis by the use of RII (Relative importance index) the reasons for delays were ranked. The ranking specifies the importance or severity of a particular reason causing delay in the project completion. In most of the literatures considered in this study followed the method of primary research to find the reasons for the delays in a particular area or region of research. The participants in those study were mainly people from the construction domain. The sample for primary research varied from 50 to 130. In this study a sample size of 120 is taken. The participants were mainly contractors, public and private sector employees from construction industry, consultants, government employees and students of infrastructure management.

Each participant except very few have worked on a residential project. This research is mainly focused on delays in residential projects. Amongst the 8 literatures discussed in this study, 4 researches were from the studies conducted in India and other 4 explains the scenario in other foreign countries such as Turkey, Oman and Tanzania. These literature includes discussion in delays in real estate projects, roads & highway projects and power plant construction projects. Different methods for the analysis of data collected from primary survey were used. These methods includes RII (Relative Importance Index), Severity and Frequency Indices, U-test analysis etc. This study used the method of RII.

From the results of RII analysis of the reasons of delays we can conclude following things.

1. Delay in approval processes for different documents whether those are from government departments, consultants & design team is the main reason of delay in Indian scenario.
2. Each group of reasons of delay contributes in extension of project completion, but contractor group is the main reason of delay.
3. Legal disputes between various parties of project is main reason for the delays from

project team. A proper understanding and clear communication can resolve this part.

4. If the owner gives early approvals to designs, it can mitigate the delay.
 5. Inadequate preliminary survey and data collection before the start of design work is the most occurred reason for delay from the side of design group.
 6. In order to rectify delays from the labour group, up-skilling the labour force and having a sufficient amount of labour on site is helpful.
 7. Breaking down of equipment during construction activities is the main cause of delays from the side of equipment group.
- All these causes are considered as important because they are based upon practical experiences of people working in the construction industry.

CONCLUSIONS & RECOMMENDATIONS

The main factors which are responsible for the delays in construction project are related to the client and contractor group of a project. Also the delay due to government approvals is the most common factor in different parts of the world. So following are some recommendations for each one of the groups responsible for the delays.

Recommendations to mitigate or avoid the Delays:-

CC. To Fas track the process of producing approvals:-

- 1) Government should focus on reducing the number of clearances depending upon the type of project.
- 2) The time span required to get a particular approval can be reduced if the initial phase application for approval made online.
- 3) Policy of single window clearance should be followed to avoid the mismanagement amongst different departments of governments.
- 4) Strict action policy should be implemented against the corruption happening during the clearance process.
- 5) The system made for approvals should be well channelized to make it easy for investors to get approvals for a particular project.

DD. Recommendations for owner:-

- 1) Payment of the work to the contractor should be given on time
- 2) To avoid delays minimize change orders during construction
- 3) Timely approval of design documents and revision of the same.

EE. Recommendations for Contractor

- 1) Improve the productivity of laborers by motivating them for work
- 2) Provision of enough number of laborers for work
- 3) Contractor should manage his financial resources and cash flows according to the requirements of the project

- 4) In order to complete the project in specified time contractor should manage the site and supervision of site should be done accordingly.

FF. Recommendations for Consultant

- 1) Consultant should do the process of reviewing and checking design documents prior to the timings so that the delays can be avoided.
- 2) Consultant should be flexible while evaluating the contractor's work.
- 3) Consultant should maintain compromising between the cost and high quality of work

REFERENCES

1. Al Maktoumi, I. S., Khan, F. R., & Al Maktoumi, A. R. (2020). Assessing the Factors causing Project Completion Delays in the Construction Sector of Oman using SEM-PLS. *Al Maktoumi, IS, Khan, FR, Al Maktoumi, AR (2020). Assessing the Factors causing Project Completion Delays in the Construction Sector of Oman using SEM-PLS. Humanities & Social Sciences Reviews*, 8(3), 900-912.
2. Amare, Y., Quezon, E. T., & Busier, M. (2017). Causes of delays during construction phase of road projects due to the failures of contractor, consultant, and employer in Addis Ababa City Road Authority. *International Journal of Scientific & Engineering Research*, 8(3), 15-25.
3. Aydin, D., & Mihlayanlar, E. (2018, November). Causes and Effects of Construction Project Delays: A Local Case Study in Edirne City Centre. In *Proceedings of the 5th International Project and Construction Management Conference, Nicosia, Cyprus* (pp. 16-18).
4. Banobi, E. T., & Jung, W. (2019). Causes and mitigation strategies of delay in power construction projects: gaps between owners and contractors in successful and unsuccessful projects. *Sustainability*, 11(21), 5973.
5. (2006). Financing of the National Highway Development Programme. New Delhi: Government of India.
6. Industry, F. o. (n.d.). Approval Process for Real Estate Projects & Suggestions to Streamline the System . Federation of Indian Chambers of Commerce & Industry.
7. Mishra, P., Jimmy, L., Ogunmola, G. A., Phu, T. V., Jayanthiladevi, A., & Latchoumi, T. P. (2020, December). Hydroponics cultivation using real time iot measurement system. In *Journal of Physics: Conference Series* (Vol. 1712, No. 1, p. 012040). IOP Publishing.
8. Pai, S. K., & Bharath, J. R. (2013). Analysis of critical causes of delays in Indian infrastructure projects. *International Journal of Innovative Research and Development*, 2(3), 251-263.
9. Patil, S. K., Gupta, A. K., Desai, D. B., & Sajane, A. S. (2013). Causes of delay in Indian transportation infrastructure projects. *International Journal of Research in Engineering and Technology*, 2(11), 71-80.
10. Shubham, V. Y. A. S. (2013). Causes of delay in project construction in developing countries. *Indian Journal of Commerce & Management Studies ISSN*, 2240, 0310.

ANALYSIS OF FOREIGN DIRECT INVESTMENT IN INDIAN INFRASTRUCTURE**Ankush Khandelwal¹ and Chinmay Vyas²**

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ABSTRACT

Purpose- Infrastructure and Economic growth is not an onetime affair, The Sustainability of overall economic growth over the long term-requires a corresponding growth in the infrastructure of the country. This article tries to delve into-

1. *Policies that are related to infrastructure in India in terms of Foreign Direct Investment (FDI) equity inflow.*

2. *The impact of FDI in various sectors of infrastructure after investment like in Public Infrastructure, Road and Highways, Power, Telecommunication, Oil and gas, etc. Methodology/Approach- Comparative analysis of investment by Foreign players has to be done in various sectors by analysing procedures and identify future trends based on findings. The study involved an explanatory research based on past papers and Factor analysis was performed using SPSS a software used for determining difference on various parameters to determine difference in FDI equity inflow from past to present. This help to get to understand the impact of FDI on year on year basis which I already mentioned in the results. Findings- FDI received in construction and development sectors like (in road and highways, power, oil and gas, telecommunication, city development) from April 2000 to December 2019 stood at 1.82 lakh crore, "according to the Department for Promotion of Industry and Internal Trade (DPIIT)". As my research is to determine the impact of FDI in the construction sector of the country for that I get to know by doing null hypothesis that there is a significant difference of Foreign Direct Investment in the Indian Infrastructure mainly in Road and Highways sector. Practical Implication- Infrastructure is always considered to be the backbone of any country and for a fast growing economy like India there is a prime requirement of adequate quality of good infrastructural projects that not only fulfil the need of its citizen but also contribute towards nation's growth. As the majority of Infrastructure sector is still develop or maintain by the Indian Government like Railways, Highways etc. because of the incapability of planner, private players to cater such a huge demand and requirement of capital investment by this sector and also the strict policies stated by government hinders the participation of Private players in this sector. According to GOI India requires 50 trillion by 2022 in infrastructure to have sustainable development. Hence there is a need of FDI equity inflow for uplifting the Indian Infrastructure and inclusive growth of the economy*

Keywords- Roads and Highways, Telecommunications, Power

Introduction

In today's era of Liberalisation, Privatisation and Globalisation (LPG), as the world become smaller and countries are more interconnected with each other than they were in the past there is a great scope for increasing in trade and investment across countries. This trend is more established throughout in developing economies

like India with large native market and abundance of skilled manpower for making it one of the most preferred destination in the world. India jumped from 12th position to 9th position in 2019 amongst the world largest FDI recipient.

Share of top investing countries FDI equity inflows (Financial years)

Ranks	Country	2016-17 (April – March)	2017-18 (April – March)	2018-19 (April – March)	Cumulative Inflows (April, 00 - March, 19)	%age to total Inflows (in terms of US \$)
1.	MAURITIUS	105,587 (15,728)	102,492 (15,941)	57,139 (8,084)	738,156 (134,469)	32%
2.	SINGAPORE	58,376 (8,711)	78,542 (12,180)	112,362 (16,228)	505,946 (82,998)	20%
3.	JAPAN	31,588 (4,709)	10,516 (1,633)	20,556 (2,965)	173,332 (30,274)	7%
4.	NETHERLANDS	22,633 (3,367)	18,048 (2,800)	27,036 (3,870)	162,251 (27,352)	7%
5.	U.K.	9,953 (1,483)	5,473 (847)	9,352 (1,351)	140,370 (26,789)	6%
6.	U.S.A.	15,957 (2,379)	13,505 (2,095)	22,335 (3,139)	146,372 (25,556)	6%
7.	GERMANY	7,175 (1,069)	7,245 (1,124)	6,187 (886)	65,477 (11,708)	3%
8.	CYPRUS	4,050 (604)	2,680 (417)	2,134 (296)	51,544 (9,869)	2%
9.	UAE	4,539 (675)	6,767 (1,050)	6,356 (898)	39,310 (6,652)	2%
10.	FRANCE	4,112 (614)	3,297 (511)	2,890 (406)	36,825 (6,643)	2%
TOTAL FDI INFLOWS FROM ALL COUNTRIES *		291,696 (43,478)	288,889 (44,857)	309,867 (44,366)	2,378,886 (420,142)	-

Amount in Crores (US\$ million)

Source: https://dipp.gov.in/sites/default/files/FDI_Factsheet_27May2019.pdf Maintaining the Integrity of the Specifications

In Financial year 2018 India was among the top 20 nations in terms of FDI equity inflow According to the report published by United

Nations in 2019. The global FDI inflows for fiscal year 2018 was accounts for 1 trillion U.S. dollars, out of which about US \$500 billion were in developing countries in Asia.

The sectors which are the major receiver of FDI are-

Ranks	Sector	2016-17 (April – March)	2017-18 (April – March)	2018-19 (April, 18– March, 19)	Cumulative Inflows (April, 00 - March, 19)	% age to total Inflows (In terms of US\$)
1.	SERVICES SECTOR **	58,214 (8,684)	43,249 (6,709)	63,909 (9,158)	416,301 (74,149)	18%
2.	COMPUTER SOFTWARE & HARDWARE	24,605 (3,652)	39,670 (6,153)	45,297 (6,415)	221,756 (37,238)	9%
3.	TELECOMMUNICATIONS	37,435 (5,564)	39,748 (6,212)	18,337 (2,668)	188,249 (32,826)	8%
4.	CONSTRUCTION DEVELOPMENT: Townships, housing, built-up infrastructure and construction- development projects	703 (105)	3,472 (540)	1,503 (213)	119,614 (25,046)	6%
5.	TRADING	15,721 (2,338)	28,078 (4,348)	30,963 (4,462)	143,599 (23,021)	5%
6.	AUTOMOBILE INDUSTRY	10,824 (1,609)	13,461 (2,090)	18,309 (2,623)	123,989 (21,387)	5%
7.	CHEMICALS (OTHER THAN FERTILIZERS)	9,397 (1,393)	8,425 (1,308)	13,685 (1,981)	91,062 (16,582)	4%
8.	DRUGS & PHARMACEUTICALS	5,723 (857)	6,502 (1,010)	1,842 (266)	84,165 (15,983)	4%
9.	CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES	12,478 (1,861)	17,571 (2,730)	15,927 (2,258)	93,873 (14,805)	4%
10.	POWER	7,473 (1,113)	10,473 (1,621)	7,330 (1,106)	77,889 (14,316)	3%

Amount in Crores (US\$ million)

Service Sector includes Financial, Insurance, Non-financial/ Business, Banking, R&D,

Outsourcing, Tech, Courier, testing and analysis.

India the largest democracy, 7th largest nation in terms of area, 2nd largest in population and 5th largest economy in terms of PPP (Purchasing power parity). With consistent growth in economy and largest pool of youngest manpower in the world became the most favourable destination in the world for Foreign Direct Investment. The major reforms taken by Indian government since 1991 by making norms more simpler and effective for an individual to do business and later on opening channels for foreign investors and provide business friendly environment "Amendment of various act like Intellectual property Rights (IPR) Foreign Exchange Management Act (FEMA), Enactment of Competition Act", became prominent factors for making country a most attractive destination for national as well as International Investors.

The last two decades have shown the noteworthy growth in investment made by Foreign equity investors across various sectors in the country. The FDI inflow in infrastructure sector increased by 16.14% in FY-19 as compared to that in FY-18.

"According to Department for Promotion for Industry and Internal trade (DPIIT)", Foreign Direct Investment (FDI) received by Construction and development sectors like power, telecommunication, rail, road, highway etc. from April 2000 to December 2019 stood at US \$25.37 billion "According to UNCTAD", India was among the top 10 recipient of FDI in 2019, driving the FDI growth in South Asian countries. And a number of measures have been taken in the last two decades majorly after the implementation of LPG to boost Public Private Partnership and other models in various sectors like power, oil and gas, telecommunication, Road, Highways & Bridges.

"According to Reserve Bank of India", Infrastructure covers the following: Railways, Airports, Highways and Expressways, Industrial parks, Urban Infrastructure (like roads, sewage, water pipeline. Hospitals, sanitation), Mining Storage and Refining, Cold Storage/Stockyards for storing food grains, meat, Steel, minerals, Tele-Communication, Oil and Gas, Ports, Power etc.

LITERATURE REVIEW

Traditionally the infrastructural practices in developing countries like India are exclusively taken care by the different Government bodies either central or State Government formulated for different works like Telecommunication related work is taken care by Department of Telecommunication, Roads and Highways work are taken care by National Highway Authority of India under Ministry of Road, Transport and Highways (MORTH), Power sector is taken care Ministry of Power which are also responsible for investment and service delivery. Before 1990 when LPG was introduced in India there were no provision for private players participation in developing infrastructure of the country because of the high cost and risk associated with the infrastructure projects, the government of India was reluctant that time and hence keep all activities in its hands. However, the services provided by Government owned enterprise were inefficient and sometimes incurs due to lack of technical expertise in this sector where a private player has an upper hand. But, Since mid 1980's the government across the globe have include the private sector enterprise in construction processes and financial services, encouraged by the International organisations like International Monetary fund (IMF) and World Bank. As per (Parker and Kirkpatrick 2004). Privatization has been the major ingredient of economic reform program which is already followed by several developed countries over the last two decades. It was thought to promote more efficient operations, improve and deliver services to large number of people and reduce financial burden on the government by increasing participation of private enterprise and by Foreign Direct Investment. Early privatization as a whole were concentrated in the manufacturing sector but, in after over the years, it has become increasingly involved in the financing and delivery of infrastructure services.

Akinchan Buddhodev Sinha , The scenario of FDI in infrastructure India, The paper investigates the various factors which influence the investment in infrastructure of any country who refers various page and articles to give a broad outlook about the importance of FDI in any country, He consider mainly three sectors Power, Road and Highways, and

telecommunication which plays a important role in providing boost to economy of the particular country especially developing country.

Rudra Prakash Pradhan, ICFAI Journal of Financial Economics, June 2008, Vol.6 Issue The paper talks about the various factors which are important for FDI equity inflow within the country with respect to infrastructure. He covers all such factors from 1970 to 2004 in his research paper, which represented the stagnant inflow in infrastructure despite it shows the positive impact on the trade openness of the country. The paper suggest that for making our economic policy most effective the government has to reform the FDI policy.

The research paper by Riken Mehta "The Role of FDI in Indian Growth and Infrastructural Development 2012" investigates about the changes which India gone under since Liberalisation 1991 by comparing the country's performance by other countries and emerging economies of South Asia . Which shows positive impact on Indian Infrastructure, He did his study on Power, Telecommunication, Road and Highways, Railways, Ports also consider history, reforms and 5 year plans to come up to the conclusion.

"John H. Dunning one of the main advocates of FDI in country's development. He put how FDI equity inflow have a significant and positive impact on Country's economy by his research in 1979 , at a conference on "Multinational Enterprises from Developing Countries". The same concept he use in his later publications in 1980's and 1990's, where is published his book with Rajneesh Narula on "Foreign Direct Investment and Government". In his book there was an article written by Nagesh Kumar named "India: Industrialisation, Liberalisation and Inward and Outward Foreign Direct Investment" put theory given by Dunning that how FDI will be contribute in India's growth and benefitted by the same. He also talks about how Liberalisation removes the barrier for Foreign players to invest in the country and provide internationalisation advantages of foreign investor to the country".(Kumar 1998)

OBJECTIVES

1. GET TO KNOW THE FOREIGN DIRECT INVESTMENT IN VARIOUS SECTORS.
2. FDI scenarios in Key Infrastructure sub sectors i.e. Roads and Highways, Telecommunication and Public Infrastructure.
3. How the particular sector be impacted by Foreign investment and to understand the impact of FDI in sectors before or after equity inflows.
4. To understand why equity inflows from Foreign players are important for any country.
5. And how a particular company can be benefitted by FDI inflow in infrastructure.

METHODOLOGY

One factor model test (F-test Anova) – This test is used to establish that whether there is significant or insignificant difference after FDI equity inflow in infrastructure sector viz. Highways, Railways, Telecommunication etc.

What is Anova ?

ANOVA a part of analytics software SPSS uses the F-test to determine whether the variability between group means is larger than the variability of the observations within the groups. If that ratio is sufficiently large, we can conclude that not all the means are equal.

LIMITATIONS

The entire research is completely based on past published research papers and data available on Government websites.

FOREIGN DIRECT INVESTMENT IN VARIOUS SECTORS

The major infrastructure projects demand huge amount of capital nvestment. The policies designed by Government of India paid huge emphasis on the investment by domestic as well as Foreign players under various programs like BOT (Built operate transfer), BOOT (Built own operate transfer) . The country being one of the most attractive destination after China in BRICS nation received a FDI of US \$25.37 in FY 19 which is up by 16% as compared to FY18 shows the positive attitude of Foreign investors about Indian economy and projects. For enhancing the FDI inflow in Infrastructure sector the government has come up with several

policy reforms and new rules and regulation to boost the investment in this sector. For instance it now allows 100% FDI for broad range of sectors and continuously engaging in simplifying the approval process for the remaining sectors like by establishing many agencies who look into this matter and ease the process within few weeks.

For doing the I select few subsectors on the basis of Foreign equity inflow they received in past 20 years for detailed analysis on various parameters and running out F-test Anova for finding their relevance with the FDI/ significant of insignificant change after FDI equity inflow. For this analysis I took three sub sectors viz Road and Highways, telecommunication, Power. However, it doesn't means the other sector like, Railways, Airports, Ports, Refineries Public Infrastructure etc. are less important, they have more or less equal significance on the entire sector as every thing is interconnected with each other but the three which are mentioned above pave the way of development for the country and the later one falls afterwards.

A. Telecommunication

India is currently the world's second largest telecommunication market with a total of 1.20 bn subscribers, the gross revenue from this sector stood at US \$17.39 billion in FY20 (April-September2019). The telecommunication registered a fastest growth in the past decade due to rapid increase in the availability, use of mobile phones and internet. India currently stands at second position after China in terms of number of internet users in the world. The government plays a pivotal role here by enabling telecom company with easy market access at affordable rate with fair proactive regulatory framework which ensures transparency and provide services to consumers at an affordable rates.

This sector possesses tremendous opportunities of employment for the youth of our country. Currently there are 687.62 million internet subscriber in the country which is expected to reach 829 million by 2021, which surge a massive growth of 45.74% during FY06-19 and become 636.73 million users.

The increasing number of internet users and mobile phone in the country is a fair sign of

India moving towards digitisation. Indians are more relying on internet based payments by using wallet service or UPI, education, official work and entertainment all goes digital. As per Department of Telecommunication (DOT) India's internet consumption raised by 13% during COVID19 lockdown, all activities goes completely online. Which is also the clear shows the importance of wireless network in country's development.

The rise in mobile phone penetration internet users and decline in data cost will add more than 500 million internet users and create opportunities for new businesses in over next 5 years. That's why telecommunication is considered as one of the most important part in nation building.

As Telecom sector requires high capital investments for developing the infrastructure which provides seamless services across nook and corner of the country, there is a requirement of various policy reforms which country's telecom sector has witnessed through considerable policy reforms and has gone into major transformational reforms in the last decade. Like NTP 1994, which re-emphasized to NTP 1999 and NIP 2012. This sector registered a substantial growth in the last few years and on the basis of current trends where India is moving towards digitalisation, the wireless network, internet in all telecommunication will plays a major role.

Till the 2012 FDI in telecommunication sector stood at 57,474.93 crore from 2000-2012 in which Mauritius was the leading investor with a total share of 69.63% followed by Singapore, Russia, Japan, USA. After that the investment in this sector increased substantially due to various Government policies like- 100% FDI allowance in Telecommunication sector of this upto 49% is allowed under direct / automatic route and 49% through government route.

To reduce the financial burden from telecom service provider, 100 % FDI approval will act as a boon and is the major idea behind raising of FDI limit.

Even this year in 2020 amid COVID-19 pandemic various private equity firms like Mubadala Investment Company, General Atlantic, Silver lake, Vista Equity partners, L Catterton, TPG, KKR, Abu Dhabi Investment

authority and social media giant like Facebook made huge investment of ₹1.15 trillion rupees in Reliance Jio an Indian Telecom service provider. Which shows the strong potential for growth of Indian telecommunication sector even during these times.

Telecom sector plays a pivotal role especially in the developing country because provide immense employment opportunity and help in transportation by managing fleet operations and in health care sector. That's telecommunication sector is considered as one of the most important part of Indian Infrastructure, and easing regulatory framework by government open door for the investors in this sector.

Investment in Telecommunication Sector in last three years

Years	Amount in Rs. Crore (Y1)
2017-18	33,536
2018-19	15,669
2019-20	26,495

Note: *The net equity inflow is derived by taking out the difference between figure provided for each year, i.e. figures within bracket and without brackets.*

*Source Diip.gov.in

B. Roads and Highways

India has second largest road network in the world with measure of 58,97,671 km that provide immense opportunity for Foreign Direct Investment. Various incentives are also provided by government to lure as much as FDI in this sector. Roads and Highways are like arteries and veins for any country and plays a very important role in the development. As India is one of the most favourable FDI destination in the world because of provided opportunity here, the government open upto a 100% FDI under automatic route for the Foreign players to invest in construction and maintenance of road , Highway, Bridges, tunnels, toll roads become a part of conclusive development by grasping the opportunities provided by India as a Global market.

FDI received in construction activity (Including Roads and Highways) from April 2000 to March 2019 stood at US \$ 42.5 billion which accounts for 9.05% of the total FDI equity inflow in the country in given time

period. This data released by a government body under "Ministry of Commerce named DIPP (Department of Industrial Policy and Promotion) which is also responsible for framing of FDI policy for the country."

For leveraging the given opportunity provided by government of increasing an investment by upto 100% in the given sector the Foreign investors forms a consortium with the local indigenous Private enterprise to take part in the development of Road and Highways project.

In addition to the various policy benefits, the government also come up with the various incentives to promote private and foreign player participation. These will compromise-

1. Project feasibility Study cost should be borne by Government.

2. Subsidy upto 40% of the project cost, to make project viable to invest.

3. Duty free import of high capacity machines and modern machines used in the construction of highways, roads, tunnels, bridges.

4. Shifting of utilities , Environmental clearances.

5. Declaration of road sector as an industry under Ministry of Road, Transport and Highways.

6. Less restriction on rules related to external commercial borrowing.

7. Right to retain toll and 100% tax exemption in any consecutive 10 years out of 20 years after commissioning of the project.

Investment in Road and Highway Sector in last three years

Years	Amount in Rs. Crore (Y2)
2017-18	14,841
2018-19	13,669
2019-20	12,468

*Source Diip.gov.in

Note: *The net equity inflow is derived by taking out the difference between figure provided for each year, i.e. figures within bracket and without brackets.*

(Please refer Exhibit 1 for the data) differentiate among departments of the same organization).

C. Power

For the welfare of nation and its economic growth Power is one of the most component of infrastructure. Therefore it is required to have adequate infrastructure for sustainable growth in this sector. India has 5th largest power generation capacity. Power sector is one of the most diversified sector because of the availability of the various sources for power generation as power is generated by conventional sources like natural gas, coal, lignite, oil, nuclear power and hydro, and non conventional sources like solar, wind, biomass, waste. The demand of electricity is rising due to increase in population and most importantly due to rise in industrial activities.

Out of various available sources which India have, for generating power. Power generation by thermal power plants accounts for around 2/3rd of the total power generate in the country it mainly comprises fossil fuel (like coal, liquefied fuel and gas).

The total reserves in the country for all the major thermal power sources are mentioned below.

Coal (Mineable)	59 BT
Oil	775 MMT
Natural Gas	1074 Bm ³

Apart from thermal the other sources which also use to generate power are solar, hydro, wind biomass, Nuclear, industrial waste etc. The total power that is generated currently the major chunk of 62.8% is generated by thermal which includes coal 54.2%, Lignite 1.7%, Gas 6.7%, Diesel 0.1%, Nuclear accounts for 1.9%, Hydro 12.4%, and other by renewables (like biomass, solar, urban and industrial waste wind energy) 23.6%. as per Ministry of Power. The total of 229.40 GW of power/energy is generated by using fossil fuel majorly coal as of October 2019 which is expected to reach 330-440 GW by 2040, as per data provided by Ministry of Power.

In the field of Nuclear Energy, Thorium the one of the important nuclear fuel is also present in abundance which also concrete India's position in energy generation by Nuclear power plants. As per Ministry of Atomic Energy, the total power generation by using nuclear fuel was stands at 13,543 million units. The

government also planned to increase the current installed capacity to 63GW by 2032.

In the Hydro power generation sector the country has an untapped potential of 1,50,000 MW out of which only 25% is being utilized. Like wise renewables such as solar, biomass, wind too have higher potential for generation and reduce dependency on fossil fuels. The Government set a target of achieving a generation capacity of 175 GW by renewable energy by 2022 which is to be segregated as 100 GW by solar and the rest 75 GW by wind. For achieving the same the government is coming with new policies like rent roofing under 'rent a roof' program for achieving the target of generating 40 gigawatts (GW) by 2022 by roof top solar panels.

Wind energy is became the fastest growing energy producing sector in India by renewable Sources and as a result of India has world's 4th largest Wind energy installations. As per data released by Ministry of Renewable Energy (MNRE) in 2019. Out of total installed Renewable energy infrastructure the wind energy/ winds mills accounts for about 70% of the installed renewable energy generation with a total deployment of 13,000 MW.

The government came up with various initiatives for improving the efficiency of current power sector like-

1. Increase the existing power generation capacity by renewables to 500 MW by 2030.

2. UDAY scheme (UjwalDiscoms Assurance Yojana) launched by government of India for debt laden Distribution Companies for improving financial and operational efficiency and also helps in the reduction of Aggregate, Commercial and Technical losses (AT&C) losses.

3. The Indian government approved a national policy on biofuel for power generation which leads to cleaner environment, employment generation, reduce dependency on imports and boost infrastructural investment in rural areas.

Apart from the various initiative taken by Government the approval of 100% FDI under automatic route for Generation, Transmission and Distribution of energy produced by solar, Wind, Biomass, coal / lignite based thermal, natural, oil and other fossil fuel will act as a boon to the power and sector and will also give

a swift push towards achieving efficiency In operation.

“According to Department of Industrial policy and promotions” which design the country’s FDI policy and also a part of Ministry of Commerce and Industry. The sector attracts a FDI of worth US \$14.5 b between April 2000 and December 2019 accounting for 3 % of total FDI Inflows in India.

Investment in Power sector in last three Financial year

Years	Amount in Rs. Crore (Y3)
2017-18	8,852
2018-19	6,224
2019-20	1,510

Note: The net equity inflow is derived by taking out the difference between figure provided for each year, i.e. figures within bracket and without brackets.

*Source Diip.gov.in

(Please refer Exhibit 1 for the data)

a.) *Government Initiatives*

The scheme which is launched by Union Ministry of New and Renewable Energy with an objective to attain, assist and encourage new and young entrepreneurs to look into power generation by renewable energy sources as an opportunity and manufacture product based on renewable energy like solar panels, battery for storage with in the country to reduce the dependency on other nations for imports and to take leverage of the situation provided, beside providing after sales service and maintenance. And also for encouraging power firms the government helps them inn setting up their unit in Special Economic Zone (SEZ) and also exempted them from Net foreign Exchange. There is also a no need of requiring license for setting up of new power plants.

ANALYSIS

For finding out, the significant or insignificant difference after FDI equity inflow in the country, I use Null hypothesis and Alternate Hypothesis which states that-

a) *Null Hypothesis (H0): There is no significant difference of Foreign Direct Investment in Telecommunication, Power , Road and Highways sector.*

b) *Alternative Hypothesis (H1): There is a significant difference of Foreign Direct*

Investment in Telecommunication, Power , Road and Highways sector.

(Please refer Exhibit 1 for the data)

Year / Sector	Telecommunication (Y1)	Power (Y2)	(Roads and Highways) (Y3)
2017-18	33,536	8,852	14,841
2018-19	15,669	6,224	13,669
2019-20	26,495	1,510	12,468
Total	75,700	16,586	40,978
Mean	X1= 25,233	X2= 5,528	X3 = 13,659

$$\text{Grand Mean} = (25,223 + 5,528 + 13,659)/3 = 14,806$$

Variation Between Samples

(X1-Grand Mean) ²	(X2- Grand Mean) ²	(X3- Grand Mean) ²
10,85,13,889	13,15,609	8,60,81,284
10,85,13,889	13,15,609	8,60,81,284
10,85,13,889	13,15,609	8,60,81,284
32,55,41,667	39,46,827	25,82,43,852

$$\text{Sum of Squares between samples} = 32,55,41,667 + 39,46,827 + 25,82,43,852 = 58,77,32,346$$

Variation within Samples

Y1	(Y1-X1) ²	Y2	(Y2-X2) ²	Y3	(Y3-X3) ²
33,536	6,89,39,809	8,852	1,10,48,976	14,841	13,97,124
15,669	9,12,78,916	6,224	4,84,416	13,669	100
26,495	15,92,644	1,510	1,61,44,324	12,468	14,18,481
	16,18,11,369		2,76,77,716		28,15,705

$$\text{Sum of Squares within Samples} = 16,18,11,369 + 2,76,77,716 + 28,15,705 = 19,23,01,975$$

ANOVA table

Variation Source	Sum of Squares	V	Squares of Mean
Sum of square between sample	58,77,32,346	2	29,38,66,173
Sum of Square within sample	19,23,01,975	6	3,20,50,329
Total.		8.	

F Test statistics: $F = \frac{\text{Variance}}{\text{Unexplained Variance}}$

Therefore, $F\text{-value} = \frac{29,38,66,173}{3,20,50,329} = 9.16$

For $v_1=2$, $v_2=6$ and for $\alpha = 0.05$, the table value of F is $F_{0.05} = 5.14$

Since the value which is calculated from F-test 9.16 is more than from what is ascertained for $F_{0.05}$ i.e. 5.14, hence from the above observation we can say that there is a significant difference of Foreign Direct Investment in Power, Telecommunication and Road and Highways sector. So, we reject our null hypothesis which says that there is no significant difference.

By performing the ANOVA F-test on the data of FDI equity inflow I get to know the variability between the mean calculated is large, which means all means of the FDI equity calculated for each year is not equal and gradually the gap widens year on year basis so

we can conclude that there is a significant impact of FDI equity inflow on the country's Infrastructure.

CONCLUSION

Infrastructure plays a major role in the development of the country and also shaping in economy as every thing are interconnected with each other, and for sustainable growth there should be the requirement of funds whether has been invested by Local investors or Foreign investor. India, still is under developing phase even after 63 years of independence that shows the slow growth of the country and despite of being one of the most attracted destination for Foreign Direct Investment, the country requires massive reforms in this sector for leveraging the state we are in. The journey is long ahead but it all depends on the step taken today by the governing bodies in achieving all set targets positively, for better future for the country and its citizen.

COUNTRY-WISE FOREIGN DIRECT INVESTMENT EQUITY INFLOWS IN INDIA FROM APRIL 2000 TO MARCH 2020

S.No	Country	2000-20
1.	Mauritius	795,941.10
2.	Singapore	609,561.54
3.	Netherland	208,321.91
4.	Japan	196,105.07
5.	U.S.A	176,222.24

REFERENCES

- Mehta, R. (2012). The role of FDI in Indian growth and infrastructure development (Doctoral dissertation).
- Sinha, A. B. (2010). The Scenario of FDI in Infrastructure of India".
- Sinha, A. B. (2010). The Scenario of FDI in Infrastructure of India".
- Konwar, N., & Chakraborty, S. (2013). Higher education scenario of the North-Eastern India. Indian Journal of Research, 2(3).
- Sinha, A. B. (2010). The Scenario of FDI in Infrastructure of India".
- Montgomery, E. (2008). Infrastructure in India: A vast land of construction opportunity. PricewaterhouseCoopers.
- Phuyal, M. Legal Analysis of Build Operate and Transfer (BOT) Projects in Indian Public Infrastructure.
- "India redefining its growth path, KPMG"(2018)
- <https://assets.kpmg/content/dam/kpmg/in/pdf/2019/08/india-redefining-growth.pdf>, accessed on 21st June.
- Bayar, Y., & Gavriletea, M. D. (2018). Foreign direct investment inflows and

- financial development in Central and Eastern European Union countries: A panel cointegration and causality. *International Journal of Financial Studies*, 6(2), 55.
11. Department of Industrial policy and promotion
<https://dipp.gov.in/publications/fdi-statistics>
Accessed on 21st June.a
 12. “Roads and Highways”,
<https://www.investindia.gov.in/sector/roads-highways> accessed on 23rd June.
 13. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. *International Journal of Innovative Technology and Creative Engineering* (ISSN: 2045
 14. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.
 15. Gautam, A. K., Chauhan, R. K., Pandey, J. P., & Verma, K. S. A Survey on Solar Power for Present and Future Perspective in Indian Market. In *Renewable Power for Sustainable Growth: Proceedings of International Conference on Renewal Power (ICRP 2020)* (p. 119). Springer Nature.
 16. “Power”
<https://www.investindia.gov.in/sector/thermal-power> ,Accessed on 23rd June.
 17. Industry, C. (1984). *Industry report. Quick Frozen Foods*, 63-71.

CONSUMPTION OF ENTERTAINMENT ON OTT PLATFORMS OF MILLENNIAL IN INDIA DURING COVID-19 PANDEMIC

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ABSTRACT

Consumption of media has changed drastically over the past few years in India, specifically the way people, mainly millennial have started watching movies and TV series has seen a major shift. Multiple factors such as availability of internet, mobile applications of OTT platforms and the ease of access have resulted in the younger generation consuming more of such products. The recent COVID-19 outbreak has forced many countries into lockdowns where people were restricted to their homes. The free time at their disposal increased multiple folds and the consumers started looking up to the OTT platforms for entertainment as that was the only major source for with all the outdoor recreational activities closed. Consumers, majorly millennial started consuming more and more of the online content which they wouldn't have probably consumed had the lockdown hadn't been imposed. The demand for such content has risen exponentially over the past couple of months. "Binge watching" an already existing trend is further emphasised during this period. This case study mainly focuses on how the consumption has changed during this pandemic. Will the shift in consumption be long-lasting or will it go back to what it was a couple of months back? How do the OTT service providers keep up with this sudden rise in demand and what strategy will they be implementing? How does this scenario impact the businesses such as movie theatres in the future?

Keywords—OTT, millennial, pandemic, entertainment

Introduction

Introduction of Over-The-Top (OTT) platforms and the ease of access to such platforms have massively impacted the way people entertain themselves. Right from the launch of the first ever OTT platform in India in 2008, BIGFlix by Reliance, this channel of consuming entertainment has gained massive traction. OTT platforms are now the major source of entertainment for any age group. Access to internet and availability of multiple options to choose from have been the major contributors for the rise in consumption of media in such platforms. There are presently more than 21 OTT platforms in India alone with each having its own original content along with number of movies for which the rights are to be bought beforehand in order to air them. Along with these, there is also a drastic rise in the number of podcast platforms in India. There are currently 10 players who majorly provide audio services. According to AIB Research, the OTT video market across the world will continue to grow at a brisk pace and with a surge compound annual growth rate (CAGR) of 10 percent through 2022, the OTT market will generate a massive \$51.4 billion.

Consumption of media has changed drastically over the past few years in India, specifically the way people, mainly millennial have started

watching movies and TV series has seen a major shift. Multiple factors such as availability of internet, mobile applications of OTT platforms and the ease of access have resulted in the younger generation consuming more of such products. The old methods to watch a movie such as in the cable television or in the theatres are slowly fading. Millennial, who are known for their desire of quick and fast results, do not like the idea of sitting through ad commercials or sit at a particular place in order to watch an entire movie. They would like to have everything under their control. They would want to watch whatever they want at their convenience and their comfort.[1] This mind set which the majority of the millennial possess has been a major drive force for the rise in the number of OTT platforms and their success. Around 55 percent of the millennial prefer OTT platforms over DTH services and out of which 90 percent of them have paid for the premium services.

Literature Review

The revenue for the global OTT monitoring and compliance market is expected to increase from \$62.0 million in 2018 to \$149.7 million in 2024, at a compound annual growth rate (CAGR) of 15.8 percent over the forecast period. Over the top (OTT) monitoring and compliance (M&C) solutions often overlap

with complementary software solutions, such as quality of experience (QoE) and quality of service (QoS) measurements for the distribution of video over streaming services. Most OTT monitoring and compliance vendors have proprietary software and use a combination of servers, network routing, and intelligent software to notify streaming services about the quality issues in real-time.

Binge-watching which is an even-popular trend among the millennial and Gen-Z has taken centre-stage. With Covid-19 in the picture, the OTT platforms have witnessed a massive boost in terms of increased viewership, new subscribers and newer audiences are flocking towards on-the-go content, much differently, be it music, video and podcast consumption.

With high bandwidth internet, low mobile data tariffs and access to the best smartphones and upcoming technologies, the urge to consume content on-the-go is growing faster than most content creators can keep up with[1]. This has opened up an ever-rising opportunity for over-the-top (OTT) streaming players in India for both B2B and B2C segments.

Between March and November 2019, around 30 Mn internet users came online for the first time from rural areas. This is in addition to around 71 Mn users (out of total 504 Mn internet users) in the age bracket of five to 11 years using internet services on devices owned by family members.

This is a whole new segment for OTT players to target as well. The available untapped market is too big for a few players to capture, which explains the high density of start-ups and companies in the OTT space. The addressable base for these platforms is still largely untapped and even new users are trying new platforms to test the waters through discounted plans and free trials.

Today, the consumers are spoilt for choice as OTT and music streaming platforms are providing seamless access to on-the-go content consumption, along with the personalized experiences targeting the right mix of audience based on their streaming habits and profile. This, in a way, has created a stickiness among the users, wanting for more.

Each OTT player in the Indian market is finding its own niche and struggling with its own challenges. International players like Netflix, Amazon Prime, MUBI, SonyLIV, Apple TV+ and others are trying to balance pricing with their content library, whereas the likes of MX Player, Airtel Xstream, YuppTV, JioTV, ZEE5, Voot, Disney+ Hotstar, JioCinema, Sun NXT, ShemarooMe, Hungama, Hoichoi and others are fighting it out over regional language content and Indian originals.

Consumers are demanding and wanting a personalized video viewing experience with a large variety of content available to them on their devices to be viewed in their own convenient time. The video streaming services have revolutionized to cater to these needs of the viewers. The videos that are watched online could be in any of the different format or basically a revenue model. The OTT SVOD market is expected to increase due to growth in GDP per-capita, increase in number of smartphone users, worldwide internet penetration, etc. Yet the market faces some challenges such as, content piracy, censorship, low internet speed, etc. With technological innovations like block chain, 5G services, and local CDN networks these challenges will no more remain like challenges.

Amidst the nationwide lockdown, OTT platforms are striving to meet the growing entertainment appetite of viewers. According to a recent survey by mobile marketing platform InMobi, 46% viewers are watching more content online.[2] Another consumer survey conducted by Hammerkopf has found that OTT consumption primetime has moved to 7 pm onwards, as opposed to 10 pm-12 am before.

To cater to this increase in demand, platforms such as Amazon Prime Video and Zee5 have made a few of their shows free to watch. Under its #BeCalmBeEntertained initiative, Zee5 is offering premium content including movies and the first episode of some of its original series for free.

Amazon Prime Video, meanwhile, has made some of the kids' content on its platform free in India. Viacom18's Voot Select, the latest entrant in the SVoD space, has reported a spike in subscriber numbers.

Viewers are consuming content across genres, thrillers, young romance and urban drama are some of the top-performing genres on the platform. The viewership for movies especially has gone up across the platforms. Cinema streaming service MUBI has seen a 28% rise in viewership on its platform in March, as compared to February.

Experts say that maintaining the streaming quality could be a major challenge for these players. Earlier in March, the Cellular Operators' Association of India asked OTT platforms to reduce the quality of video to reduce the strain on the cellular network infrastructure. However, the current surge in viewership could translate to more subscribers for these players in the long run.

Hotstar, the top OTT player in India with 300 million monthly active users as of July last year, according to RedSeer, will now have to counter the setback caused by the cancellation of the Indian Premier League 2020, which brought huge traction on its platform.

According to the Boston Consulting Group (BCG) and CII report, the average digital video consumption in India witnessed a 2X growth in the last two years. The report also mentioned that on average time spent in video consumption by Indians increased from 11 minutes to 24 minutes per day (as of November 2019).

The time spent on OTT streaming has increased significantly, where the content consumption across most platforms, including OTT, podcast, gaming has witnessed an average increase of 30-60% since early March.

A lot of OTT players are shifting their focus towards localisation of their platforms, to be able to connect with the Indian users, be it in terms of regional languages, geography and user experience etc[3]. Predominantly, most OTT video streaming players are looking at Hindi, Tamil, Telugu, Marathi and Bengali as the most-preferred languages.

DataLabs by Inc42+ revealed that except for the seven core regional content providers, including ALTBalaji, Sun NXT and Ullu and others, 21 other OTT players have English as a core content focus.

As social distancing and work-from-home continue to prevail, the shows watched on the OTT platforms have turned into conversation starters across the country, and globally. Also, many movies are now being released on OTT platforms and are creating a lot of buzz on social media platforms. According to industry experts, this trend is going to stay as the fear of pandemic continues to keep people away from the theatres and cinema halls[4].

According to KalaGato, OTT platforms are experiencing a surge in demand that's never seen before. Streaming platforms are taking the complete advantage of the situation and coming up with newer content strategies and shows to keep users hooked onto the platform. For example, Eros Now reported close to 80% growth in data consumption and it is up by 200% on subscriptions in just a couple of weeks.

The OTT landscape looks promising with a lot of players, both local as well as international companies trying to come up with innovative ways to attract new users and retain existing users on the platform, and are creating an immersive experience with the integration of AR/VR technology; new business models;[5] new content strategy, where influencers are turning into OTT content creators and more.

Research Methodology

The approach for the article is majorly through secondary research. Journals, Research Papers, News Articles and Expert Opinions are mainly considered in order to come to a conclusion. The following parameters were searched for as part of the research.

- i. Average time spent on OTT platforms by millennial before and during the COVID-19 lockdown
- ii. Increase in the number of the subscriptions for OTT platforms during the lockdown
- iii. Number of OTT platforms subscribed for before and during the lockdown by the consumers
- iv. Variants of the entertainment consumed (Movies, TV Series, Documentaries etc.)
- v. Increase in revenue for the OTT service providers

Modeling and Results

There is a steep increase in content consumption as it reported the time spent by the average user to be over 4 hours per day as compared to previous 1.5 hours on social media platforms. The comparison of the online content consumption trends of Q4'2019 and Q1'2020 details the high and low points showcasing the stickiness of the content on the video platforms with deep- dive analysis of monthly trends for each genre in Q1'2020. As a primary video sharing platform, YouTube alone has garnered over 300 billion views in Q1'2020 which is 13% more than Q4'2019 & 11% more than Q1'2019. The millennial remain the most active group on YouTube in India with 70% of viewership coming from the age group 18-34. Entertainment, Music & News were the top 3 genres based on content consumption contributing to over 70% of views in Q1'20. Over 90% of the views on YouTube were through Mobile devices.

One of the biggest gainers of the lockdown has been OTT or video-streaming platforms. There has been a “secular rise in OTT consumption in duration across demographics and devices” as people scout for stay-at-home entertainment options. YouTube, which already enjoys widespread popularity in India, has seen a 20.5 percent surge in subscribers in the country. It has garnered over 300 billion views in the first quarter of 2020, growing 13 percent since the fourth quarter of 2019, according to a joint study by Mindshare India and Vidooly (video analytics platform). More than two-thirds of YouTube viewership came from millennial in the 18-to-34 age bracket, which remains the most active group on the platform. And, over 90 percent of video views came through mobile devices, indicating behavioural shifts in media consumption. Netflix gained further from the widespread closures of movie theatres and cineplexes. That led to top film studios offloading their unreleased titles on the video-streaming platform, allowing Netflix to premier new titles almost every week. In Q1 2020, viewers were also treated to Disney+ content with the service finally rolling out in India through Hotstar (which it acquired in 2019). A few OTT platforms are even offering extended free periods to drive subscriptions in the wake

of the coronavirus crisis. Overall digital subscription revenues are likely to see an upswing, gaining from the “habit formation” that is happening now.

ZEE5 and Alt Balaji have seen their subscriber bases grow. While Amazon Prime Video and Netflix—the two giants in the OTT market in India—have refused to reveal the kind of surge they have witnessed, the fact that several big-ticket films are now lined up for OTT release instead of theatrical ones, is proof enough of the rise in their respective subscription bases. Even traditional movie-goers, who vouch for a film because of the star's name. will now get onto the OTT bandwagon. While most films get a digital release, it usually happens after the theatrical run is over. With a lack of options, cinema-goers will also latch onto the OTT platforms. The online platform for Zee Network, ZEE5, has registered a significant 80% rise in subscription numbers. With the Covid-19 lockdown, the OTT industry has seen a significant uptick in the number of users and consumption. Originals grew by 200%+ and movies grew by 236% respectively. During this lockdown period, ZEE5 saw their Daily Active Users (DAUs) and app downloads rise by 33% and 41% respectively. In particular, there has been a substantial rise in subscription numbers by over 80% and a 45% rise in paid viewers watching the content. The result in this positive surge can be attributed to the lockdown. Alt Balaji has had an average of 17,000 new subscribers each day in lockdown, a 60% increase from the average of only 10,600 per day in March prior to the lockdown and the platform has over 1.7 million active direct subscribers.

For a long time before private channels proliferated, viewers shared a common experience of watching serials on the government-sponsored channel Doordarshan. These serials had substance, entertainment value and a certain touching simplicity of presentation which had elements to make them stuff of nostalgia. Even today these serials are re-watched with the same fervour and warmth as they were watched when they were shown on Doordarshan. From mid-1980s, serials such as Hum Log, Buniyaad, Nukkad, Ramayan, Mahabharat, Byomkesh Bakshi, Vikram Vetal,

Trishna, Oshin and Kirdaar showed that in a limited episode format one could entertain and appeal to a wide and vast audience. These serials were based on literature, true events, original ideas and mythology[5]. In a clear sense, these very ingredients make streaming platforms a unique offering today. The experience of watching serials in the mid-1980s on Doordarshan has been almost similar to what today's audience experience watching web series on streaming platforms. The only difference is web series on streaming platforms have better production value than the serials on Doordarshan. This aspect may give a sense of novelty to what the services might offer.

In the mid-1990s, things changed drastically. A large number of private channels were launched as the power of television as a medium of reaching out to a wide audience was acknowledged and recognised by producers and advertisers. Television provided a viable economic model of making money for creators and investors. This resulted in what usually happens when too many players enter an industry. When a structure and the costs associated with that structure are not so high, creative freedom is also high. Such structures are congenial for creating artistic content. But when structures grow and evolve as more players enter and compete, creative freedom gets sacrificed and more importance is given to the viability of the content. In such a structure, 'science' prevails. The focus shifts to creating serials which can be elongated and are not tight enough from providing wholesome and meaningful entertainment in limited episode format.[4] This is because such a structure is remunerative for producers in terms of television rating points and hence, advertisements. Consequently, serials became imitative and monotonous. This brought division in categories of audiences.

The audience which craved for wholesome, meaningful and thought-provoking entertainment was utterly ignored. Infrequently, this audience satisfied this taste from films or some serials which showed the promise of good entertainment in the early phase but subsequently conformed to the format dictated by market forces. This created division among

audiences and it became clear to advertisers that the target audience for general entertainment content on television will be non-working women and men will be interested in sports and non-entertainment channels.

Over the years, a few categories of audiences, which already existed, exhibited their distinction in the way they watched content. These categories showed a clear trend how content will be consumed in theatre as content on television became extremely formulaic, imitative and sterile. Broadly speaking, six categories of audience emerged in the two decades. Firstly, there is an audience of evolved taste. They are nothing but discerning audience. They have access to information and they understand what they like and what they don't like. This category basically is a torrent audience who download films from the internet. Then, there is an audience which, largely, catches up with others around them. This audience gets disappointed far often than the evolved audience because it goes to theatre more often than the audience of evolved taste. Then, there is urban audience which just seeks pure entertainment. This audience does not have keen interest in cinema. They don't have any viable and equally interesting means or avenues of entertainment on weekends. For them, going to theatre for a film is a family outing. This ritual borders on discharging family duty of taking care and being considerate towards wife and kids.

This category is followed by lower middle class, which is the staple audience for Hindi movies. This audience has sustained the formula on which the juggernaut called Hindi cinema has been established. A film which merges known tropes without making it esoteric and presenting it in a fresh way is an event for this audience. Watching films in theatre is a strict ritual for this audience because it is like a spiritual ceremony in dark which gives them intense happiness. This is the most stable theatre goer. The fifth category is the audience which is in tier-II and tier-III cities. This audience in tier-II and tier-III cities is driving revenues at the box office because of the two reasons. One, multiplexes have expanded in these locations rapidly in the past five years as space constraints and rising costs in cities make

expansion outside metros more feasible and viable. Two, audiences in tier-II and tier-III believe the ritual of going to multiplexes as one of the ways they catch up with city-dwellers. And lastly, there is rural audience which is undemanding and is content with what comes its way.

Increasing predictability of content on television, rising ticket prices, economical internet packages (the launch of Jio services has played a critical role in this), exposure and understanding of well-written and superbly executed English and non-English content from the west, easy access to films through piracy and most importantly, the freedom to watch content at one's subjective pace and convenient time without the patience-testing advertisements sowed the seeds for a much-needed space for an offering for the audience with evolved taste. Streaming or OTT platforms filled up this space in the past five years.

Discussions and Recommendations

Today, in India, there are close to thirty-six streaming platforms which are owned by Indian companies. Apart from these, there are global streaming platforms such as Netflix, Amazon Prime Video, and Disney+Hotstar.

Since the lockdown it is clearly evident that the awareness and importance of streaming or OTT platforms has increased. According to various estimates and reports, there has been jump of 8- 100% in subscribers' addition of major OTT platforms. According to industry experts, the lockdown has helped OTT platforms secure new subscribers. Even the average age of the subscribers' universe has increased. there are an increasing number of people who are acknowledging the engaging and superior production value of the content offered up by streaming platforms.

The recent flurry of release of Hindi films on streaming platforms also add to their increasing importance as it shows that producers have acknowledged the potency of these platforms in distributing content and reaching out to a large universe of viewers. Amazon Prime Video has acquired seven Bollywood and regional films.[4] A noteworthy aspect about this flurry of release is they also include films

boasting big stars and well-known directors and producers. A case in the point is the film *Gulaabo Sitabo*. Well-established and critically-acclaimed director Shoojit Sircar directed the film which has successful pairing of the man with a Midas touch Ayushmann Khurrana and Amitabh Bachchan.

Now, in this context of the increasing importance of streaming platforms among viewers and producers for content consumption and distribution, one needs to understand whether business in television or theatre affected.

Gauging the pattern of how television and streaming platforms are providing content, it is evident that television and streaming platforms feed into each other. It has been observed that the content generated by television finds its place in the catalogue or offerings of streaming platforms also. The famous TV series *Kyunki Saas Bhi Kabhi Bahu* is available on streaming platform Disney+Hotstar. It is also observed that broadcast-backed streaming platforms show the content of their streaming platforms on their respective channels. For instance, the content of Zee5, a streaming platform of Zee Entertainment Enterprises, is being shown on its channels also and vice versa. [6] This aspect of feeding into each other is likely to prolong the relevance of television and quell any kind of panic-driven knee-jerk assumption that streaming platforms will kill television.

Besides this, television will serve its purpose in different ways. The emergence of Smart Television with surround sound home theatre facility gives a new purpose of watching content of streaming platforms on television. Also sporting events which require bigger screen than mobile devices will also justify the existence of television. Most importantly, India's infrastructure will provide longer life for television to exist because broadband and telecommunications connectivity are yet to penetrate deeper in locations beyond tier-II and tier-III cities.[7] This is evident from the fact that one of the most highly watched series during lockdown period was the re-run of the serial *Ramayan* on DD National. This indicates

that there is no threat for TV from streaming platforms.

Even as regards theatre, streaming platforms have not been a threat to their business model. It has been more than five years global streaming platforms have entered into India. And encouraged by them, television channels launched their own streaming services. In the past five years, there has been no impact on footfalls in theatres. Footfalls in two major multiplexes such as PVR and Inox Leisure have grown in this period. Footfalls in PVR and Inox Leisure grew to 99.4 million and 62.5 million respectively in FY19 from 59.9 million and 38.6 million respectively in FY14.[8] Also, an analysis of financial performance of these multiplexes before the advent and after the advent of streaming platforms (FY14) shows that there has been reasonably good growth in revenue per screen before and after FY14.

Revenue per screen for Inox increased to Rs2.9 crore in FY19 from Rs2.6 crore in FY14. Similarly, for PVR, revenue per screen increased to Rs4 crore in FY19 from Rs3.1 crore in FY14. Also, the number of films which recorded more than Rs100 crore at the box office jumped close to two times to 13 in FY19 from seven in FY14, points out a KPMG report. Even the box office collections have grown to Rs3759 crore in FY19 from Rs2493 crore in FY15.[2] This is despite the fact that the average ticket price of multiplexes has been rising in the range of 5-8% in the past five years. This shows that streaming platforms have not created any material impact on theatre business as it is content which attracts viewers to theatres not just the 'avenue' of entertainment.

Though till last year, streaming platforms have not hurt the theatre or movie business, due to the recent announcement of films to be released on streaming platforms in the coming months, there is an increasing concern over the future of movie and theatre business. This is because digital release does not fetch returns as high as theatrical release. According to an analysis of auditing firm KPMG, around 75% of overall revenue on a film comes from big screen cinema release while digital makes up

13% and the rest from television and satellite broadcasting. Given the small share of revenues streaming platforms generate, it is unlikely it will jeopardise the business model of movie and theatre business.

Besides this, it is the very structure of content offering of streaming platforms works in the favour of movies and theatre business. This is because the structure does not appeal to all kinds of audience. In recent years, there have been a few observations of well-known film-makers which amply explain the fact that cinema or movie business is likely to remain and will charm the audience for years to come. There are three key observations of famed and critically acclaimed film-makers why cinema or theatre as an avenue will survive and not lose its relevance. These comments centre on the very structure of streaming platforms.[5] Director Oliver stone, in an Oxford Union dialogue, said that the content on streaming platforms is journalism and cinema have a quality of literature.

In a sense, streaming platforms are like television channels only. They show programmes on digital platform. The only difference is OTT platforms provide content to the viewer in the following manner: When they want, where they want and how they want. This means there is convenience and freedom to viewers to watch content anytime and at any point in the narrative of a series. Though these platforms have created a perception that they cater to a certain category of viewers, in truth, they are merely creating "library" of content. It is clear that they want to cater to all and sundry. This is evident from how content is delivered on these platforms. These platforms provide subtitles. One can listen to the narrative of a series in more than language (includes regional languages) apart from English. According to Ernst & Young, Indian consumers prefer to watch videos in vernacular and regional languages. In India, close to 93% of the time spent on videos is in Hindi and other regional languages. As a result, streaming platforms have content which go beyond Hindi and English and reach out to these consumers.

Another aspect of business model of streaming platforms is what looks like the strength of these platforms can also be its limitation. These platforms sustain on creativity, which unlike plain advertisement model, does not make up for fickle pattern of subscription. According to several research studies, viewers have shown clear preference for original and fresh content. This shows that subscribers are more interested in fresh and original content, which is a tall order to a certain extent. Given these realities, viewers will not be glued to their OTT screens and will step out of their comfort zones and watch films in theatres.

Limitations

Though the study was able to consider most of the current scenario, there are a number of limitations. Since the pandemic has not ended yet and it doesn't look like it would any time soon, there could be a possibility of this scenario panning out way differently from what is expected.

Also, since it's been just 3 months into the lockdown period, the sudden surge in demand for the content among the millennial could be a knee-jerk reaction to the sudden impact of the pandemic. The behavior patterns could change over a long time. However, it is being assumed that the current scenario would prevail for a long time.

Conclusion

The COVID-19 global pandemic has resulted in a new normal where there are numerous changes in the way things are done and consumption of media in the OTT platforms is one of them. These changes are now expected to last for a very long time. Therefore, the change in the consumer behaviour patterns too is set to remain for a long time. Also, with the

Work from Home culture gaining traction, consumers, mainly millennial will have the convenience and the time to consume more and more content. The surge in demand is here to stay.

The service providers must now look at other avenues such as trying to gain the rights for releasing the latest movies on their platforms, which is already being done to some extent. Also, there has to be creative content in the form of documentaries and web series in order to keep the audience glued. Of the two, going forward, documentaries could gain more popularity as they are not very widely watched as of now but since the millennial likes to watch something different every time, the documentaries could be one of those. Therefore, it is imperative that the service providers understand the trends and the needs of the consumers and act on them immediately.

Though the theatre business has been impacted due to the lockdown and the social distancing norms, it is too early to come to a conclusion if this impact would last long. With only 3 months into the lockdown, we can't be sure about when the pandemic is going to end, when the theatres will be opened and if these few months are enough for people to get unhabituated to the theatres. If the current scenario persists for a very long time, the theatres will get affected to some extent as the not-so-regular moviegoers will slowly fall out of habit. However, the movie lovers would still be preferring movie theatres over watching at home because the atmosphere in a movie theatre plays a major role in the entire experience.

References

1. Madnani, D., Fernandes, S., & Madnani, N. (2020). Analysing the impact of COVID-19 on over-the-top media platforms in India. *International Journal of Pervasive Computing and Communications*.
2. i. Team, "Indian Television," 11 September 2020. [Online]. Available: <https://www.indiantelevision.com/iworld/over-the-top-services/65-millennial-and-gen-z-prefer-ott-over-tv-report-says-200911>.
3. J Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in

- VANET. International Journal of Innovative Technology and Creative Engineering (ISSN: 2045
4. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.
 5. Ghode, R. (2020). 'Media and Me'in the Lock-down: An Exploratory Study to Understand Media Consumption Pattern among Urban Millennial during Lock-down Period due to Covid-19. *Global Media Journal*, 18(36), 1-6.
 6. Cheng, M. (2019). 8 Characteristics of millennial that support sustainable development goals (SDGs).
 7. Galhotra, B., & Dewan, A. (2020, October). Impact of COVID-19 on digital platforms and change in E-commerce shopping trends. In 2020 Fourth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC) (pp. 861-866). IEEE.
 8. Narayanan, R. L., & Kartheeswaran, K. (2019). Future of Digital Marketing in 2020. Research Gate.
 9. O. Kamble, "The Impact Of COVID-19 On Digital Consumption," Your Story, 2020.
 - 10 U. C. a. L. G. Spain, "Digital Technologies and the COVID 19 pandemic," United Cities and Local Governments Spain, 2020.

ANALYSIS OF COVID-19 ON INDIAN BUILDING CONSTRUCTION INDUSTRY**Prayag Mehta**

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ABSTRACT

With the urbanization trend and aim to provide better infrastructure to people, Indian building construction industry is growing every year exponentially. With the current pandemic situation of COVID-19 outbreak in our country, this industry is going to be affected badly as there were two months of complete lock down and working on some projects even after post lockdown is difficult. Analysis of this situation is important to understand the damage that has been caused to the industry as a whole & to plan projects further accordingly in near future as many lives & much money at the stake. Methodology used for the research is comparative analysis of whole industry by using bottom up approach with the help of surveys & interaction with leaders of industry. Job reduction & delay in completion of projects will be major variables of the analysis. This industry is the backbone of one of the pillars of growth of our country. It contributes to around 7-8% GDP of the country (CBRE, 2019). There are small numbers of big-sized firms, limited number of medium-sized firms & huge numbers of contractors & sub-contractors who works on the projects independently. This scattered industry provides daily job to the major chunk of people who are considered as a labor. Overall this industry is providing jobs to around 50 million people in this country, which is also increasing every year with announcement of new projects. It is also co-related with so many manufacturing industries like steel, cement.

Keywords - Construction Industry, Impact of Covid-19, Building construction, Indian Real estate

INTRODUCTION

Due to this pandemic Covid-19 situation, the whole world is facing issue in terms of survival & business. The minor virus outbreak from china has affected now more than 200 countries around the world. On 1 march, approximately in 70% countries there was not even a single case recorded.

While on 15 march, this virus spread in 71% of the countries. From this, one can estimate the contagiousness of the virus. Market situation across globe is downgrading every second & people worry about their jobs & business every second. It is well known fact that from oil prices, we can approximately analyze the market situation. Right now, the prices of oil are dropped about 50% with almost 20-30 US Dollar a barrel. Coming to our country, the people are in deep shock & trying to cope up with the new normal. Since Independence, this has been the biggest chaos our country is facing. Of course, 2008-09 was a major downfall but people were going for work & trying to boost the economy. Around 16480(current data) have lost their life in our country. After survival, there is a concern about jobs & business. A research says 12.2 Crores of Indians have lost their job due to this pandemic from that 2.7 crore people were in an age group

of 20-30, which is very disturbing (12.2 crore people lost jobs in India during coronavirus lockdown, 2020). The core business & job providing sectors like real estate & retail business has also affected badly in this time. Indian real estate which is the pillar of infrastructure growth for us, the business sector which had attracted 1 billion us dollar in 2019 after government allowed 100% FDI in sector is now facing some serious issues. Due to complete lockdown initiated by government, the retail industry could not work properly. This industry is highly labor intensive & number one job creation sector in our country, many lower-class people have lost their jobs & now cannot even provide food to their family. Indian real-estate industry sector is currently facing loss of 1 lakh crore rupees & more losses coming in next six months. More jobs will be lost but after the adaptability of new normal & implementation of some new norms like social distancing, there might be a chance to do good business after that. In this pandemic, People have come to know about the importance of having their own house & home-offices. More building construction opportunities will be there in far future. If this industry could adapt more technological changes there is a hope for the better business prospect

LITERATURE REVIEW

Due to this outbreak of corona virus, Real estate business cannot do business. The main part of this business is construction of new building & selling the houses & properties but in this difficult time people are suffering from job loss & high salary cuts. This lock-down has resulted into delay of on-going constructions & even post-lockdown, it is going to be a challenge to start construction in red & orange zones. For the people who are willing to buy new flats need assurance of health for their family in that specific area. So, the whole understanding between buyer & seller has to be established. Some brokers are also offering technological advancement like Face time, Skype for buyer to be safe from this harmful virus. Thousands of people who were working as a labor have lost their jobs. So, there is going to be affect on their lifestyle & their families too. People in this business have taken huge loan from banks. Their repayability to bank is also very low as the on-going projects were stopped due to lock-down & already constructed buildings are not selling rapidly. Many scholars also worry that it going to affect the whole financial balance & can create financial crisis in country if the situation is going to be the same for more months. Post the effect of this virus, conventional ways of doing business has to be changed. More changes in norms & technological advancements has to be made. Labor exodus is also going to impact on the starting of new project of construction industry as well as completion of ongoing projects. To complete any kind of project, labor is required. But this migration has made it difficult to do so. The implementation clauses like force majeure for the on-going contract construction is also important factor for many on-going projects, which will provide extension in date of final date of completion of project.

OBJECTIVE

1. To understand the post COVID situation of the market.
2. To calculate the loss of market.
3. To come with some suggestion which will improve the situation of market.

METHODOLOGY

The study is based on the secondary data. News articles & surveys done by scholars was insightful. To understand the consumer reaction, secondary survey was also done, interviews with connections & some business-related people has also been done. As this topic is fairly new, not more research paper was there but some of the papers on economy has provided some valuable insights on the business. So, all over it was the complete analytical approach on the impact of business with some secondary research & people interaction too.

ANALYSIS

Pre-COVID scenario

The building construction & Retail industry in India is very scattered. The building construction industry is mainly divided into two parts. Residential & Commercial. Commercial can be divided into Hospitals, offices, malls etc. Growth of this sectors depends upon the requirement of homes & offices. The other factors are the space required for the same. Overall construction industry is positioned third amongst the overall sectors in our country. The residential & commercial industry were booming with CAGR of 11.1% & 12.2% from 2015-19 in the development period respectively. The building construction industry as a whole was expected to reach to 11.2% of CAGR to reach 35220.8 billion value by 2024. Real estate sector was expected to reach out up to 1 trillion us dollar in 2030. More income, trend of urbanization & economic growth of country were amongst the prime reason for the growth of this sector. This sector was fourth in terms of FDI inflows according to Department of Industry and Internal Trade Policy (DPIIT) Some of the major investments & initiates are enlisted below.

- The smart city initiatives by government to for the renewal & development of 100 cities with the estimated cost of 98,000 crore was major investment in real-estate sector.
- Pradhan Mantri Awas Yojna (PMAY) (for urban) has created 1.20 crore jobs by sanctioning 1.12 crore houses for people.

- Government has also approved 100% FDI for township & settlement projects
- For reviving the housing projects of top cities in our country, an alternative Investment fund of 25,00 crore was set.
- A 60,000 crore of National Housing Urban Fund was approved in February, 2018.
- Government has created an initial 10,000 crore fund in National Housing Bank.
- Blackstone has invested more than 12 billion US Dollars in India.
- Puravankara Ltd, A Bangalore based company planned to invest 850 crores rupees for luxury housing projects in Mumbai, Chennai & Bangalore.
- First REIT raised 4750 crore rupees was launched in 2019 by Blackstone & realty firm Embassy group.
- Government has reduced GST rates to 1% for affordable homes & 5% for under construction flat in 2019.
- Tax holiday was provided to first time home buyers.
- Government has reduced the corporate tax rate to 25.17% from 30% for existing companies and to 15% from 25% for new companies.
- Relaxation in FDI Norms for single retail.

Major investible projects

Development of Palava Industrial Township:

Lodha developers limited has come up with project of township

Location- Mumbai, Maharashtra

Project cost- USD 3.97 bn

Construction of Economically weaker section, Low Income group and Middle-income group houses (EWS, LIG & MIG) (Pradhan Mantri Awas Yojna package-C)

Location- Jabalpur, Madhya Pradesh

Project cost- USD 1.69 bn

Construction of Economically weaker section, Low Income group and Middle-income group houses (EWS, LIG & MIG) (Pradhan Mantri Awas Yojna package-A)

Location- Jabalpur, Madhya Pradesh

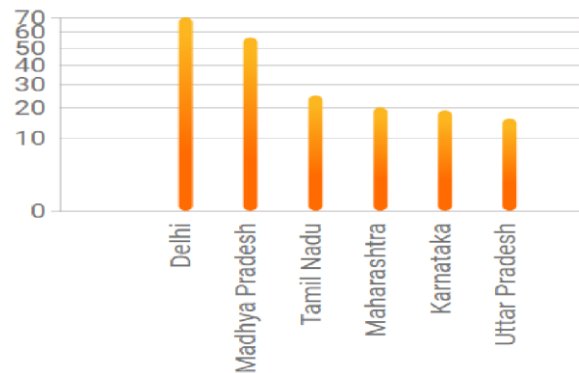
Project cost- USD 1.67 bn

List of Major residential projects

Indian Residential Market					
Parameter	2018	Growth Y-O-Y	H1 2018	H1 2019	Growth Y-O-Y
Sales (Housing Units)	242,328	6%	124,288	129,285	4%

Total 298 opportunities are there with the project worth approximately USD 13 bn out of which 59 are EPC (Engineering Procurement & construction) & 16 PPP (Public Private Partnership) projects

Below is the picture shows the number of projects in various states



(Invest India, n.d.)

Mandi Housing Project – Government of Himachal Pradesh have come up with this project.

Location- Himachal Pradesh

Project cost- USD 72 bn

Kamrup Township Project

Location -Assam

Project cost- USD 92.57 bn

Slum development Project

Location -Bilaspur, Chhattisgarh

Project cost- USD 85.73 bn

Residential project- Initiated by Sai Kripa real estate private limited

Location – Odisha, Cuttack

Project cost- USD 39.67 bn

Residential Sub-Sector

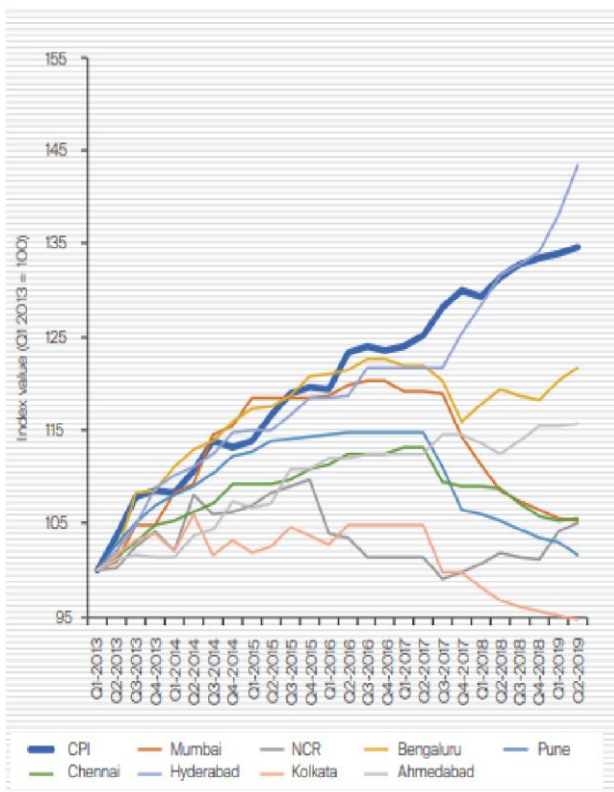
Indian residential sector is the prime important sector in real estate as it is connected directly with the life of people. Affordable Housing, Housing for all, PMAY are some of the schemes under government with the aim to provide shelter, which comes under basic necessity to all of the people of our country. With the implementation of Real Estate Regulation & Development Act (RERA) & Goods & Services Tax (GST), there has been a lot of change occurred in last few years.

Launches (Housing Units)	182,207	76%	91,739	111,175	21%
Unsold Inventory	462,372	-11%	497,289	450,263	-9%
Quarters to sell	10.2	-	11.3	9.3	-

Snapshot of whole residential sub-sector

With the inflation around 5.5 % in November, 2019, Residential sector has done well sales wise. There was an increase in sales to 129285 from 124288, which is approximately 4%, which is making it third consecutive quarter for sales improvements. The supply of new homes rose by 21% & unsold inventory dropped by 9%. Coming to cities Kolkata had showed 30% reduction in sales. Overall sales were rose by 10% in first six months of 2019, then it dropped. Bangalore shows increase in sales by 9%, Pune creased by 6%, Chennai by 5 %, Ahmedabad by 2%.

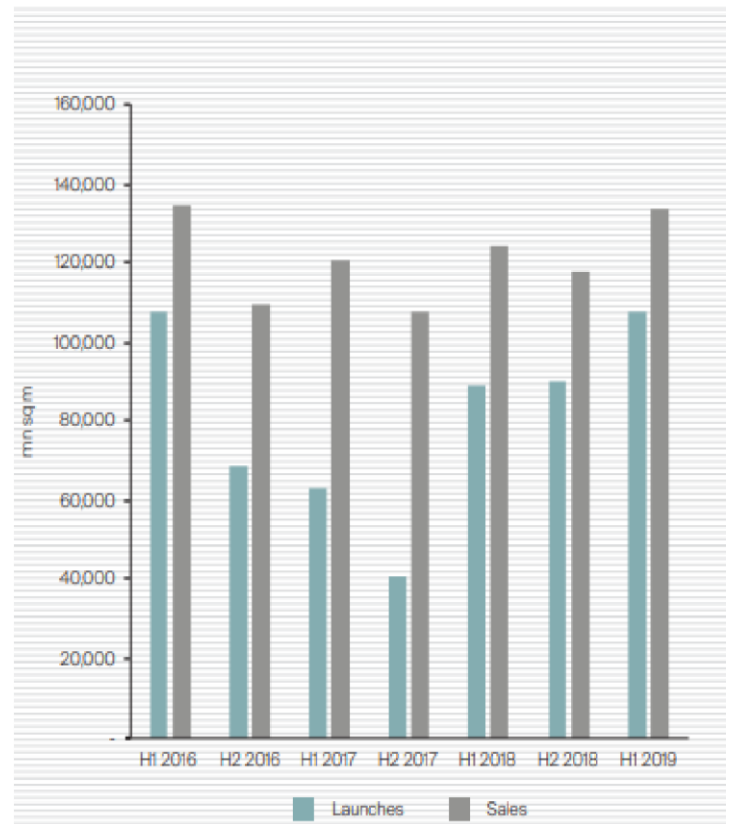
Price of residential properties are below the retail inflation rate from last four years for top most 8 cities in India, which is the prime reason of growth being lesser in sales than launches. Hyderabad is the only city in which price is more than retail inflation, which is the reason for increased rates of property in the city.



(Vivek Rathi, 2020)

Consumer price index(CPI) is well above the growth of price except Hyderabad city In addition to that government approved more 3.31 lakh houses under PMAY in 2019.

Indian Residential Market activity of last four years



(Vivek Rathi, 2020)

When comparing the sales & launches of 4 years from 2016-19, one can easily see that 2016 was a peak & a good year for residential business in terms of launches & sales in the first half. Same is the case with the first half of 2019.

From the first half of 2016, the launches decreased drastically till second half of 2017. Lowest number of launches were in the second half 2017. When comparing the last two-year launches, there was 21 % Year-to-Year change.

Retail Pricing

The highest price of residential property was in Mumbai metropolitan region with 76,591 rupees per square meter in 2019 & the price decreased by 3% from the last year.

The second highest price was of Bangalore with 51,893 rupees per square meter. This region's price was increased by 2% from the last year.

Next in the line is Chennai with the price of 47110 rupees per square meter & there was no price change.

The price of Hyderabad was 47,071 with the price change of 9%, which is higher than the retail inflation index & that is why it is the only region in which the price was above the retail inflation index in the last four years.

The last city amongst eight big cities was Ahmedabad with price of 30,667 rupees per square meter with no change of price when comparing it with the previous year.

Commercial Sub-Sector is another Prime sector in Real estate. As any business progresses, the company needs more workspace & their commercial Sector comes into picture. With the trend of globalization, there are lots of foreign companies investing in our country & need for more offices are increasing day by day. The franchises like KFC, McDonald's, Nike, Levi's. They have space in every city & they are always in a need of more space for their expansion.

Commercial Sub-Sector

Indian Commercial Market					
Parameter	Year 2018	Change Y-OY	H1 2018	H1 2019	Change Y-OY-
Transactions Mn Sq. m (Mn sq. ft.)	4.4 (47.6)	11%	2.0 (21.8)	2.6 (27.4)	26%
New Completions	3.7 (39.3)	15%	1.7 (18.2)	2.2 (23.9)	31%
Weightage Average rental Rupees/Sq. m/month (Rupees/Sq. Ft./ Month)	849 (79)				
Stock	64.6 (695)	6%	62.6 (674)	67 (721)	7%
Vacancy(%)	13.1%	-	12.7%	12.7%	-

(Vivek Rathi, 2020)

Snapshot of Commercial Sub-sector

With the increasing inflation & Implementation of GST, the commercial sector has done extremely well. The new launches were increased with the 31%. So, from this one can understand the demand of commercial space in our country. There was a shift of supply from residential to commercial spaces more in 2018-19, When we are comparing the two sub-sectors.

Also, in these years there was more of a rental or lease growth, as companies do not want to mismanage their money by spending it on buying properties but they want to take it on a lease for more profits. In the first half of 2019, there was a giant 26% increase in lease transactions. this shows the potential of leasing.

Rental Growth

In the big cities like Mumbai & Chennai there was a 7.5% & 3.5% growth in renting transactions. Surprisingly, Ahmedabad had the highest growth of 14.3% growth & after that Bangalore & Hyderabad stood at the growth of

13.5% & 11.3% respectively. Pune had the growth of 10%. All over rental growth was around 10% in 2019.

The price of renting office in first half of 2019 was highest in Mumbai with 1259 rupees per square meter per month. The second in the list is NCR with 926 rupees/square meter/month.

Third was Bangalore with the price of 856 rupees/square meter/month. The lowest price was at Kolkata of 393 rupees/square meter/month, which also had the lowest rental growth of 0.6%.

Sector-wise Analysis

Sector-Wise Data of Transactions		
Industry	H1 2018 (Half one)	H1 2019 (Half one)
IT	28%	35%
BFSI	18%	13%
Manufacturing	14%	12%
Other Services	40%	40%
Note- Other service includes Media, Telecom Industry & Co-workings etc.		

(Vivek Rathi, 2020)

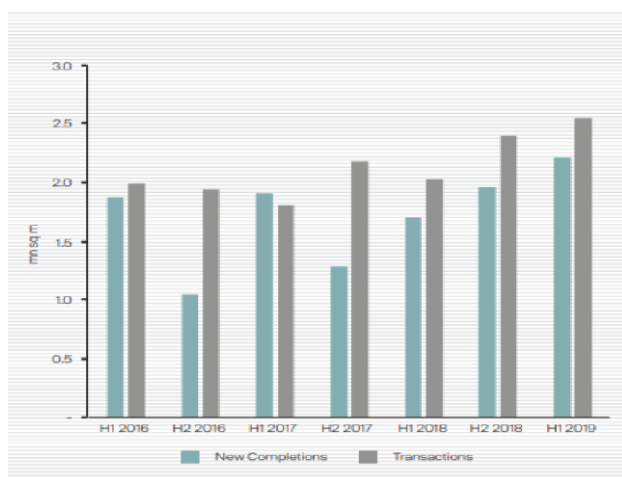
When comparing the all sector, Other services had broadly beat the giant IT & BFSI sectors in the last two years. While looking at the data, one can understand the increase in IT sectors due to more foreign companies, Data security & data advisories. The banking Financial & Insurance (BFSI) sector had shown the marginally high decrease in transactions from 2018 to 2019. This is due to focus on Non-Banking Financial Institution (NBFC) & NPA loans given by some major banks.

Office supply Split as per 2019

Office supply split of top 7 Indian cities as per the year 2019	
City	Percentage occupied
Bangalore	25%
Hyderabad	24%
NCR	20%
Mumbai	10%
Pune	10%
Chennai	8%
Kolkata	3%

(Joshi & Chowdhury)

Transactions & Launches history of commercial space in last four years



(Vivek Rathi, 2020)

The number & value of transactions which had occurred in the last four years, the first half of 2019 did the best. Coming to city wise transactions, Bangalore had the 26% increase in

transactions in 2019 when comparing it with 2018 & Ahmedabad had 25% increase in transactions.

Interesting facts about the top most cites in real-estate for the year 2019.

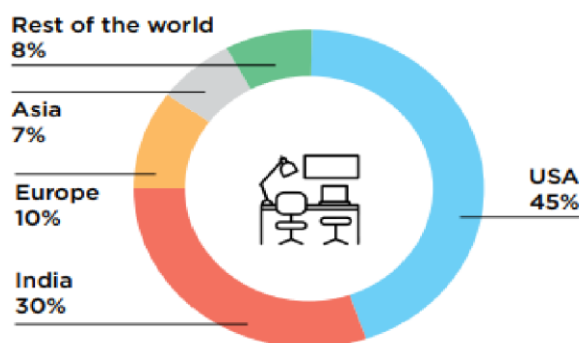
- 157% of year to year growth in terms of launches was there for first of half of 2019 in Ahmedabad.
- 26% of year to year transaction was there for commercial In Bangalore.
- 47% of year to year growth in new launches was there for the first half of 2019 in Hyderabad.
- Hyderabad is the only city in which price increases more than retail inflation index.
- 90% of the sales dropped for the first of half of 2019 in Kolkata.
- 188% of growth in commercial transactions by volume was there for the first half of 2019 in Kolkata.
- 61% of year to year growth in commercial transactions was there for first six months of 2019 in Mumbai.
- 64% of year to year growth in new completions of commercial spaces was there for the first six months of 2019 in Delhi.
- 19% year to year growth in new residential property was there for the first six months of 2019 in Chennai.

Post COVID Scenario

With the sudden outbreak of this highly contagious virus, There is huge concern in people for survival as well as basic needs. Businesses are affected badly. The methods of doing conventional business I not working anymore. The labor, prime key to this business is not available in bulk right now. Due to safety issues, people are not coming in the market to buy properties. There are hundreds on-going projects stopped due to this unprecedented situation. There is a huge unsold inventory in market. The dynamics of the business has been completely changed. This business of real estate is consumer economy driven. Since the market situation is bad with the people losing jobs, it is affecting badly to the business.

Effect of Covid-19 on Indian commercial sector As we seen, In the pre-COVID scenario there was a huge demand increase each year from

2016 to this year. All the Major Indian players & foreign company had planned to do major expansion in their business. Demand for IT sector was also very increasing. It was estimated that this year demand would be somewhere around 47 Mn Square feet before pandemic. There was a huge project scheduled too. But due to lack of material & labor, there is going to sharp 25-30% decrease in the supply of this space. The demand is also likely to drop by 20-34%. The major business of foreign company do is by renting property for offices. The prime country to invest in renting commercial property in our country is USA with 40-50% of whole foreign rental share. Since the USA is also affected badly due to this pandemic, Next year there I going to be sharp decrease in demand for rental. Other European countries' stake is somewhere around 10-15%, So that is not going to put much pressure. Some Indian franchisee are also doing business by renting properties. So next year the tremendous pressure will be there on rentals.



(Joshi & Chowdhury)

Demand for more Flexible & open work spaces post pandemic is going to be increased. Separate space to work will be the priority of the companies.

New timings of work, WFH(Work from Home) & Social Distancing will be the new norms with more technological advancements.

Effect of Covid-19 on Indian Residential Sector

In this difficult time of pandemic, People have realized the value of having their own homes.

But market situation is bad from last few months due to complete lock-down. The situation post COVID is going to be completely different. Pre-COVID From 2013-19 15.62 lakhs homes were launched. From this the share

of Mumbai metropolitan region (MMR) & Delhi was about 57% which is 8.9 lakhs. This year it was expected to complete 4.7 lakh houses but due to complete lock-down, It is going to be delayed by several months in case of well-funded projects. The situation with not so well-funded projects is worse than that. The demand of new houses is also going to be affected due to this low-market situation. The surveys mentioned of decrease in demand up to 25-30%. Talking about sales, In 2018 there was about 18% increase of sales, while in 2019 the growth was lesser. But after this pandemic, Considering the aspect the buying property requires to visit physically site, meetings, Interactions & good market situations. Since these all are difficult to manage at this time, There is going to be sharp 25-30% decrease in the total sales.(According to the interaction with scholars & few surveys). There is also good number of unsold inventory available in the market. In 2018, there was somewhere around 8% inventory. In 2019, It declined till 4-5%. But this year, looking at current scenario, The inventory is going to be remain stable or maybe decreased by 1%. The government scheme of affordable housing with the aim to provide house to all middle class people of our country. Of the total houses that were launched in the last few years, 40% were under affordable housing scheme. In this difficult times, It is going to difficult for the middle class people, who are doing their jobs from home with some salary cuts. So, this year there is going to decrease in sales of those houses too. The unsold inventory which we have right now, out of which 36% is of affordable housing & survey says that there is going to be increase in annually 1% in that inventory. Consumer sentiments are biggest driver for any business & Right now people are still coping with the new normal. Their views about spending money on buying property is not so positive. Most of the middle class families are thinking about providing essentials to their family & savings & These kind of not so positive sentiments are not going to be changed for the remaining period of 2020 & some initial months of 2021. There is an expectation of some revival package from the government to revive the losses & put this business on track

after the whole COVID situation reaches to controllable extent.

Under construction unit of top seven Indian cities	
City	Units
MMR	465,000
NCR	425,000
Pune	262,000
Bangalore	202,000
Kolkata	90,670
Hyderabad	64,250
Chennai	54,200

(Joshi & Chowdhury)

Analysis of COVID on sector as a whole, By considering various factors into account one by one.

- Shortage of labor- Due to the exodus, There is going to be shortage of labor for on-going projects as well as future projects.
- Lack of funds & Materials- There is a huge shortage of materials & funds for the ongoing projects, which creates delay in final date of construction.
- Social Distancing & new norms- Even if the new construction projects begins, there has to be some changes in design & contract as work spaces have to make slightly wide, Social distancing & safety norms has to be adapted.
- Pressure on completion of on-going projects- Giant loan is taken by builders from bank for the specific projects, so to lessen the burden of debt the on-going projects have to be completed as soon as possible.
- Pressure of giving delivery & fulfilling commitments- Construction companies have given final date of construction & stakeholders need delivery of those properties so to fulfill commitments, construction has to be finished.
- Work from home- This few months has been the complete change in terms of how people do the work. Work from home is not new for the people now. In fact, IT companies are more than comfortable with their employees working from home. This aspect going to affect the whole commercial sector demand & will put much more pressure on rentals.
- End-user willingness- Even if the on-going projects are completed & new projects starts, this industry is consumer economy driven. The willingness & ability to purchase new property or take it on lease should be there. If the user does not have ability or willingness to buy, this new launches will be added to the unsold inventory which will ultimately block the investment one has put by constructing it.
- Rental pressure- Much foreign companies & Indian franchisee are going to stop their expansion for at least a year, so this is going to affect the demand for rental properties & will put tremendous pressure on industry.
- Technological changes- If a broker have to sell the property, they have to make more technological advancements like use of skype or facetime for showing the properties to the interested consumers, Online meetings & discussions.
- Trend of co-working space- Instead of renting out or buying properties in near future, there will be a need of huge co-working space where people can follow social-distancing norms & not have the burden of spending more money for their work space.
- Government aid- Government is trying to make things easier for people of Industry as well as consumers. One such example is reduction in repo rate.
- Importance of Own house- This difficult times have taught people the importance of having their own homes. The mentality of millennials have now been completely changed from renting to buying their own house as they are in the need for sense of security.
- Investors interest for Ready to move homes- More & more investors are inclined towards RTM homes as they will be in demand after a year & it is a good investment.
- Online Marketing- Right now people are not buying properties but in a near future there is going to be a demand for it. Currently there are approximately 600 million people using internet connection, So online marketing of properties will be a good option. There they can compare the various properties, see the

images of property & can have online meetings as well. This advancement is going to change the look of whole industry.

- Rental prices hike- To reduce the increased pressure on the rentals with the fall of demand, there might be a chance of increasing the rental fairs. Even consumers & scholars feel that rental prices may increase.

DISCUSSION

The whole discussion was to understand the complete 360 degree impact which this contagious virus had made.

Analytical approach is used for the research & data is secondary.

The research findings suggest that,

- There is going to be sharp increase in demand of properties for near few months.
- Next few months will be a complete focus on selling the unsold inventory.
- There will be a few changes in the new contract which will add clauses of new norms like social distancing & more open spaces.
- Implementation of force majeure clause on existing contract will be good from the perspective of contractor in case of government projects.
- There is going to be a tremendous pressure on rentals revenue & there might be a chance of increasing the rental fair as well.
- The design of future offices will be completely different from before as they will need more open spaces.
- There will be a delay in completion of on-going projects due to lack of funds & materials.
- Millennials mentality has been completely changed due to this pandemic, now they want to have their own houses.
- Migration of labor will be a challenge for the completion of on-going & future projects.
- Consumer sentiments are of prime importance in construction & real-estate business.

LIMITATIONS

The limitation of study is that primary data collection is not possible during this difficult

time so all the data apart from few surveys is secondary. To predict the exact interpretation or future scenario is not possible so there are few possibilities that data may fluctuate slightly from what has been predicted in the demand & supply of post COVID scenario. Even there might be some variation in the secondary data which one has collected.

CONCLUSION

In the whole discussion, The importance of building construction industry & retail estate business of our country. Being the prime job providing industry, analysis of this pandemic times on this industry is important to know the future scenario of market. In these past few months, it has been affecting our country badly so it is important to revive this industry as this industry is not only the important one with respect to economy but it is also important from consumers' view point because this industry satisfy the basic demand of shelter for the people of our country. The vision of providing house to each & every citizen is yet to fulfill & for make that dream come true, some focus has to be put for revival of loss of business. As this industry is consumer driven, consumer sentiments also plays major role in the performance of this industry. To expect people to invest in buying property & houses, there has to be some stability & job security in the market. For that, Whole economy of the country has be stable. It is still a long way to go because apart from the measures that our country has taken, there is some planning required for the revival of the economy & this business as well. It is important that people involved in this industry & consumer take pragmatic view. It is important to know the demand of consumer & planning of Tailor-made customized projects accordingly. The focus should be on finishing the on-going projects & selling the unsold inventory. The new business models will also come & decision to migrate in few places will also be taken by consumers seeing the current scenario. Taking all of these into consideration, one has to move forward while making some technological changes in the ways of doing business & industry will flourish soon.

REFERENCES

1. CHOUHAN, P. Impact of COVID-19 in North Eastern States of India.
2. <https://www.deccanherald.com/business/12-2-crore-people-lost-jobs-in-india-during-coronavirus-lockdown-cmie-833783.html>
3. 31,000 residential units during H1 FY13 in NCR. (2012, December 24). Retrieved from Indain Infoline: <https://www.indiainfoline.com/>
4. Bhadauria, S. (2020, June 5). COVID-19 impact: Rental rates may spike in the near-term. Retrieved from 99acres: <https://www.99acres.com/articles/covid-19-impact-rental-rates-may-spike-in-the-near-term.html>
5. Tax, I., & Law, C. COVID-19 impact and Force Majeure Clauses in Construction Agreements under RERA.
6. Turetsky, J. (2019). Blockchain and the Future of the Commercial Real Estate Industry.
7. Gujral, V., Palter, R., Sanghvi, A., & Vickery, B. (2020). Commercial real estate must do more than merely adapt to coronavirus. *McKinsey & Company*.
8. Gupta, R. (2020, June 25). Retrieved from 99acres: <https://www.99acres.com/articles/an-analysis-of-pre-lockdown-and-post-lockdown-real-estate-scenarios.html>
9. Santra, S., Das, S. K., & Biswas, S. (2020, December). Impact of COVID-19 Pandemic on Women Entrepreneurs: An Indian Study. In *Globsyn Management lobsyn Management Conference Proceedings Proceedings*.
10. Santra, S., Das, S. K., & Biswas, S. (2020, December). Impact of COVID-19 Pandemic on Women Entrepreneurs: An Indian Study. In *Globsyn Management lobsyn Management Conference Proceedings Proceedings*.
11. Mishra, A. (2019). Foreign Exchange, Gold, and Real Estate Markets in India; an Analysis of Return Volatility and Transmission. *Indian journal of finance, 13*(7).
12. Invest India. (n.d.). Invest India. Retrieved from National investment promotion & facilitation agency: <https://www.investindia.gov.in/sector/construction>
13. Joshi, V., & Chowdhury, A. B. (n.d.). Covid-19 Impact on the Indian RE sector. ANAROCK.
14. Mohnani, A. (2020, June 3). Effect Of Migrant Workers Unavailability On Construction Sector. Retrieved from Realty NXT: <https://realtynxt.com/2020/06/03/effect-of-migrant-workers-unavailability-on-construction-sector/>
15. Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., ... & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International journal of surgery, 78*, 185-193.
16. J Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. *International Journal of Innovative Technology and Creative Engineering* (ISSN: 2045)
17. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.
18. Chandra, C. M. (2020). OCCUPATIONAL HEALTH HAZARD IN MARITIME SECTOR--A STUDY TO OVERCOME THE CHALLENGES. *UGC Care Listed Research Article Trends Of Pure Science And Applied Disciplines In Higher Education System In India And Abroad During Covid-19 Lockdown Period*, 153.
19. Vivek Rathi, D. G. (2020). Indian Real Estate. Knight Frank.

DIGITAL STRATEGIES IN THE PHARMACEUTICAL INDUSTRY IN INDIA**Tilak Parmar**

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ABSTRACT

Purpose—The aim of the research paper is to check the role of digital technologies in the transformation of pharmaceutical industry in an emerging economy context. This research paper helps in understanding the role of digital technologies in improving the current and future state of R&D, manufacturing, operations and sales & marketing function of the Indian pharmaceutical industry. **Design/Methodology/Approach**—The study used primary and secondary data for research. Primary research was done by identifying target participants from pharma industry working in different companies and different functions. Data was collected using purposive sampling technique through a structured and validated questionnaire in the survey. **Findings**—The response and the survey result shown that the pharma companies see a positive role of digital technologies in the transformation and they are expecting a positive change in the various functions with the investment in the digital technologies. This will help them to decide whether to invest, collaborate or outsource the technology. **Practical implications**—The research enables in finding the role of digital technologies in transformation of the current and future state of different.

Keywords: Indian Pharma Industry, R&D, Manufacturing, Supply chain, Digital strategies

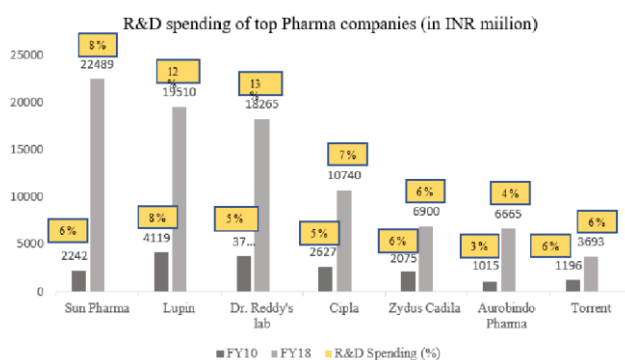
INTRODUCTION

Indian Pharmaceutical industry has domestic market value of \$20bn and export market value of \$19.14bn in 2019. The industry is the largest provider of generic drugs globally (20%) and supplies more than 50% of the vaccine demand of the world. It accounts for 10% of world's production by volume and third in the world by value. It is the source of 60000 generic brands and more than 500 Active Pharmaceutical Ingredients (API). The Indian government under 'Pharma Vision 2020' aims to make Indian pharmaceutical industry into a global leader not only in the production of low-cost generic drugs, but also in the end to end drug discovery and drug development. However, while government vision and industry growth look very promising on the surface, there is still a huge gap between the vision and operation realities of the Indian pharmaceutical sector. The Indian pharma industry always faced an issue of compliance, quality and good manufacturing practices. India has more than 600 FDA-approved sites but over the several years more than 800 issues have been identified by the US FDA. The issue ranges from failures at the initial batches, poor quality control at R&D, poor quality of raw material, data integrity etc. Also, the utilization rate of drug manufacturing in India is around 75%. The 25% inefficient utilization is caused by multiple factors like ineffective scheduling, high

changeover time, machine breakdown etc. The reason of the quality and compliance issue in the manufacturing is low margin of profit of the Indian pharma companies because of drug price control by orders of the Indian government and lenient restrictions in the manufacturing practices. For a long time, this low margin and low profit demotivated the Indian pharmaceutical companies to modernize and upgrade in their manufacturing capabilities and capacities. Since United states is one of the most sought market for export by Indian pharmaceutical companies and India found to be an ideal place for contract manufacturing by global pharma companies, the pharma companies understood that in order to grab the opportunity, the issue of quality and compliance needs to be addressed. Today the Indian pharma companies are making regulatory compliance an integral part of their corporate strategy and they are ensuring a proper communication, training, periodic reviews, guidance and support from top management takes place in order to make the manufacturing processes compliant and efficient.

If a pharmaceutical company decides to manufacture a drug, it has to make it pass through hundreds of trials and finally the golden batch is prepared. Traditionally in Indian pharmaceutical industry the entire trial and error process was manual and it takes a lot of time and money. Also, the error rate was

very high because of high human error. The Indian pharma companies understood this and they started investing in new technologies and Research and Development (R&D) to rejuvenate their outdated manufacturing practices. The reason of investment was the cost involved in preparing a new drug and introducing it to the market which is exorbitantly high. It was nearly \$1.1 billion in 2010 and in 2018 it was \$2.1 billion, according to Deloitte report. The Indian pharma companies understood the problem and so the average spend on R&D increased considerably from 5.9% in 2010 to 8.8% in 2018. The R&D by Indian pharma companies is mostly into generics, complex generics (biosimilars), drug discovery and drug development. The R&D in biosimilars drugs will be a key differentiator for Indian pharma companies because it is expected that the Indian pharma industry will capture 8% of global \$62 billion market of biosimilars by 2025, according to EY report. Today the pharma companies are using Artificial Intelligence (AI), Machine Learning (ML) and Internet of Things (IoT) in the drug discovery and drug development. The benefit of using AI, ML and IoT is that the entire manufacturing process can be done quicker. Also, the pharma companies using AI and IOT can identify compounds four times faster, and reduce their failure rate by as much as 20%.



Source: EY analysis of Companies Annual Report

The supply chain of the pharmaceutical industry is similar to that of any other industry in the manufacturing sector. The major functionality of supply chain in any industry is planning of goods and services, procurement and contracting strategy, management of inbound and outbound material and working

capital management. Indian pharmaceutical companies spend 1/3 of their annual revenue in the Supply Chain Management (SCM) and the cost amount of SCM is 13% of India's Gross Domestic Product (GDP). But still the supply chain of Indian pharmaceutical industry is highly disorganized and complicated. The supply chain model of Indian pharma industry has multiple stakeholders such as C&F agent, super stockist, distributors, sub stockist, pharmacy retailers etc. Each stakeholder further has multiple layers. For example, among the pharmaceutical distributors, there are hospital stockist, consignment agent, medical device supplier, generic pharma distributor, essential medicine distributor etc. Most of the large pharma companies have about 10000 distributors who are supplying to the pharmacy retailers and number of retail pharmacies in India is more than 9 lakhs in 2019. The pharma industry has more than 3 lakh brands and to remain competitive in the market because of enhanced formulation in the drug or new drug development, the pharma companies individually launches 15-30 Supply key Units (SKUs) every year. The complication in supply chain aggravates further with poor warehousing and storage facility. The transportation structure of India is inefficient to meet the needs of supply chain because the Indian railway system is inadequate and highways are less than 5 % of Indian roads and the cost of using airways is very high. Also, Indian pharma companies manufacture high just in case inventories of drugs to cover any unforeseen demand. The negative implications come out because of all this is reverse logistic, high rate of expiries of the medicines and huge losses. In India the storage facility for drugs and insulins lacks 'cold chain network' which is an important issue to address because different drugs have different temperature storage requirement. There is a need of continuous monitoring of the drug across the supply chain from warehouse to stockist to retailers to ensure that the quality of drug remain intact and the drug formulation does not change. In addressing the issue on the cold chain network Indian pharma companies are investing in better technology and connectivity. In addressing the issue on warehousing facility in the supply chain, the pharma companies are

ensuring the good storage and distribution practices are followed in the warehouse by using automation and new technologies. In addressing the issue on the procurement, the Indian pharma companies are investing in R&D to reduce its dependency for Active Pharmaceutical Ingredients (API) on other countries and ensuring the availability of raw material. Today in the pharmaceutical supply chain there is a need of consolidation and improvement. In addressing the issue on the supply chain, Indian pharma companies are investing in technology like Artificial Intelligence (AI), Internet of Things (IoT) and Data Analytics to ensure that there is reduction in the failure rate and the supply chain becomes more robust and agile. Also, the use of IoT in the supply chain will help in capturing the data at real time like process condition, machine utilization rate, product demands, inventory levels, supply chain shipments, temperature control during transport etc. Today a seamless communication and use of digital technology is required across the supply chain from the supplier side to the end customer. This will help in bringing greater transparency in the supply chain which will finally help in making the supply chain agile and responsive.

Pharmaceutical Marketing includes marketing of drugs and medical devices by the pharma companies to the doctors, hospitals, retailers and consumers. Earlier for sales and marketing function Medical Representatives (MRs) were the most important source of information for doctors to know about drugs (new drug or advancement). But now doctors find it comfortable to know about it from the online sources because of convenience, limited time and flexibility. The marketing function in the pharmaceutical industry is changed completely from what the companies want to promote, to what the doctors want to listen. So, the companies today are investing in Data Analytics software and providing specific pointers to MRs which they use to know about the likes and preference of the doctor and what need to be promoted to them which ultimately saves a lot of time, cost and lead to better conversion. Also, the pharma companies are today equipping their sales people with smartphones with in-built activity planning software to track their progress and online

learning modules to make them updated of the recent advancement in the field of pharmaceutical.

Today the patients are becoming more tech-savvy and health conscious. They spend a considerable amount of their income on health product, devices and services. They use wearables like digital watch to monitor their health. They are active on various health sites and health applications. The internet users are increasing exponentially in India with current user base of 560 million. To target this digital customer the pharmaceutical companies are investing heavily in e-portals and tele consultation to increase their reach and engagement. For example, a survey by EY showed that a leading pharma company is able to increase its reach of more than 2 million patients in 2 years because of company sponsored blogs on e-pharmacy platform. The use of e-pharmacy platform is on the rise in India for purchasing the medicine. A survey by FICCI reveals that the convenience of ordering, deep discounts, lower price is motivating the customers to purchase medicines from e-pharmacy. Today pharma companies are investing heavily to engage physicians, channel partners and patients on their platform with multiple digital initiatives like apps, chatbots and e-portals. The advertisement spend on healthcare in India by pharma companies is growing at an annual rate of 26%, according to zenith report. There is abundance of data due to rapid digitalization in the pharmaceutical sector. The marketing function has changed completely from intuition to evidence based. In the current digitalized world, there is a need of better customer connect therefore the pharma companies are investing heavily in digital marketing to increase their reach and to provide more personalized content to engage the target customer. Also, the pharma companies are now understanding the importance of analytics in the decision-making process in all the functions in the industry starting from manufacturing to supply chain to sales and marketing. The companies are now understanding the importance of data and digitalization in transformation of the pharma industry and so are investing in technology to transform the today's need of the company and a better tomorrow.

LITERATURE REVIEW

There were some study materials like research paper, articles, journals etc. which were referred while writing this research and they are mentioned in the literature review of this research paper. (Reddy & Rao, 2016) mentioned in their research that there are 4 main areas where digital development and transformation will drive value for pharma industry- First is use of analytics to harness the power of data, Second is personalized engagement with the doctors and patients using digital technologies, Third is capability building not limited to sales but also to marketing function by effectively using digital marketing to increase reach and engagement and Fourth is digital transformation of business processes.

A study was conducted by (Ganguly & Kumar, 2019) in their research paper identified multiple strategies that can help the organization in designing a resilient supply chain. First strategy is having clear visibility of supply chain. This helps in identifying the ineffective current decisions and future disruptions. Second is supply chain agility which helps in finding most suitable ways to manage uncertainty and unpredictability. Third is creating supply chain redundancy by having multiple suppliers and holding some extra inventory in order to fulfil the need of dealing with disruption. Fourth is supply chain collaboration in order to reduce vulnerabilities. Fifth is supplier selection and sixth is inventory management. The research found out that visibility, agility and collaboration are top 3 factors contributing to nearly 80% of the attribute weight in the resilient supply chain in the pharma industry. (Loitongbam, 2016) mentioned in his research about the need of innovation in Indian pharmaceutical industry. The research paper analysed the data of 552 Indian pharmaceutical firms and found that the Indian firms faces a lot of challenges as they enter in the export markets from global multinational companies. Since there is a little scope in the product differentiation, in order to be more competitive in the global market, the domestic firms have to improve in their product design, quality and production process i.e. overall investment in R&D need to be increased to meet the quality and demand of the global market.

(Sampath, 2006) in the research paper classified the group of pharma companies into categories such as innovators, niche operators and manufacturers based on their Annual Sales Turnover (AST). Innovators are those companies whose AST is more than Rs 300 crore, Niche operator are those companies whose AST between Rs 100-300 crore and Manufacture are those companies whose AST less than 100 crores. The research found innovators spend 8.09%, collaborator/operator spend 5.15% and manufacturer spend 7.74% of their annual sales on Research and Development (R&D). In analysing the importance of various factors in the new product and process innovation, the paper found that quality of infrastructure, venture capital availability, IPR protection, skilled personnel and research are considered the most important factor.

A study was conducted by (Alagarsamy, Kandasamy, Subbiah & Palanisamy, 2019) to explain the importance of Internet of Things (IOT) in the pharmaceutical industry. They explained the importance of IOT technologies in the reduction of cycle time, attaining standardization and providing data integrity in the manufacturing processes in the plants. The paper also explained that IoT helps in enhancing the product quality, clinical trials and reduction in the overall cost. The paper concludes that the pharmaceutical companies should use IOT in the drug discovery and drug development department to save time and cost. (Dr. Rahate, Joshi & Upadhyay, 2015) in their research paper talked about various digital and business strategies adopted by top Indian pharmaceutical companies. For example: Cipla integrated product development feature which includes formulations and clinical trials, analytical and regulatory functions. Lupin invested heavily on R&D (8.6%) of its net annual sales on drug discovery, biotechnology and automation and Dr. Reddy laboratories in order to make its distribution system more efficient, tied up with IT company to monitor its inventory level and sales data on daily basis which helped the companies in reducing the shortage at the end of the distributor to half and ensured the timely delivery of medicines to patient.

(Langhause, 2017) in his research conducted and analysed a survey of more than 200 drug manufacturer, equipment and services supplier and found that 70% of the pharma manufacturers believe that the increase in efficiency, quality and productivity can only come through technology and automation. Also, the research paper stated that the pharma companies are using various models like Industrial Internet of Things (IIoT), Industry4.0, data analytics and are utilizing computing technologies and automation to improve their manufacturing and business processes. The survey in the research found out Regulatory backlash (28%) to be the most important issue the vendors think holding back their customers digital progress.

(Baines, 2010) in his research examined the challenges the pharma industry faced in the recent times. These includes Regulatory pressure, Decline in the drug discovery rate, Competition from the generic drugs and marketing of new chemical entities. In the research Baines conducted extensive interviews of the pharma executives and practitioners. In the research he found that the reason of decline in discovery rate of drugs is high safety standard dictated by FDA and increased scrutiny. The solution of this is to make better portfolio decisions and invest in R&D. The paper explained that the pharma companies now understood that if they want to remain competitive in the market they need to invest in existing companies (small Pharma, generics biotech) to learn about the business environment, build R&D, manufacturing, supply chain, marketing and sales infrastructure.

(Bhole & Dr. Verma, 2018) mentioned in their research paper the various digital initiatives taken by the Indian pharma companies to stay ahead in the competition. For example, Sun pharmaceutical launched a mobile app 'Respitrack' for awareness on asthma, Abbott India launched 'Knowledge Genie', an app for information related to heart and liver, GSK had digital information portals and platform by the name 'Viva' for doctors etc.

(Sandle, 2019) in his article explained about the role of digital transformation in shaping the pharma industry. The first is fulfilling the regulatory interest of US FDA. Second is using

digital analytics for the improvement of the manufacturing processes. The analytics will help in understanding the relationship between raw material variability and process performance. It will also help in improving the quality through real time analytics rather than the after the fact testing and finally the analysis of the data will help in the predictive manufacturing practices.

A study was conducted by (Gosar & Acharya, 2019) to explain about the need of upgradation in the service delivery model in the pharma industry. The paper explained about the use of Customer Relationship Management (CRM) through Enterprise Resource Planning (ERP) software. The ERP helps in automation of the process with the customer data to use and act upon. The ERP in pharma can help to integrate the entire pharma retail process. The smartphone of Field service Engineer (FSE) can be used to have an in-built app with Global Positioning System (GPS). The GPS will help to track the time spent by the FSE in the market. The app can be used to update the daily progress and challenges of the FSE and service report of the customer. Also, the data of the App can be harnessed and analysed using ERP software to make better predictions and future decisions.

(Swarupa Arvapalli et.al, 2019) in their research paper explained the importance of Artificial Intelligence (AI) in the Pharma Industry. The researcher explained about the multiple tools of AI used in pharma industry. In manufacturing of drugs AI can help in drug discovery through the analysis of automated data. Also, the paper explained how several companies are using robot running on AI in preparation of oral and injectable medicine.

(Kokilam, Joshi & Kamath, 2016) in their research paper explained about the ways to strengthen the supply chain of the pharma industry by using Information Communication Technology (ICT). The paper explained about the role of technology to gain better visibility in the supply chain of pharma industry. The paper explained that earlier barcodes are used for tracking and visibility purpose, now the role is shifted to Radio Frequency Identification Devices (RFID). The RFID helps in tracking the shipment of the drugs from the procurement, to transportation of drugs into the

warehouse, to checking the inventory in the warehouse, to update in the system about reverse logistic or stock out which eventually help in making the current and future inventory decisions. The paper concluded that the main goal in the supply chain is the effective utilization of inventory and reduction in the overall cost and that can be achieved by the use of technology.

(Bolineni, 2016) in the research paper explained about the problems in the supply chain function in the Indian pharma industry and use of digital strategies in managing the supply chain. The research paper explained that the enhancement in the supply chain can only come through automation and improved communication. Further the research explained that the inventory can be better utilized and predicted by using better forecasting models and that can be done by using digital tools and technology that can harness data fast and accurately.

(Jain, S. & Jain, R., 2019) in their research papers explained the importance and use of Information technology (IT) in the India's pharmaceutical industry in terms of productivity, quality, cost and compliance. The survey was sent to 400+ pharma professional and the result was analysed using statistical analysis (ANOVA). The research found that most of the organization spend more than 4% of their total capex on IT. The final conclusion comes out in the research was that those companies who are spending more than 4% of total budget in IT have seen an increase in the productivity and quality and decrease in the overall cost.

RESEARCH METHODOLOGY

The research was conducted to understand the role of digital technologies in the transformation of various functions in the pharmaceutical industry. The technique used in the research was purposive sampling technique where we sent the survey with the structured and validated questionnaire to the sample population, who were employees of different pharma companies in India. The reason to choose this method was because we had prior knowledge about the purpose of our research and that gave us an opportunity to choose and approach eligible participants. We sent the

survey to 105 respondents, but we only got the survey response back from 88 respondents, and we had chosen the survey response of 70 respondent, who had filled the complete survey. We ensured that the sample population in the survey was heterogenous in terms of age, gender, experience, designation, department, qualification and companies. The reason of choosing heterogeneous sample population in the survey was to conduct an unbiased research. The questionnaire in the survey were designed on the basis of the objective of the research. A detailed study on the pharmaceutical industry and various technological advancement in the industry was completed before preparing the questionnaire in the survey to ensure that the survey result adds value in the research. The survey was sent to the participants with a link on the messaging platform and Email. After getting the survey response Microsoft excel was used for processing the data of the survey.

KEY OBJECTIVES

To understand the role of technology and digital strategies in the transformation of the current and future state of Quality and Compliance (Q&C), Research and Development (R&D), Supply Chain and Manufacturing (SC&M), Sales & Marketing (S&M) functions in the pharmaceutical industry in India.

RESULT AND ANALYSIS

The sample population in the survey was of diverse age and gender. Out of the 70 respondents in the survey 52 were males (74.2%) and 18 were females (25.7%). The respondents in the age group between 25-35 years were 34.20%, between 35-45 years age group were 45.70% and more than 45 years age group were 20%. Also, the respondents were working in different function in the pharmaceutical industry. Out of the 70 respondents, 8 respondents (11.40%) were working in Research and Development (R&D). This participant helped in knowing the R&D practices followed in their company in the manufacturing and supply chain department. Out of 70, 12 respondents (17.4%) were working in operations and supply chain function in the pharma industry, 45 respondents (64.2%) were working in sales & marketing

function in the pharma industry and 5 respondents (7.14%) were working as techno commercial in the pharma industry. Also, the respondents were working in different designation and had different years of experience of working in the pharmaceutical industry. Out of the 70 respondent 22 (31.4%) were working as management trainee, 51.4% were working as manager, 11.4% were working as general manager and 5.7% were working in the top management position in the leading pharma companies. 30 respondents (42.8%) had work experience of less than 5 years, 31.4% had work experience between 5-10 years, 15.7% had work experience between 10-15 years, 10% of the respondent had work experience more than 15 years in the Indian pharma industry. The respondents in the survey were from different functions, designation and experience which helped in getting the diverse responses in the survey about the impact of digital technologies in the transformation of different functions in the pharmaceutical industry in India. The survey results helped in drawing conclusion and recommendation in the research.

Table 1.1: Demographic Details of Respondents, Source: Primary

Respondent Details	Number of Respondent	Percentage
Age (in years)		
25-35	24	34.20%
35-45	32	45.70%
45-60	14	20.00%
Total	70	
Gender		
Male	52	74.20%
Female	18	25.70%
Total	70	
Designation		
Trainee	22	31.40%
Manager	36	51.40%
General manager	8	11.40%
Top management	4	5.70%
Total	70	
Experience (in years)		
0-5	30	42.80%
5-10	22	31.40%
10-15	11	15.70%
More than 15	7	10%
Total	70	
Functional Domain		
Research and	8	11.4%

Development		
Operations	12	17.14%
Sales and Marketing	45	64.2%
Techno commercial	5	7.14%
Total	70	

Table 1.2: The R&D investment (%) by the companies as a part of their Net Annual Sales, Source: Primary

R&D (%)	Number of Respondent	Percentage
0-5%	12	17.1%
5-8%	22	31.4%
8-12%	26	37.1%
More than 12%	10	14.2%
Total	70	

Table 1.2 show the survey response on the investment in Research and Development (R&D) by the different pharmaceutical firms in India as a part of annual sales. Out of the 70 participants who were working in different firms in India , 10 participants (14.2%) replied in the survey that their companies were spending more than 12% of the annual sales on R&D, 37.1% of the participant replied the R&D investment in their firm was 8-12% of the annual sales, 31.4% replied R&D investment in their firm was 5-8% of the annual sales and 17.1% replied R&D investment in their firm was 0-5% of the annual sales.

Table 1.3: Major investment in digital technologies in different functions in the company, Source: Primary

Functions	Number of Respondent	Percentage
Manufacturing (Quality and Compliance)	54	77.1%
Supply Chain Management	13	18.5%
Sales and Marketing	3	4.2%
Total	70	

Table 1.3 shows the survey response of the major investment in digital technologies in different functions in the Indian pharma

companies. The survey result showed that highest investment of the companies was in the manufacturing department (77.1%) to ensure good quality and compliance, then 18.5% in supply chain management and then 4.2% in sales and marketing.

Table 1.4: Areas in which pharma companies are making investment of digital technology, Source: primary

Areas	Number of Respondents	Percentage
Data Analytics	28	40%
Digital Services for Personalised Care	17	24.2%
Digital Engagement Technologies	10	14.2%
Automated Processes	15	21.4%
Total	70	

Table 1.4 show the survey response on different areas where the pharma companies were making the investment in the digital development. Out of the 70 participants in the survey 28 participant (40%) selected their company are investing in the Data Analytics, 24.2% selected their companies are investing in the digital services for personalised care, 14.2% selected their companies are investing in digital technologies for engagement purpose and 21.4% selected their companies are investing in the technology for bringing automation in the processes.

Table 1.5: Expected changes with the investment and use of technology in different functions, Source: Primary

Functions	Number of Respondents	Percentage
Improvement in the R&D results (Drug development and advancement)	53	75.71%
Improvement in Manufacturing Processes (Quality and Compliance)	65	92.8%
Creating an agile, automated and integrated Supply Chain	49	70%
Creating Sales and Marketing more customer-centric	32	45.7%

Table 1.5 shows the survey response which was based on the survey questionnaire with an option to select multiple option. Out of the 70 participants 53 participants (75.71%) believed that the technology will help in improvement in the R&D for drug discovery and drug development, 92.8% respondent believed that the technology will help in the improvement of the manufacturing processes and quality and compliance, 70% respondent believed that the technology will help in the integration of the supply chain and 45.7% believed technology will help in making the sales and marketing processes more customer centric.

DISCUSSION

The reason of conducting the research was to understand how the digital technology can help in the improvement and integration of the multiple functions in the pharma industry. The research helped in understanding the importance of digital technologies like AI, IoT, Data analytics etc. in the different functions of pharma industry. In the research, survey was conducted from the personnel working in the Indian pharma industry across the different companies and designation. From the survey result in the table 1.2, it can be seen that 51.3% of the companies were making investment of more than 8% in the Research and development (R&D) as a part of their annual sales i.e. half of the personnel were working in such companies which focusses in the Research and Development department. From the survey result in the table 1.3, it can be seen that that the major part of R&D is invested in the improvement in the manufacturing practices (77.1%). This looks very good in the India's pharmaceutical industry part because Indian pharma companies faced a lot issue of compliance and quality in their manufacturing processes. The R&D investment in the manufacturing will help in reducing the overall cost and failure rate in the drug discovery and dug development. This will be a key differentiator for the Indian companies because the cost involved in preparing a new drug and introducing it to the market has increased sharply from nearly \$1.1billion in 2010 to more than \$2.1billion in 2018. The R&D investment in manufacturing the biosimilars drugs will be very beneficial for the Indian pharma

companies because it is expected that the India will capture 8% of global \$62 billion market of biosimilars by 2025. Also, the R&D investment in the manufacturing department will help the pharma companies in improving their utilization rate and reducing the cycle and lead time.

The survey result in the table 1.4 illustrates the various areas in the pharmaceutical companies, where the companies were making investment in the digitalization and Table 1.5 shows the changes companies were expecting with the use of technology in different functions. In the survey result 40% of the respondents were working in the company making major investment in the data analytics. The importance of data analytics is paramount in every department in the pharma industry. In R&D and manufacturing department, data analytics can help in tracking the success rate of the testing of molecules and drug discovery with advanced simulation techniques and predictive modelling. Also 75.7% of the respondent selected the option in the survey that their companies were expecting improvement in the R&D results and 92.8% selected the option that their companies were expecting improvement in the manufacturing processes with the investment in the technology. In supply chain and operation, analytics can help in tracking the flow of the product and to plan the inventory with the use of cloud analytics software. In the sales and marketing functions, data analytics can help in understanding the profile of the patients and what need to be prescribed to them. This will eventually lead to precise targeting and better conversion. In the survey 14.2% of the respondents were working in the companies making investment in the digital engagement technologies. These technologies will help the companies to engage better with physicians, channel partners and patients. In the survey 24.2% of the respondents were working in the companies making the investment in the digital technologies for personalised care of the patient. These technologies will help in monitoring the health of the patients (24*7) and providing appropriate feedback to them and 45.7% of the respondent in the survey selected the option that their companies were expecting sales and marketing function will become more

customer centric with the use and investment in technology. In the survey 21.4% respondents were working in the company making investment in technologies for automation in the processes and 70% of the respondent selected the option that the technology will help in the integration in the supply chain function in their company.

CONCLUSION AND RECOMMENDATION

The response and the survey result shown that the pharma companies see a positive role of digital technologies in the transformation and they are expecting a positive change in the various functions with the investment in the digital technologies. Today, the pharma companies should assess the current state of their processes, system, technology, data and people and if they find any gaps, they need to see if technology can help in filling the gap. The companies should invest in technology helpful in harnessing and analysing the data. The main focus of the technology will be to make the system more simple, efficient and agile. The strategic approach in the digital vision of the company will begin with the leaders and top management working across the different domains, who will be accountable in driving the digital strategy in the organization. These people will need to understand the technological requirement in the functions and decide whether to invest, collaborate or outsource the technology. Also, the companies need to train the internal people and hire some external people who can effectively use the technology. The progress and the changes from the technology needs to be constantly monitored and evaluated to decide the improvement required in the technology. It is important that the organization need to change as a whole for the digitalization of the company because new data driven technology will completely revolutionize the fragmented pharmaceutical sector of India and it will help in the transformation of the R&D, Manufacturing, Supply Chain and Marketing function of the pharma companies and will eventually serve the need of today as well as lead to a better tomorrow.

LIMITATIONS

Out of the survey sent to 105 participants, only 70 participants completed the entire survey. The reason can be participants were not interested in participating or they lack the knowledge required in answering certain questionnaire in the survey. Therefore, in future the researcher should consider sending the

survey to much larger population. Also, Respondents might be biased in answering certain questions in the survey. The reason can be they want to show the positive image of their company therefore it is suggested that the researcher in the future must consider creating few descriptive questionnaires in the survey.

REFERENCES

1. Reddy, A. V. J., & Rao, B. M. (2017). Opportunities and challenges for Indian Pharmaceutical companies in overseas markets and need of digital tools for sustainable success. *Indian Journal of Pharmaceutical Education and Research*, 51(2), 226-238.
2. Ganguly, A., & Kumar, C. (2019). Evaluating supply chain resiliency strategies in the Indian pharmaceutical sector: a fuzzy analytic hierarchy process (F-AHP) approach. *International Journal of the Analytic Hierarchy Process*, 11(2), 153-180.
3. Chaudhuri, B. R., Bhattacharyya, S., & Chatterjee, S. (2019). Pharmaceutical exports and patents in India—an empirical investigation (No. EC-19-39).
4. Sampath, P. G. (2006). Indian pharma within global reach?. UNU-MERIT, Maastricht Economic and Social Research and Training Centre on Innovation and Technology.
5. Alagarsamy, S., Kandasamy, R., Subbiah, L. & Palanisamy, S. (2019). Applications of Internet of Things (IoT) in Pharmaceutical Industry, PP 3-10.
6. Dr. Rahate, V., Joshi, S. & Upadhyay, M. (2015). Transformation in Pharmaceutical Industry: Developing Customer Orientation, PP 1616-1619.
7. Langhauser, K. (2017). Degrees of Digitalization: Armed with the education and motivation, pharma needs a new plan. Retrieved from <https://www.pharmamanufacturing.com/articles/2017/degrees-of-digitalization/>
8. Baines, D. A. (2010). Problems facing the pharmaceutical industry and approaches to ensure long term viability.
9. Bhole, L. & Verma, S. (2018). Digital Marketing: A Road Ahead to Pharmaceutical Selling, pp 62-64.
10. Araújo, M. R., Sa-Barreto, L. L., Gratieri, T., Gelfuso, G. M., & Cunha-Filho, M. (2019). The digital pharmacies era: How 3D printing technology using fused deposition modeling can become a reality. *Pharmaceutics*, 11(3), 128.
11. Dr. Gosar, A. & Acharya, R. (2019). Development of a Service Delivery Model that Will bridge the Gap between Service Support Expected by Indian Pharmaceutical Companies.
12. Al-Dewik, N. I., & Qoronfleh, M. W. (2019). Genomics and precision medicine: Molecular diagnostics innovations shaping the future of healthcare in Qatar. *Advances in Public Health*, 2019.
13. Kokilam, M. B., Joshi, H. G., & Kamath, V. G. (2016). Strengthening the pharmaceutical supply chain management with information communication technology intervention: A windfall to the Indian rural public healthcare system. *Journal of Health Management*, 18(2), 274-289.
14. Bolineni, P. (2016). The Indian Pharmaceutical Industry's Supply Chain Management Strategies (Doctoral dissertation, Walden University).
15. Saini, S., Prajapati, P. K., & Jain, S. L. (2020). Transition metal-catalyzed carboxylation of olefins with Carbon dioxide: a comprehensive review. *Catalysis Reviews*, 1-47.
16. Daidj, N. (2016). Strategy, structure and corporate governance: Expressing inter-firm networks and group-affiliated companies. Routledge.

17. Patidar, A., Vinchurkar, K. & Balekar, N. (2018). Digitalization in Pharmacy, PP 37-40.
18. Champagne, D., Hung, A., & Leclerc, O. (2015). The road to digital success in pharma. McKinsey White Paper.
19. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. *International Journal of Innovative Technology and Creative Engineering* (ISSN: 2045
20. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.
21. Sarwal, R., Prasad, U., Gopal, K. M., Kalal, S., Kaur, D., Kumar, A., ... & Sharma, J. (2021). Investment Opportunities in India's Healthcare Sector.

FACTORS THAT AFFECT PURCHASE INTENTION OF SUBSCRIPTION OF ONLINE VIDEO STREAMING SERVICES AMONG MILLENNIAL AND GEN Z

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ABSTRACT

Growth in digitization combined with availability of low cost internet tariff in India has led to an increasing number of users subscribing to online video streaming services. As a result, this had led to the entry of a large number of players in the online video streaming services category in recent years. The category is expected to record double digit growth from subscription revenues in the next 5 years. Due to availability of a plethora of streaming service providers, the consumer decision making becomes all the more complex. Hence, in such a category, a consumer's purchase intention aids the providers of these services with the actual consumer buying behavior. There are a variety of factors that play an important role in affecting the purchase intention of a consumer belonging to the millennial and Gen Z. This paper sets out to identify factors such as ability to share a subscription, different viewing options, role of advertisements, pricing, frequency of content roll-out and relevancy of the recommendation system of a streaming platform. Primary research was conducted to collect responses using questionnaires and quantitative analysis of the data obtained was done. The findings of the study indicated that out of all the factors discovered only ability to share a subscription, pricing, relevancy of recommendation system and viewing options have a significant impact on the purchase intention of a consumer. The factors identified can provide valuable insights into consumer preferences which can further be used by the researchers or service providers of streaming services to improve the quality of their offerings in order to drive higher customer engagement and sales.

Keywords—Subscription, OTT, video streaming, behavior, decision making, digitization

Introduction

With the launch of reliance Jio in 2016, a long wave of digital disruption took place in India. The mobile data consumption in India started growing leaps and bounds, the country witnessed an unprecedented growth in the terms of data usage. With the constant up gradation of 4G networks across networks, the average monthly data usage by an individual user has witnessed a CAGR of 16% annually. With each user using 11 GB of data each month, the way media consumption is done by users on smartphones has seen a dramatic shift. The data usage is set to touch 24 GB per month by the end of 2025[5]. With the change in consumption pattern a new wave of digital subscribers have risen in the country. To tap into the content consumption part of a consumer, the major telecom as well as technology companies has tried to build a footprint with regards to the content consumption of a user. As a result of this, various companies have tried to build services that provide direct access to the digital customer. OTT video content has been at the forefront of what keeps users hooked to their screens.

Platforms offering online video streaming services via a subscription model are a relatively new phenomenon in India. Historically, OTT video content never appealed to the mass consumer segment. Hence it was only produced keeping a niche audience in mind. But with growing digital consumption fueled by various factors, the OTT video content market started creating content for mass consumer segments. There has been a shift in how the users consume traditional media now. The boundaries that once separated digital media from traditional media have become narrower.

Video subscription revenues witnessed a growth of 111% in 2019. This is primarily because content like originals and sports went behind pay wall and also the amounts paid to content owners by telecom operators for their customers increased [10]. There are a host of extrinsic factors pushing the increase of OTT SVOD market size. Factors like increasing GDP per capita, surging smartphone users in the country and increasing internet penetration are driving more user to OTT SVOD market.

This clearly indicates the potential that exists for OTT video content platforms to grow and acquire a larger share of customers. Netflix and amazon prime video are particularly of foreign

origin. Cable subscription fees in foreign nations like US are particularly high. These players offer competitive pricing as compared to the cable subscription in those countries. To succeed in India price can be one of the major factors affecting a consumer's purchase intention. A customer usually evaluates a subscription primarily on the cost that he/she has to bear for the service. Then comes in other factors that play a major role in his/her final decision of making a purchase or not. Hence this paper tries to identify the key factors that influence consumers' behavior for purchasing subscription video on demand. The current research explores the relationship between prices of the subscription, viewing options, ability to share the subscription, frequency of content roll-out, relevancy of the recommendation system of the platform with the purchase intention of the consumer.

Literature review

A. Overview of OTT video services in India

OTT service is basically using a public network to distribute premium content online. It uses the Internet Protocol (IP) to transfer content over the network [29].

End user only needs to have an active internet connection to access the OTT video service at their leisure. This internet connection can be either mobile based or available locally. These platforms circumvent multiple system operators such as cable or satellite television [7]. Theorists however view OTT video platforms as the death of platform, however streaming can be understood more of as a new way of consuming audiovisual content. The video streaming services market is expected to reach \$98 billion in 2025, which is more than twice the figure of \$48 billion recorded in year 2019[16].

The prediction has been done keeping in mind the rise of internet users in India. The number of internet users in India has shown a dramatic rise. From 259 million internet users in 2015, the numbers more than doubled to 564 million in 2020. The users are further expected to reach 666 million by the end of 2023 [26].

In terms of audiences that watch online content, in FY 2018 the number was 225 million and it is expected to grow to 550 million by the end on FY2023 [34]. Apart from

the players that have entered the OTT video streaming ecosystem, the incumbent telecom operators are also trying hard to monetize the opportunity by bundling services with Considering the growth potential of OTT platforms in India, several players joined the bandwagon and launched their own video streaming platforms. In terms of numbers, the top three platforms with most number of paid users are Netflix, Amazon prime video and Hotstar [9].

Apart from the players that have entered the OTT video streaming ecosystem, the incumbent telecom operators are also trying hard to monetize the opportunity by bundling subscription with their recharge plans eventually increasing the data consumption by the users [34].

Given the characteristics of the Indian markets and the relative newness of the OTT video content platforms, it becomes difficult to predict the impact of these OTT video platforms on the users. Hence it becomes crucial to investigate the factors that influence users' intention to purchase a subscription to a particular platform. India has a very large population and hence the market size and the growth potential is huge. At present, 55% of the total OTT video platform users are from the top 5 cities in India. At the same time, of the overall users of OTT video platforms, 36% belong to Tier I cities [20]. In a recent report, the falling on DTH is particularly evident. Due to rising cost of DTH subscriptions and increasing popularity of OTT video platforms, India lost close to 2 million DTH subscribers in 2019 [14]. OTT platforms have been a major driver of this kind of change. And yet, this is just the beginning. Traditional media have always been for mass consumption. But when it comes to OTT, it is more about a personalized experience which the traditional media is unable to offer. With falling data prices and bundling of subscription by the telecom operators, the OTT video content is reaching to a far wide audience.

In India, the major players in the online video streaming category are Netflix, Amazon Prime video and Hotstar. These players were quick to anticipate the surge in demand for OTT video content and rolled out services rapidly. Hotstar launched its service in 2015, with Netflix

coming in 2016. These players have managed to grab a large share of user base since then. Overall, the Indian OTT market is growing at a CAGR of 22.6% [12]. In the current OTT video content market, majority of the players follow a freemium model. In this particular model, the platforms allows users to use all the features free of cost for a specified period of time post which the user has to upgrade to a monthly or an yearly subscription plan by paying a fee. For a country like India, users are wary of trying new services by paying a fee. Hence the freemium model allows a particular brand to showcase its offerings post which the user can decide if he/she wants to continue using the service or not. Over a period of time since these subscription based video platforms have been introduced, all the players have tried to innovate their offerings. Since smartphones are the most popular devices used for consuming OTT video content, the platform have tried to make the platform more mobile friendly. One of the unique selling propositions these platforms offers is allowing users to download the content offered for offline viewing. This acts as an important factor that drives users to buy their subscription since the network connectivity in the nation hasn't matured yet and there are regular signal drops being faced by the users. However if this is the only reason why users buy a subscription will be uncovered later in the paper.

B. Previous literature on online video streaming services

OTT video content is a relatively new platform in India; hence there has been limited quantitative research from an Indian viewpoint. A qualitative research on factors affecting adoption of OTT services in the millennial age group has been discussed [24]. User behavior to online streaming services is an important factor to be considered while designing any service. [13] have discussed this by analyzing user sessions on various video streaming platforms. To build a loyal user bases [25] suggested measures to improve service quality in a business that constantly strives to get hold of consumer attention.

More than 50% of the Americans plan to discontinue their cable subscriptions owing to price rise. [23]. The quarterly trends of the

past five years was run by TiVo which concluded that half the surveyed people were switching to streaming services due to the rising cost of cable TV subscription [23]. There were users who had already stopped using the cable TV because of increasing service charges. As an alternate these customers switched to streaming platforms like Netflix, Amazon prime and Hulu [23].

[3] Determined that entertainment is the primary purpose for using cable TV whereas online streaming services have been used for information learning. Consumers have dropped cable television because of the cost and made a switch to streaming services.

Due to the onset of Coronavirus across the world, the media industry started launching films on the OTT platforms, something previously restricted to only theatres. This trend is speculated to continue since the OTT platforms have a wider audience reach. Hence the film industry will reconsider OTT platforms as a feasible option of releasing cinema. [31] Discussed the big battle between theaters and OTT platforms.

All platforms have some or the other form of unique content that caters to a wide set of audience. These platforms use premium content to get people to pay and subscribe to their services. The minimum subscription duration is one month for majority of the platforms. A user interested in watching only a particular content from multiple platforms will need to subscribe to all of them for a minimum of one month. Most users do not have that kind of spending ability. Hence these platforms miss out on a large number of users due to the unavailability of pay per show pricing model. [22] Discusses the opportunity worth a billion dollars that the Indian OTT industry is missing. Several factors motivate users to adopt OTT services. These have been investigated by [6]. The possibility of OTT video content acting as a substitute for TV consumption is examined by [21]. Size of the company or the date of launch of the OTT service does not indicate the business performance of OTT players [8].

Rather, to sustain the business of a company, the intention of a consumer to pay for using the OTT service has been emphasized. With regards to the promoting subscription of online video streaming services, there is a shortage of

research in this area. This study aims to identify and analyze factors that affect a customer's purchase intention which can help in building the right strategy for promoting the business in the market.

C. Purchase intention

In order to run a profitable business, a company or a firm must realize the factors that affect a consumer's decision to purchase a particular service. When a customer is usually satisfied with the service, his intentions to purchase promote profitability to a business. With regards to the field of business, purchase intention can be considered to one of the most important sections. In case of online video streaming service this intention to purchase is determined when a customer's completes his free trial period offered by the streaming platform. At this point of time customer satisfaction related to the service will determine if the consumer will make the purchase or not. His purchase intention will determine if the service was able to meet his expectations and need [19]. On the other hand, if the service quality of the streaming platform does not meet the customers' expectations, this will lead to dissatisfaction. Hence purchase intention acts as a key to the long term success of a business which assists in keeping customers and collecting CLV (customer lifetime value).

It is difficult to measure customer expectations before launching a service. Businesses realize this only post the launch of a service. Hence it becomes all the more important to determine purchase intention. In spite of the cost involved in building the service, purchase intention acts as an important tool in preserving the competitive advantage of a business. A higher level of purchase intention by the customers will eventually help in building a relationship with the customer that is profitable. The acquisition cost of a new customer is higher than preserving an existing customer. Hence, in order to preserve the existing customers continuous improvement in service levels becomes important to preserve an important source of revenue.

D. Viewing options

With the improvement in the technology, the level of details that could be captured in a video frames increased exponentially. As compared to a 1080p video, 4K Ultra high definition today delivers four times more details. There has been a growing trend of using 4K. This format was first launched in 2013. At the same time, in countries like India, 4K television sets have become more affordable for the masses [2]. The top players in the market have started releasing content in UHD quality. As per [4], a high definition experiences affects the apparent usefulness and use of Ultra High Definition Television.

Since most of the content is consumed by people on the move, the patchy network acts as a deterrent to the live streaming of the content. The online video streaming companies started offering downloading content for offline viewing, which meant a user could download particular content on his/her device and watch it even in the absence of a live internet connection. However not all of the content is being allowed to be downloaded. This can become a make or break factor while evaluating alternatives to a particular subscription. A user who consumes content majorly while he/she is travelling might not want to buy a particular subscription if it doesn't allow him/her to watch content offline by downloading it beforehand.

Hence viewing options becomes an important parameter to be considered for evaluating consumer's purchase intention of an online video streaming subscription. A set of 4 items have been used in measuring the viewing option responses in the survey.

E. Ability to share subscription

As per a recent survey, more than 60% of the Indian online video streamers share their subscription with their friends/families/peers [27]. That puts India in the number 1 spot of sharing their accounts with others. This has both good and bad ramifications for the market players. More accounts being shared implies there is an increasing demand for video streaming services. On the other hand, the market players lose out on revenues that they could have garnered from these watchers. To restrict the account sharing, most of the major

online video streaming service provider has put a cap on number of simultaneous users accessing the same account.

Netflix allows only a total of 6 registered devices per account with a total of 5 profiles. Under the basic account, only one user can stream at a time whereas to get more people to stream from the same account, a user had to shell out more money. Amazon prime video on the other hand does not restrict the number of devices that can access the same account, however restricts simultaneous streaming. It allows only three devices to stream different media simultaneously. If same content is being viewed, it can be done only on two devices at a time. In case of Hotstar, allows a maximum of 6 simultaneous streams [18]. These factors play an important role while a consumer looks for purchasing a subscription. Only the major platforms have been discussed here to explain subscription sharing. Almost all the platforms that offer video streaming services, there is some certain fixed limit on number of users allowed. Hence its effect needs to be measured on the consumer purchase intention.

F. Frequency of content rollout

Most online platforms have a repository of movies/TV shows/ Web series that a user can access anytime. These platforms continually keep adding new content in order to make the platform satisfy its users. Most platforms have started developing their own content in order to lure more customers to their service and increase stickiness of their existing user base. One of the leading players, Netflix, spent \$15.3 billion dollars in order to produce its own content [17]. This has been one of the reasons for users to pick Netflix over its rivals. It released more than 20 Original shows in 2019. A user is bound to end up using a platform where he/she resonates more with the content being rolled out. In order to capture a larger market share, these platforms have started introducing content from different languages across the world by providing subtitles for the shows. Hence from a point of view of a customer, the quality and frequency of content roll out becomes a factor while evaluating alternatives. Hence its impact on the consumer purchase intention needs to be evaluated.

G. Recommendation system

Since there are too many options available to watch on a single platform, too much of information causes users to get distracted. The consumers on a daily basis are exposed to plethora of online sources to discover reliable information. This causes distress to the consumers. In order to reduce this distress of the consumers, all the online video streaming platforms have invested heavily in developing algorithms that recommends personalized content to users [32]. Recommendations systems have been in place for quite some time in all the platforms that fall under the umbrella of online video streaming services. But most of these platforms recommend content which is either most popular or searched the most number of times [33]. The element of personalization has been missing in this. The addition of a personalization element can drastically improve the user experience of the platform by providing more value and hence contribute to increased platform stickiness. Among the TV shows that people watch on Netflix, more than 80 % of them are discovered by people through the built in recommendation system [11].

A watch list that is personalized for a user can on average increase the CTR by 80-110% [30]. Hence recommendation system provides a way to build unique selling proposition for each platform among its consumers. Therefore how important it is as a factor for a consumer while evaluating options to purchase a subscription is evaluated in this paper.

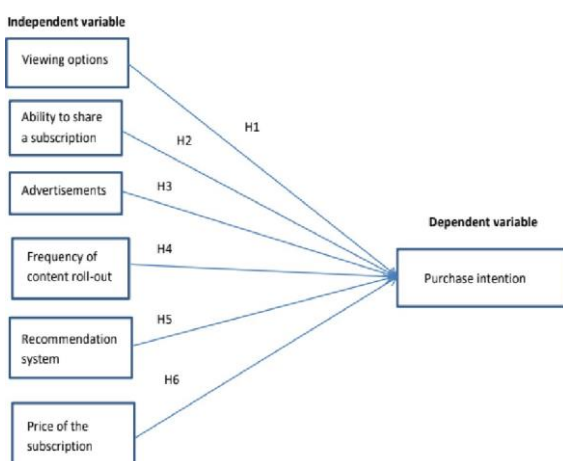
H. Advertisements

One of the key elements of a brand promotion is advertisements. They act as a tool to sell and promote the products and services. Advertisements introduce the service to the potential customers. The media industry has grown multifold, and technological advancements have to be attributed to this. Due to the advancement today brands have multiple channels to reach out to customers in order to promote the service they are offering. The various ways of promotion used by online video streaming services include but are not limited to advertising on social media channels like Facebook, YouTube, Instagram etc. These also use television as a medium to increase their brand reach. They enter into contracts

with famous Bollywood celebrities or media influencers and launch advertisements targeting their users. Users are able to relate more to a particular brand if it is endorsed by a famous celebrity. Increasing the exposure to advertisements ultimately has an effect on the brand purchase since it affects brand choice of the customers [15]. The kind of response a user develops towards an advertisement plays a vital role in transforming customers' attitude. This happens until a customer's purchase intention is formed [28].

Research framework

Based on the above literature, the antecedence of purchase intention is price of the subscription, ability to share a subscription and viewing options. Considering the growing potential of the OTT industry, the choice of factors was mainly done on the basis of how users engage with the platform. On the basis of previous studies available and the way the online video streaming ecosystem has developed in India, constructs including price of the subscription, viewing options, ability to share the subscription, frequency of content roll-out, advertisements and relevancy of the recommendation system of the platform have been proposed in the research framework. PASW statistics version 18.0, formerly SPSS statistics was used to analyze the data quantitatively.



Hypotheses development

The relationship between viewing options and purchase intention

Hypothesis 1: (H1) viewing options have a positive influence on purchase intention

The relationship between ability to share subscription and purchase intention

Hypothesis 2: (H2) the ability to share a subscription has a positive influence on purchase intention

The relationship between advertisements and purchase intention

Hypothesis 3: (H3) Advertisements has a positive influence on purchase intention

The relationship between frequency of content roll-out and purchase intention

Hypothesis 4: (H4) Frequency of content rollout has a positive influence on purchase intention

The relationship between recommendation system and purchase intention

Hypothesis 5: (H5) the relevancy of Recommendation system a positive influence on purchase intention

The relationship between price of the subscription and purchase intention

Hypothesis 6: (H6) Lower price of a subscription has a positive influence on purchase intention

Research methodology

A. Unit of Analysis, Sampling, and Data Collection

The research targeted millennial and Gen Z from different parts of the country. Due to constraints on time and resources the sample consisted of 152 students. Convenient sampling was done in order to gather responses. The purpose of the survey was informed to all the participants on the first page of the survey.

B. Questionnaire design

The survey was floated online and there were two parts of to the survey. The first part included the demographic information like age of the participant, gender, family income etc. The second part of the survey contained the construct measurement involving all independent variables price, viewing options, advertisements, recommendation system, frequency of content roll-out, ability to share subscription on the dependent variable purchase intention in order to test their relationship. Since the availability of previous research was very limited, the scale for measurement was adopted from various

research papers as well as some variables were developed from literature support. Likert scale rated 1 to 5 (strongly disagree to strongly agree) has been used to measure responses of all the variables.

Data analysis and results

A. Descriptive analysis

Ages, gender, annual income of the family were the demographic features captured in the survey. Apart from this, to know the current subscription of online streaming services, users were asked to report the number of active subscription they have.

As presented in Table 1, of the total 152 participants, 73% are males and the rest 27% are females. The number of male respondents is more than the number of female respondents. Majority (73%) of the survey participants are in the age group of 18-25 years. About 26% percent participants surveyed are from the 26-30 age range. Hence the sample has a good mix of both Gen Z and millennial. An interesting point to note here is that almost 50% of the sample population has their family income more in the 10-20 lac range. The number of subscriptions bought by people can be attributed to the high purchasing power.

Table 1. Summary of demographic profile

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	41	27.0	27.0	27.0
	Male	111	73.0	73.0	100.0
Total		152	100.0	100.0	

		Age			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-25	112	73.7	73.7	73.7
	26-30	40	26.3	26.3	100.0
Total		152	100.0	100.0	

		Annual_Family_income			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10-20 lacs	70	46.1	46.1	46.1
	5-10 lacs	38	25.0	25.0	71.1
	Above 20 lacs	29	19.1	19.1	90.1
	Less than 5 lacs	15	9.9	9.9	100.0
Total		152	100.0	100.0	

		Number_of_current_Subscriptions			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	42	27.6	27.6	27.6
	2	33	21.7	21.7	49.3
	3	34	22.4	22.4	71.7
	More than 3	28	18.4	18.4	90.1
	None	15	9.9	9.9	100.0
Total		152	100.0	100.0	

B. Reliability analysis

Multiple items were used to gather responses on a single variable. Hence Reliability statistics was used to check if the items explain the variable appropriately or not. All the factors had 4 items each in the questionnaire. From the reliability analysis, all the factors except the frequency of content roll-out were found to be of good reliability. The value of the variables except frequency of content roll-out is above 0.6

Hence after performing the reliability analysis, the variable frequency of content roll-out was dropped from further analysis.

Table 2. Reliability

Factor	Status	Cronbach's Alpha Result
Viewing options	Independent variable	0.655
Subscription sharing	Independent variable	0.907
Recommendation system	Independent variable	0.711
Price	Independent variable	0.843
Advertisements	Independent variable	0.732
Frequency of content roll-out	Independent variable	0.522
Purchase intention	Dependent variable	0.839

C. Factor analysis

KMO measure of sampling adequacy helps us find out if the data is suited for factor analysis. A value of 0.817 was obtained from the KMO test. A value of 0.817 is considered good for factor analysis data. From the Bartlett's test the value obtained was $p=0.000$ ($p<0.05$) which signified that the factor analysis is appropriate. From the Table 4, rotated component matrix, the five variables are accepted. As mentioned in the reliability analysis, there was one variable (frequency of content roll-out) whose Cronbach's alpha was less than 0.6 was not taken further for factor analysis.

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.817
Bartlett's Test of Sphericity	Approx. Chi-Square	623.070
	df	120
	Sig.	.000

Table 4. Rotated component matrix

	Component					
	1	2	3	4	5	6
Viewing_option_1	0.735	0.114	0.174	0.314	0.332	-0.052
Viewing_option_2	0.692	0.219	0.219	-0.025	0.417	0.452
Viewing_option_3	0.715	0.367	-0.049	0.498	0.362	0.374
Viewing_option_4	0.738	0.254	0.314	0.221	0.104	0.382
Subscription_sharing_1	0.147	0.778	0.225	0.371	0.201	0.292
Subscription_sharing_2	0.254	0.625	-0.017	0.297	0.438	-0.045
Subscription_sharing_3	0.118	0.611	0.301	-0.035	0.318	0.238
Subscription_sharing_4	0.117	0.729	0.341	0.384	0.273	0.317
Recommendation_1	0.478	-0.012	0.149	0.261	0.662	0.361
Recommendation_2	0.311	0.237	0.364	0.152	0.691	0.257
Recommendation_3	0.224	0.117	0.342	0.367	0.738	0.218
Recommendation_4	0.382	0.219	0.161	0.198	0.793	0.274
Price_1	-0.043	0.346	0.415	0.737	0.297	0.491
Price_2	0.156	0.478	0.328	0.794	-0.042	-0.023
Price_3	0.379	0.149	0.451	0.692	0.149	0.352
Price_4	0.238	0.207	0.118	0.714	0.304	0.407
Advertisement_1	0.245	0.228	0.362	-0.037	-0.041	0.784
Advertisement_2	0.367	0.334	0.251	0.358	0.223	0.681
Advertisement_3	0.174	0.164	-0.009	0.217	0.371	0.752
Advertisement_4	0.143	0.254	0.185	0.324	0.217	0.721
Purchase_intention_1	0.332	0.263	0.715	0.179	0.418	0.405
Purchase_intention_2	0.136	-0.004	0.782	0.478	0.351	0.309
Purchase_intention_3	-0.032	0.348	0.683	0.447	0.25	0.177
Purchase_intention_4	0.208	0.337	0.764	0.452	0.304	0.358

Durbin-Watson test was performed to check the auto correlation between the dependent and the independent variables. The resulting value obtained was 1.811 which implies an autocorrelation almost reaching zero. From the regression analysis, a R-square value of 0.603 was obtained which implies that these independent variables combined explain 60.3% of the variance in the dependent variable i.e the purchase intention. From the ANOVA table, it can be concluded that the independent variables can be used to predict the dependent variable. From the regression output in table 7 on the basis of p value <0.05 it can be concluded that out of the 5 factors, Advertisements have a p value >0.05 which means it is cannot be used to predict the consumer purchase intention. Hence advertisement as a variable is ruled out. The remaining 4 factors have $p<0.05$ and can be used to predict the dependent variable, purchase intention.

Also, as per the VIF values in table 7, the values are less than 10 for all the variables. We can safely conclude that multi-collinearity between the variables does not exist. Hence as per the hypothesis proposed, the null hypotheses for H1, H2, H5 and H6 can be rejected and for H3 can be accepted. With a beta value of 0.432, it can be concluded that subscription sharing ability has a major impact on the consumer purchase intention. The beta values for viewing options, price and recommendations as reported in the table are 0.204, 0.314 and 0.335. These values indicate that these variables independently explain 20%, 31% and 33% of the variance in consumer purchase intention.

Table 5. Result of R-Square and Durbin Watson Test

Model	R-square	Durbin-Watson
1	0.603	1.811

Table 6. Result of ANOVA test

Model	F	Sig.
1	15.794	0.000

D. Regression analysis

Table 7. Regression

Model 1	Standardized Coefficients			Collinearity statistics	
	Beta	t	Sig.	Tolerance	VIF
1 (Constant)		0.297	0.766		
Viewing options	0.204	2.418	0.017	0.671	1.491
Subscription sharing	0.432	5.907	0.000	0.894	1.119
Price	0.314	-0.079	0.014	0.691	1.449
Advertisements	-0.007	1.371	0.172	0.973	1.028
Recommendation system	0.335	3.492	0.009	0.774	1.378

Discussion

Due to the large population size of the country, India as a market for online video streaming services has a huge growth potential. With lowering data tariffs and increasing reach of high speed internet to a larger population, the companies can strategize and look forward to penetrating in the Tier-2 and Tier-3 cities population by offering local/regional content. With regards to millennial and Gen Z population, lesser preference is given to advertisement by these platforms. More preference is given to the benefits that users can accrue from buying the subscription are taken into consideration while a user plans to buy any platform subscription. Due to the easy availability of information, users are more informed than ever. These users source their information from a variety of platforms ranging from newspapers, online articles, user reviews on multiple platforms, peer groups like friends and family. The consumers in India are price conscious and hence take prices of subscription plans as a major factor while evaluating their purchase. As a consumer gets exposed to more and more information, there is an increase in the awareness and knowledge with regards to the brands and features. (Kotler,2010). Before any consumer decides to go in for a particular behavioral choice, he/she consider the implications of making that particular choice [1]. A particular platform while designing any set of offerings need to take into account of all these factors such that the resulting product meets the needs of a majority of the customer base.

Conclusion and recommendation

Television has been the major source of video content in India. This trend is however experiencing a dramatic shift. Digitization has helped improve the mobility of content where anyone with a smartphone with an internet connection can now watch video content from anywhere around the world. The recent surge in number of players in the OTT video market is a testimony to the fact that India has immense growth potential for video content.

The main purpose of this study was to identify and analyze the factors that affect a consumers' purchase intention to buy a subscription of a platform that offers online streaming services. The study was done for the millennial and Gen Z population in India particularly because there are very few studies related to this domain.

More than 90% of the participants surveyed had paid for one or more subscription services. Online streaming services have slowly started replacing the traditional television. Hence an industry in its initial stages of developing and modifying consumer's preferences needs to be examined in order to meet the right set of expectations and making the business profitable at the same time.

Based on the above research it is recommended that online video streaming platform companies should pay greater focus on how relevant their recommendation system works. Since there is a lot of content available on these platforms, users usually get confused about their viewing preferences. A good recommendation system will provide relevant content to the users and make the service more relevant as well. Majority of the population in the millennial and the Gen Z category are always on the move. Slow internet speeds while commuting can act as a barrier for users to stream videos. Hence option to manually select the video quality as per the user requirements and an option to download and save videos for offline viewing will help companies get more customers on the platform. Most video content gets pirated as soon as it is released. As a result of this the video streaming platforms lose out on a lot of potential users. Pricing will have to play a major role in this case. As discussed in the introduction section of the paper, that if a user wants to see a particular program/show/movie from multiple

platforms, he/she will have to purchase monthly subscription of all the platforms. This is not an economical solution for most viewers. Companies should look forward to introducing sachet size packs and micro payment system with validity less than a month. This can help them get more customers. Most users share the subscriptions that they buy with their friends/families. This is one of the most important factors consumers consider while evaluating their purchase of a subscription because it helps them reduce their cost of purchase. While some platforms like Amazon prime video do not have a limit of number of users using the same account at different times, others have a cap on the number of people who can use single account. With the new trend emerging where movies are directly released on the OTT video platforms; this field is certainly going to gain traction from mass audiences. Hence a new segment of population would try to use the service and watch a newly released movie without stepping out of their home. Hence it will be a major opportunity for the OTT platforms to offer their services perfectly and latch the customers to their platforms. The companies need to be customer centric in order to understand their requirements better. The freemium model acts as good starting point for potential customers who can avail the service for free for a limited time and eventually decide if they want to continue using the subscription by paying a fee. Government is also taking initiatives to expand the reach of high speed internet services to farther towns and villages. At this juncture, the next wave of customers for OTT platforms can be from these areas provided the platforms have a right mix of service on offer at a price which people residing in these areas would be able to afford. At the same time, due to the presence of a large number of players the market is very competitive. It becomes clear that the companies will have to do more than just offer entertainment on their platform. Owing to the evolving customer taste, newer

content will increase stickiness to the platform. Hence the OTT video platforms can also look forward to exploring other mediums to keep the consumers engaged. The future of online streaming platforms will lie in providing entertainment, infotainment and education all at the same place. Hence it is very imperative to study the current market scenario and customer behavior such that when any new service is released in the future, learning from the previous understanding of the users, a better and profitable service can be rolled out.

Limitations

For a country like India, the research done for online streaming services was very few. Hence research papers from other countries had to be used for designing the approach for the study. For the Indian context research done by major consultancy firms was taken at face value. These consultancy firms conduct their own surveys on a sample of the population to come up with usage statistics and insights. These numbers and insights have been used to base some of the factors in the research. Advertisements did not impact the purchase intention of the consumers. This contradicted the fact that advertisements are an important tool for marketers in general. This could be due to the small size of the sample taken. Further research needs to be done in order to quantify the impact of advertisements of the consumer purchase intention. The sampled population consisted of people only from the educated backgrounds with a modern lifestyle. There are several attributes that affect consumers' purchase intentions; however this research has tried to study only a few of them. In order to obtain more meaningful results, additional attributes can be considered. Also, this paper has only target a section of the population i.e millennial and Gen Z. Further research considering the entire population can be done in order to get behavioral insights of the consumers.

References

1. Azjen, I. (1980). Understanding attitudes and predicting social behavior. Englewood Cliffs.
2. Banerjee, A. (2019). Blockchain with IOT: Applications and use cases for a new paradigm of supply chain driving efficiency

- and cost. In *Advances in computers* (Vol. 115, pp. 259-292). Elsevier.
3. Bondad-Brown, B. A., Rice, R. E., & Pearce, K. E. (2012). Influences on TV viewing and online user-shared video use: Demographics, generations, contextual age, media use, motivations, and audience activity. *Journal of Broadcasting & Electronic Media*, 56(4), 471-493.
 4. Lee, M. R., Choi, S. J., & Lee, Y. J. (2015). A Study on the Adoption of UHD for Users Perceived usefulness and ease of use of UHD TV. *Journal of Broadcast Engineering*, 20(1), 48-56.
 5. Holla, N. (2020). Indigenous Technology as a Strategic Moat for India. *ORF Issue Brief No*, 390.
 6. Lim, S., & Lee, Y. J. (2013). N Screen service users' motivations for use and dissatisfying factors. *The Journal of the Korea Contents Association*, 13(3), 99-108.
 7. McAdams, M. (2019). WHAT IS OTT?— UNDERSTANDING THE MODERN MEDIA LANDSCAPE. *Таргой—электронный журнал— 2019—Режим доступа: [https://www. tarjoy. com/resources/what-is-ott/](https://www.tarjoy.com/resources/what-is-ott/)[дата обращения 21.02. 2020]*.
 8. Kim, M. S., Kim, E., Hwang, S., Kim, J., & Kim, S. (2017). Willingness to pay for over-the-top services in China and Korea. *Telecommunications Policy*, 41(3), 197-207.
 9. Parihar, A. S. Script writing for 'short video' with New Media skills.
 10. Pherwani, A. (2020). How will the M&E sector navigate the era of consumer ART.
 11. Plummer, L. (2017). This is how Netflix's top-secret recommendation system works. *Wired*.—2017.—URL: <http://www.wired.co.uk/article/how-do-netflixs-algorithms-work-machinelearning-helps-to-predict-what-viewers-will-like>.
 12. Kim, K. C. H. (2019). The Impact of Blockchain Technology on the Music Industry. *International journal of advanced smart convergence*, 8(1), 196-203.
 13. Qiu, F., & Cui, Y. (2010, October). An analysis of user behavior in online video streaming. In *Proceedings of the international workshop on Very-large-scale multimedia corpus, mining and retrieval* (pp. 49-54).
 14. Rakheja, H. (2020). India Lost 2 Mn DTH Subscribers In 2019, Reveals TRAI Report. *Inc42 Media*.
 15. Raj, S. P. (1982). The effects of advertising on high and low loyalty consumer segments. *Journal of Consumer Research*, 9(1), 77-89.
 16. Simon, M., & Houghton, S. M. (2003). The relationship between overconfidence and the introduction of risky products: Evidence from a field study. *Academy of Management journal*, 46(2), 139-149.
 17. Harvey, S. (2020). Broadcasting in the Age of Netflix: When the Market is Master. *A Companion to Television*, 105-128.
 18. techtree. (2019). OTT Platforms Crackdown on Password Sharing. *TechTree.Com*.
 19. Taylor, S. A., & Baker, T. L. (1994). An assessment of the relationship between service quality and customer satisfaction in the formation of consumers' purchase intentions. *Journal of retailing*, 70(2), 163-178.
 20. Sundaravel, E., & Elangovan, N. Emergence and future of Over-the-top (OTT) video services in India: an analytical research.
 21. Cha, J., & Chan-Olmsted, S. M. (2012). Substitutability between online video platforms and television. *Journalism & Mass Communication Quarterly*, 89(2), 261-278.
 22. Chinchlikar C. (2020). OPINION The billion-dollar opportunity the Indian OTT industry is missing. *YOURSTORY*.
 23. Prasath, S., & Nirmala, K. (2019). A Performance Comparison of Authentication and Privacy Preserving Techniques for Secured Communication in VANET. *International Journal of Innovative Technology and Creative Engineering* (ISSN: 2045
 24. Venkata Pavan, M., Karnan, B., & Latchoumi, T. P. (2021). PLA-Cu reinforced composite filament: Preparation and flexural property printed at different machining conditions. *Advanced Composite Materials*, <https://doi.org/10.1080/09243046.2021.1918608>.

25. Dawi, N. M., Jusoh, A., Nor, K. M., & Qureshi, M. I. (2016). Service quality dimensions in pay TV industry: A preliminary study. *International Review of Management and Marketing*, 6(4S).
26. Sondhi, N., & Joshi, H. (2020). Profiling young internet addicts: implications for their social well-being. *The Electronic Library*.
27. exchange4media. (2020). Over 60% of Indian streamers share OTT subscriptions. Exchange4media.Com.
28. [28] Goldsmith, R. E., & Lafferty, B. A. (2002). Consumer response to Web sites and their influence on advertising effectiveness. *Internet research*.
29. Gonçalves, V., Evens, T., Alves, A. P., & Ballon, P. (2014). Power and control strategies in online video services.
30. Hande, P. (2020). Media OTT: Top Personalization Tips to Attract & Retain Subscribers. NetcoreSmartech. <https://netcoresmartech.com/blog/top-personalization-tips-media-and-ott>
31. Munshi, S. (2020). Prime time soap operas on Indian television. Routledge India.
32. Jeckmans, A. J., Beye, M., Erkin, Z., Hartel, P., Lagendijk, R. L., & Tang, Q. (2013). Privacy in recommender systems. In *Social media retrieval* (pp. 263-281). Springer, London.
33. Kim, M. S., Kim, E., Hwang, S., Kim, J., & Kim, S. (2017). Willingness to pay for over-the-top services in China and Korea. *Telecommunications Policy*, 41(3), 197-207.
34. Pandit, M. Beyond Television And Cinema: Audience Evolution In The Streaming Age.

IMPACT OF GOVERNMENT LOCKDOWN ORDER OVER CORONA PANDEMIC AND FORCE MAJEURE CLAUSES IN INFRASTRUCTURE PROJECTS

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ABSTRACT

Force majeure is generally known as an excusable risk in construction delay, which entitles contractors to time extensions only, but the neither contracting party is entitled to monetary compensation to recover delay damages. The outbreak of coronavirus pandemic caused the lack of workforce and disruption in construction work calls for special attention on the force majeure clauses especially in the infrastructure projects. Existing methods of delay analysis are not capable of addressing this problem, because none take into account the effect of other delays when evaluating claims of force majeure. Stimulated by this void, this study proposes an improved and sound method for fair review among contracting parties of the responsibility for force majeure delay claims due to government lockdown. This research paper analyses the instances where certain contracts such as concession agreements concluded with India's National Highways Authority explicitly involve an 'epidemic' as a force majeure case while some contracts, namely, power purchase agreements with Solar Power Corporation of India Limited do not explicitly involve an 'epidemic' as a force majeure case. This methodology used in this research paper is implemented on a different type of contracts to ascertain its practicability and demonstrate its application to claim relief on account of force majeure due to suspension of work amidst government lockdown. The paper contributes by highlighting the situation of force majeure delay due to the coronavirus pandemic that could be compensated for and raises awareness among researchers and industry practitioners.

Keywords: *force majeure; government lockdown; construction delay.*

Introduction

The current ongoing coronavirus pandemic and government lockdown imposed has presented a different set of challenges to delay in construction projects. This has led to various issues and contract disputes among parties as there was no set precedence of such an event in Indian contract laws. The implausibility of performance is provided for under Section 56 of the Indian Contract Act, 1872 (ICA), during the completion of a contract. In Chapter IV of the ICA, section 56 applies to the execution of contracts and is meant to deal with one type of situation where the performance of a contract is excused or dispensed with. The constitutional clause at first glance stressed. It will appear that paragraph 2 of Section 56 would appropriately fit in the COVID-2019 scenario.

Delay in construction projects is one of the most recurring problems and common issues in building claims. If a project is not completed on time, the lost profits and financing costs of an owner can swiftly add up. Likewise, a contractor would invest large sums on missed resources and extended Cost of Performance. Because of this challenge, and with the rising scale and complexity of nature among the

ventures, construction arguments have recently gained substantial publicity because of the rising number of delay disputes.

Contract disputes generally require arbitration and therefore comes in the need of having various clauses of non-performance in a place where parties can be excused not entirely but for the period when performance is improbable. There are various organizations that have such clauses according to the industrial nature and area of operations. The government lockdown imposed by the government of India has not only halted ongoing infrastructure projects but also produced challenges like unavailability of works, lack of resources, and disruption in the supply chain of the necessary equipment that is required in any infrastructure projects.

Most contracts specifically include a condition in which the contract will be terminated or discharged upon the occurrence of such circumstances. In such cases, the contract would be dissolved within the terms of the contract itself. However, the outbreak of coronavirus pandemic has led to confusion among various parties over whether it could be termed as a force majeure event and therefore

has led to an increasing number of disputes over contractual obligations in infrastructure projects. The key factor here lies in knowing if force majeure can be invoked to excuse the liability of non-performance which would lie in general terms and nature of the contract among parties. There are a certain set of requirements that need to be fulfilled by the contractor for invoking force majeure clause in a contract where the owner may ask the contractor or parties involved to send a formal notice stating non-performance or suspension of work due to occurrence of force majeure event or event which has a global impact like COVID-19.

Once this has been reported to the owner, regular consultation takes place between both parties to actually determine when the work can be resumed. Additionally, the party could also be asked to produce plans for mitigation and a new completion timeline after the occurrence of a force majeure event. The parties are also sometimes required to communicate when the force majeure event ends and when resumption in work could be possible. If the work can't be resumed beyond 90 days and there are no scenarios under which parties are able to come in unison to decide if performance of work could be deemed possible then any involved party can request for termination of the contract on grounds of frustration of contract.

Due to the outbreak of Covid-19, The ministry of finance has issued a memorandum with regards to 'Force Majeure Clause' stating that the coronavirus pandemic should be considered a case of natural calamity and force majeure clause should be invoked, following the due procedure and wherever considered appropriate, However, the definitions of contingent contracts, force majeure, and frustration are important for understanding the complex solutions available to the parties in a contract under the scenario of COVID-2019.

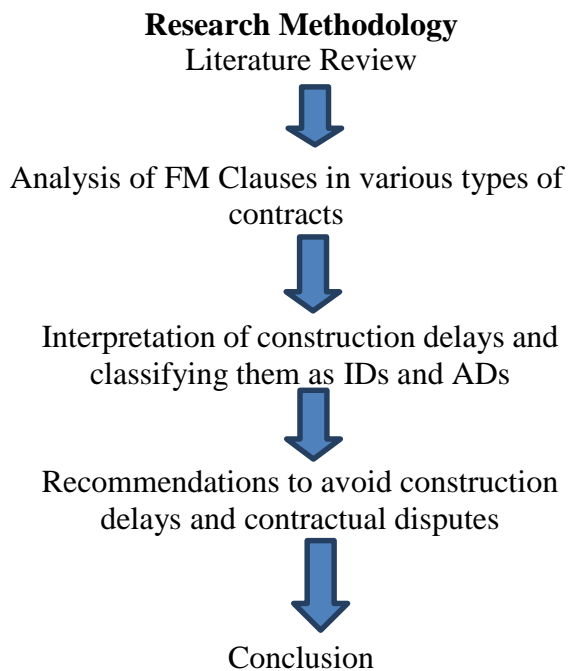
Literature Review

The unexpected pandemic of the Covid-19 has severely affected contractual efficiency worldwide. Industries would think desperate times warrant desperate measures. Maybe, or not." It depends," as the legal cliché goes, it will focus on a factual and legal review of the underlying contracts in case of contractual loss.

Government lockdown imposed throughout the country is certainly an unforeseen scenario for ongoing infrastructure projects in the country while it is a welcome step for not only people involved in infrastructure projects but also to the general population. The lockdown has made it difficult for contractors and various individuals involved in a construction project to adapt and continue operations at construction sites leading to non-performance and construction delay. The nature and terms of a contract between parties during the delay period play a huge role in terms of determining whether the contractual obligations on a party could be relieved in a period where performance is not possible due to unforeseen circumstances. However, relaxation in contractual obligation doesn't necessarily mean that there would be monetary compensation for delay/damages unless it is specified in the contract and both parties have knowledge of it. Construction delays are although natural when they are a result of circumstances that are beyond any party's control but they should be avoided at all costs. There are various types of delays in construction projects but there are mainly classified as non-excusable delays and excusable delays. The non-excusable delays are those delays where the delays are a result of actions of contractors that could have been avoided if there appropriate or timely action from contractors could have prevented the delay. In such a type of delay, the contractor is held liable for the owner's damages due to delay. The contractors also don't receive any time extension and monetary compensation or recovery for damages due to delay. Excusable delays are those delays which occur due to unforeseeable circumstance which are beyond the contractor's control. Such delays mainly arise due to force majeure events or events having a global impact like the coronavirus pandemic. In such delays, the contractors are allowed time extension for the period in which delay occurs while there is no monetary compensation for delay related damages, the contractor is also not liable to pay the late project completion damages.

Impact on the projects due to coronavirus pandemic is necessary to measure before coming to the conclusion of whether clauses on non-performance and frustration of contract

could be invoked. Factors like the accountability of extending of project's performance in force majeure periods along with various delay issues due to force majeure events are not generally considered in existing analysis techniques. This happens mainly due to a lack of awareness of such factors as well as a shortage of such claims in infrastructure projects litigation. The Covid-19 pandemic brings into light such factors and more focus could be given to transforming non-compensable delays to compensable delays arising due to government lockdown as various individuals involved in infrastructure projects have been impacted and proper delay claim analysis is the call of the hour to determine which party would be liable to pay for damages in case of delays due to force majeure events.



The methodology for the research was to analyze various clauses in contracts for non-performance and force majeure events for contracts from government, public, private, International, and NITI Aayog contracts. The rationale behind analyzing contracts from these five sectors was to comprehend various clauses related to force majeure events and their nature in these contracts. The government lockdown plays a huge role in determining the duration of the delay as the COVID-19 still looms large. The contracts from these sectors also highlight the conditions for non-performance and frustration of contract and relaxation in

contractual obligation. However, the key concept lies in understanding whether these contracts have any mention of an epidemic or any event that has a global impact and renders the project's performance improbable.

The suspension of work clause in contracts for force majeure events also focuses on conditions of non-performance and frustration of contract. These conditions and clauses present a wider picture for understanding whether a particular contract would stand in an event of global impact like coronavirus pandemic. Then the next step is to determine the impact on the project and whether the damages can be compensated due to government lockdown. This coupled with the extent of non-performance since the government lockdown has been relaxed in certain areas of the country serves as an essential factor to determine the possibility of claims of an excusable delay in various infrastructure projects. However, if the contract has no mention of such events as force majeure events but they are rendering the performance of the contract impossible then the next step is to consider Section 56 of the Indian contract act, 1872. The contractual provisions would obviously have more impact in such matters over section 56 of the Indian contract act, 1872 but they can be refuted on grounds of notice requirements. Likewise, if a contractor or the owner has already anticipated the intervention of such events during the performance period of the contract and a case for non-performance cannot be made because the parties have already decided that there would be no exception to performance in case that anticipated event happens. Although, such cases can also be defended on grounds on unequal bargaining powers between two parties. The last part of the methodology was to classify the claims into two categories of delays which are inexorable delays and avoidable delays. The claims can be classified into these two categories by examining the factors contributing to the delay for unforeseen events like COVID-19. Currently, analysis methodology in place for delay analysis only recognizes the Inexorable delays (IDs) and in case such claim is termed as excusable in nature then the only extension in the time period is granted to the contractors and no monetary compensation is

granted to any party involved in the contract. The process of establishing the chances of avoiding a delay during force majeure event helps in finding our liable party where the delay could have been avoided if the liable party would have taken action at an appropriate time. The avoidable delays (ADs) are not regularly considered for delay analysis even after the fact various instances of such cases substantiate their permissibility. We can rightly state that avoidable delays are the result of repercussions of extending the earlier established time period of the projects and could have been avoided by sticking to the established timeline of completion by both parties.

Results and Analysis

A contract that contains terms or clauses apart from the force majeure clause can also lead to non-performance or suspension of work due to force majeure event. These terms can include price surge or avoidable delays which can determine the liability on the occurrence of any such event due to force majeure event. In such scenarios, a proper analysis is required considering the nature of terms mentioned in the contract along with detail provisions for any kind of delays so that any kind of relaxation on contractual obligation can be provided to the party which also includes a scenario if both parties have mutually agreed upon an event which was anticipated and included in the contract between both parties.

Analysis of all different types of contracts ranging from government, public, private, International, and NITI Aayog contracts have indicated the conditions or factors that lead to suspension of work in an event a force majeure event occurs. A deep-down analysis of each type of contract certainly provides a clear picture when it comes to understanding whether the force majeure in each of these contracts could cover complications in work due to the Covid-19 pandemic.

Government contracts like bidding document for procurement works released by government of Punjab, building and roads branch of public works department clearly states under release for performance clause that if there is a scenario where the contract is frustrated by the outbreak of war or by any other happenings which are not under the control of either the

owner or contractor, the right of declaring that the contract is frustrated lies with the engineer who will certify it. Hence, the contractor would ensure the site is safe and termination of work as soon as possible after the engineer provides the certificate and the contractor would be paid for any work done before receiving the certificate and after the agreement was granted to the contractor. The terms in the government contract are specifically stating that in case any such event occurs which makes the performance of work impossible it would lead to frustration of contract and the contractor would receive the payment for work performed before the frustration of contract. In this case, even though there is no mention of a global pandemic or a force majeure event, the release for performance clause could be invoked in light of the current government lockdown due to the COVID-19 pandemic where non-performance of work is certain. This clause further helps to make sure they are no contractual disputes and no breach in contract since government lockdown helps to invoke this clause. The contract also states the conditions that would lead to termination of the contract which includes fraudulent practices by any party or stoppage of work without any notice by the contractor. Public sector contracts considered for this research contract for construction works by central warehousing corporation which states under suspension of work clause 15 A (Compensation in case of delay of supply of material by the government) which states that contractual agency would not be entitled to claim of compensation from central warehousing corporation for damages incurred in the scenario of delay in supply of materials whether such delay is the result of force majeure event or circumstances beyond the control of central warehousing corporation. The terms mentioned in the contract could be invoked in the case of COVID-19 pandemic where major transportation modes are struggling to operate causing a disruption in the supply chain. Unlike the government contract here the contractors are not liable to receive any sort of compensation from the employer's end. However, clause for suspension of work under clause 15 includes various facets and conditions which contractor needs to fulfill before the engineer-in-charge deems suspends

the work, the contractor in such case would receive time extension for the period for every suspension as well as 25 % extra completion time if any part of work which has separate completion period in the contract and is a part of suspended work. In any case, if there is no work for 90 days since engineer-in-charge suspends the work, the contractor would be entitled to monetary compensation for wages paid to his workers/employees and also cover 2% of any indirect expenses of the contractor once he submits the claim with full details to the engineer within thirty days of completion of ninety days of non-performance at the construction site.

NITI Aayog contracts also present different provisions for suspension of work. Engineering Procurement and construction of civils works agreement by NITI Aayog was taken for the analysis which under Article 19 Force majeure clause states that defines force majeure clauses and then subdivides the reasons for force majeure event into three-part which are (i) Non-Political Event (ii) Indirect political event (iii) Political event. All these three events have specific conditions and remedies offered to the contractors and the employers on the occurrence of such events. In the scenario of force majeure event which is a result of non-political events, the contract clearly states events like an epidemic as part of a force majeure event along with the general act of god events. Upon the occurrence of non-political events, neither party is liable to receive monetary compensation from each other and would be covering their own respective cost in case of force majeure event. Acts of war, invasion, State-level strikes exceedingly more than a period of 10 days and any civil commotions constitute an indirect political event under this contract. For monetary compensation, the contractor would be liable for any force majeure cost that doesn't exceed the insurance cover for indirect political events while of the force majeure cost is above the insurance cover amount, one half of the extra cost will be compensated by the employer to contractual agency and lastly, the political event constitutes any event where there is a change of law and it's repercussions can't be remedied or any unofficial or beyond law refusal to grant any approval or license which

is necessary for the completion of work. In the political event, the employers are liable to compensate for any monetary claims due to the occurrence of force majeure event by the employer to the contractor. The general practice of providing notice to the employer is necessary for receiving any relaxation in contractual obligations within ten days of occurrence. The extension in time period would also be granted in day to day manner after the engineer-in-charge determines that possibility of performance of work. The contract has also a separate section for dispute resolution or arbitration for scenarios where both parties are not able to come to an agreement. They would be required to present evidence for impact on the work due to the force majeure event.

FIDIC contracts serve as a cornerstone for widely followed standards or guidelines for various type of projects in the construction industry. For international contracts, FIDIC contracts for engineering procurement and construction or turnkey projects were considered for analysis.

Clause 19 under force majeure clause clearly states definition of force majeure events and highlights two key factors for any event to be considered as force event if and only if it's beyond any party's control and no party could be held liable for the occurrence of such an event along with general force majeure events like wars, riots, strikes, and act of god events. Unlike the Niti Aayog contracts, in FIDIC contracts the duration to notify the employers about the occurrence of force majeure event is fourteen (14) days and the contractual agency upon verification of on-performance during such an event will be excused as long as the work is hindered by force majeure events. The general standards of sending the notice by the contractor to the employer are to be followed after the occurrence of an event that is beyond any party's control and the onus to minimize the damages during force majeure event lies with all the parties involved. The contractual agency is liable to receive an extension in a time period for the duration in which the force majeure event persists and also payment of damages or cost incurred during the force majeure event. Under the sub clause of Optional termination, payment, and release if the suspension of work is extending up to a

regular period of 84 days and an irregular period of 140 days both the parties would be in their power to ask for termination on grounds of frustration of contract. In this sub-clause, the contractor would be liable to receive payment for the cost incurred till the termination of the contract which could include wages, cost of materials, and removal of temporary equipment. In addition to above sub-clause, there is another clause for release for performance under the law which states a situation occurs where none of the party could be held accountable for non-performance under law s of the contract apart from the occurrence of events mentioned under force majeure events, in such case both parties could request for termination of contractual obligations and there would be no liability of performance on both the parties and same rules would follow

Type of Contract	Can Covid-19 be considered as FM Event	Monetary Compensation	Time Extension
Government	Yes	Yes	Yes
Public	Yes	No	Yes
NITI Aayog	Yes	Yes	Yes
International	Yes	Yes	Yes
Private	No	No	No

for monetary compensation as state above. This clause could be invoked for non-performance due to the Covid-19 pandemic due to the language of sub-clause mentioned in the contract thus benefiting parties for damages or costs incurred due to government shutdown.

Lastly, for analysis of private sector contracts of GMR contract for infrastructure projects was considered. Under force majeure clause certain events are defined which would constitute force majeure events such as an act of war, natural disasters, etc. However, there is no mention of any event apart from the aforementioned events that could be included as a force majeure event. The contractors are liable to receive any sort of monetary compensation only after receiving the certificate for the frustration of the contract after the possibility of performance is determined by the employer’s engineer. The terms of contract leave little to no indication

whether force majeure clause could be invoked in the current scenario of government lockdown due to Covid-19 which might lead to a contract dispute between parties since the contract does not explicitly provide provision for performance to be excused on the account occurrence of force majeure event apart from the general act of god events. The arbitration and sub-judice, in this case, lie with CERC (Central electricity regulatory commission) with regards to power purchase agreement. Therefore, in any scenario, if GMR is unable to honor the agreement and supply the electricity to the contractual parties due to force majeure event, it is still asking the involved parties to pay to cover up the construction and operating expenses till a timeframe of 12 months. The parties involved are then in their power to terminate the power purchase agreement. However the associated parties can impose a penalty on the company if supply is less as compared to the capacity mentioned in contract or supply of electricity is provided for lesser hours as compared to a number of hours mentioned in the agreement along with penalties in case there is some sort of failure to fulfill the obligations mentioned in the contract.

The table below provides a summary of the analysis of the terms and general nature of the contracts with respect to force majeure clauses.

Most contracts have provisions for invoking the force majeure clause in case that the event is beyond any party’s control and has not been listed as force majeure event. Contracts like FIDIC contract for EPC/Turnkey projects have separate provision listed for an event which is beyond the control of parties but are not mentioned under general force majeure event like an act of God, war, etc while NITI Aayog contracts have classified the clauses into three different causes due to which the force majeure event has occurred and the remedy offered to parties depends upon the cause of force majeure event which also has specifically mentioned the term epidemic when force majeure clause can be invoked for the occurrence of events like COVID-19 pandemic under non-direct political event in the clause. Although the government contracts does not specifically include the term pandemic or

epidemic in the force majeure clause, it still mentions that in case of occurrence of any event which cannot be attributed to any party and performance of work is not possible would also come under force majeure event under the clause in the contract which would help invoke the force majeure clause in times of events like COVID-19 Pandemic. For public sector contracts, the events which are beyond the control of any party are also considered as a force majeure event apart from the standard events in the definition and the force majeure clause could be invoked in current times of coronavirus pandemic. However, the public sector contracts do not fully compensate for expenses and damages incurred by the contractor while an extension of the time period is granted for a period in which the work has been suspended by engineer due to occurrence of an event beyond any parties' control and lastly the private sector contracts where terms of force majeure do not specifically include any event apart from general events like an outbreak of war, an act of god event which come under force majeure. Private sector contracts like power purchase agreement do not provide much of relaxation for the first 12 months where involved parties have to still pay the capacity until 12 months after which they can terminate the contract. However, parties involved in a contract with the company have liability to impose on penalty in case the contractual obligations are not met by the company in a normal scenario when there is no occurrence of force majeure event as mentioned in the contract. In private sector contracts, change of law and other acts of god events qualifies as force majeure event and arbitration process lies with regulatory bodies

Discussions

The contracts analyzed for this research paper have shown us the possibility of coronavirus pandemic to be considered as force majeure event under various suspension of work or release for performance clauses in various contracts which is the major concern with regards to contractual issues in infrastructure projects. The analysis of different type contracts mentions the conditions for invoking the force majeure clause and events that

constitute or are considered as force majeure in each type of contract. The main objective of the research was to determine whether or not force majeure clause could be invoked due to government shutdown which is a result of the Covid-19 Pandemic and answer to lies in understanding the language and terms mentioned in the different type of contracts. As per the analysis, most contracts have specific provisions for events of global impact beyond any party's control as force majeure event apart from an often mentioned acts of god events. Therefore, it would seem easy to invoke the FM Clause in light of outbreak of the Covid-19 pandemic but it is not. The measured impact on the project and estimated period and level of non-performance need to be determined before the force majeure clause is invoked because as seen in the analysis there are certain requirements to be fulfilled for invoking the clause which is a regular period of 84 or 90 days or irregular period of 140 days. In order to efficiently measure the impact and determine the time period for completion along with the level of non-performance for a particular project. We need to classify the delays caused in the construction projects into ID (inexorable delays) and AD (avoidable delays). The classification of construction delays serves essential to determine the level of non-performance and the total period of non-performance by working on reducing the avoidable delays to any construction project. The avoidable delays are generally not considered in delay analysis techniques for construction delays if we analyze can keep into mind the avoidable delays which can help us to avoid performance being pushed into the force majeure period. As mentioned during methodology, any delay that was caused by force majeure events which occurred within the period of construction agreed by both parties should be excused as even without any ordinary delay, the delay caused by force majeure event would still affect the work and therefore such delays are ID (inexorable delays). However, in a such a case where the delay caused by force majeure events has occurred after originally agreed time period of completion between parties due to ordinary delays which caused the project to be moved into an extended time period and a delay due to

force majeure event occurs in the extended time period, these delays could have been prevented if the project was completed within original completion period agreed upon by both parties. Therefore, such delays could easily be categorized as avoidable delays. Remedies to contracting parties or party which pushed the performance into extended-time period should not be entertained upon claims put forward by that party due to occurrence of force majeure event since such damages to force majeure event would not have occurred if completion period of the project would not have extended.

The major concern over here is to understand who should be held responsible in case of an ADs (avoidable delays). The solution to identifying the party who should bear the responsibility if an ordinary delay has caused the performance to be pushed into an extended-time period lies in taking into action of both parties which contributed to an ordinary delay which might be a result of ignorance of that party. Therefore, any remedy claimed by the party who caused the delay and the force majeure event occurred during the extended project time period should not be compensated. Avoiding such delays in the project schedule should be given a top priority. In the case of IDs (Inexorable delays) such claims should be compensated according to damages incurred by the claiming party due to force majeure event occurring within the project schedule. Risk mitigation for damages caused by force majeure event is necessary as it will help reduce the period of non-performance and also reduce costs due to force majeure events. However, if a party has been provided with any sort of monetary award or any benefit as part of the agreement between both parties before the occurrence of a force majeure event and after performance is impossible due to force majeure event now, the benefit receiving party should return the benefit provided by the other party. Allocation of the assessed risk beforehand especially given the current situation due to COVID-19 pandemic should be mentioned in contract which will help to cover all scenarios and appropriately identify and allocate risk to a particular party. This practice will help in dispute resolution and litigation process as the terms of the contract covers a complete list of

responsibilities and risks which is attributable to a party. The terms and nature of the contract will always play a huge role during arbitration process. For example, if a clause highlights that occurrence of any force majeure events will not trigger termination of the contract, claims of the frustration of contracts later cannot be put forward by any of the parties as both sides have agreed upon on such terms in the contract.

Accurate measurement of responsibility on both parties on occurrence of any force majeure events will help deduce if the project could have been completed in the original scheduled time. The above-mentioned different type of contracts provides a detailed list of consequences and remedies to suffering parties due to force majeure events. However, delay analysis is necessary for ideal practice while taking into consideration both IDs (inexorable delays) and ADs (avoidable delays) and it should also be kept in mind that these delays are different from other major delays that are not caused by force majeure event. The analyzing IDs (inexorable delays) and ADs (avoidable delays) are a straight-forward method but it can become complex when both parties are creating multiple delays that extend the original time schedule of the project into an extended period. Therefore, the impact of avoidable delays caused by both parties needs to be assessed which results in pushing performance in an extension period.

Conclusion and Recommendations

The nature and general terms mentioned in the contract are essential in determining whether the remedies could be granted to suffering party due to damages incurred from a force majeure event. A close examination of all clauses mentioned in the contract-related impossibility of performance would be in determining whether a force majeure clause could be invoked or not. Apart from the language and terms of force majeure clauses in the contracts the companies may have various other clauses which would help in invoking unlikelihood of performance given the company's area of operations in a sector. In these cases where unlikelihood of performance could be invoked from clauses other than force majeure clause in situation like the coronavirus pandemic, all conditions under the clauses need to be

examined. One examples of such clauses is Adverse change clause. The 5 different types of contracts were taken into consideration during the analysis of the force majeure clause presented various conditions that need to be fulfilled for invoking force majeure clause. The feasibility of invoking force majeure clauses due to Covid-19 pandemic for each of these contracts was done. In NITI Aayog, government contracts and International FIDIC contracts the force majeure clause can be invoked because of government shutdown due to COVID-19 pandemic and the contractors are liable to receive compensation for the damages after fulfilling the required pre-requisites of invoking the clause. Public sector contracts like construction works by central warehousing corporation does have provision for extension of project schedule but the contractors, in this case, are not liable to receive any benefits from the employers according to the terms of the contracts and lastly private sector contracts don't offer any sort of compensation or benefits in damages and delays caused by the occurrence of force majeure events. The impact of delays caused in each type of contract should be measured and classified into ADs (Avoidable delays) or (Inexorable delays) to determine whether the remedy claimed by a particular party should be provided or not.

The government lockdown in certain areas of country is longer in full effect. Therefore, if there is possibility of commencing the work after ensuring safety at site for workers and officials in such cases there would be certain clauses in the contract that would be needed to be evaluated on the basis of price hike and other factors. Reworking on terms of contracts would be a win-win scenario for both parties as to the performance of work during the current situation would need special provisions to maintain workability. In the areas such as Mumbai or Pune in the country where hotspot for number of cases of COVID-19 where the performance of work is not possible at the site for a foreseeable future, the involved parties should access the situation to decide if the contract needs to be terminated or suspended as the government shutdown is in full effect in these areas and there could be cases of workers and officials getting infected due to coronavirus. Therefore, it is highly beneficial

to consult for legal advice on overall language and terms of the clauses so that both parties understand their performance responsibilities and risks during a force majeure event to avoid any contract disputes.

Limitations

There are few limitations that came across during the study of different types of contracts. There are separate mentions of clauses in few contracts for the frustration of contract and impracticality of work in case a force majeure event occurs. However, these two terms are generally considered to have the same meaning but there are treated differently when it comes to Indian contract law. Under Indian contract law section 56, the frustration of contract happens when it is determined performance of work is not possible in the current scenario and it puts an end to the contract without any notice or prior procedure while impracticability or impossibility of work performance doesn't include a scenario like force majeure where the situation is beyond both party's control and where the work could be resumed in future. Government lockdown being lifted in certain areas and therefore the possibility of work to be resumed in those areas of the country is one of the situations which would be an example where work could be resumed. The frustration and impossibility of work are related in English laws where a party can be remedied from the impracticality of work by proving the frustration of the contract. In India contract laws these two terms are not inter-related and therefore a party has to assess the legal risk before invoking force majeure clause as to avoid confusion whether under Indian contract law if the situation will result in frustration of contract which will automatically end the contract or impossibility of performance under the given situation and only suspension of work is required.

Further, the different types of contracts considered for analysis also have separate mentions of suspension of work and frustration of contract clauses which have different provisions and offer remedies to suffering party on the basis of their claims of damages incurred due to force majeure event. Also, government lockdown is not uniform in India in various parts and thus the possibility of

performance and associated risks will be different for various parts of the country. The different types of contracts analyzed in this research paper also have defined remedies which a suffering party can receive upon the fulfilling the conditions but since the COVID-19 pandemic is completely unforeseen event and present different sets of challenges for parties who would be resuming the performance under current conditions would

require renegotiation of terms of contracts. However, most of the contracts don't have special provisions of renegotiation of these terms in contracts which would be causes issues to maintain workability in current times with restricted resources available to contractors.

Conflicts of Interest: There was no conflict of interest.

References

1. Pollock, F. (1905). *The Indian contract act: With a commentary, critical and explanatory.* Sweet & Maxwell.
2. Perera, N. A., Sutrisna, M., & Yiu, T. W. (2016). Decision-making model for selecting the optimum method of delay analysis in construction projects. *Journal of Management in Engineering*, 32(5), 04016009.
3. Assaf, S. A., & Al-Hejji, S. (2006). Causes of delay in large construction projects. *International journal of project management*, 24(4), 349-357.
4. Yang, J. B., & Teng, Y. L. (2017). Theoretical development of stochastic delay analysis and forecast method. *Journal of the Chinese Institute of Engineers*, 40(5), 391-400.
5. Swanson, J. A. (2013). *The Hand of God: Limiting the Impact of the Force Majeure Clause in an Oil and Gas Lease.* *NDL Rev.*, 89, 224.
6. Pinnell, S. S. (1998). *How to get paid for construction changes: Preparation resolution tools and techniques.* McGraw-Hill.
7. Aroulanandam, V. V., Latchoumi, T. P., Balamurugan, K., & Yookesh, T. L. (2020). Improving the Energy Efficiency in Mobile Ad-Hoc Network Using Learning-Based Routing. *Rev. d'Intelligence Artif.*, 34(3), 337-343.
8. Seifert, B. M. (2005). *International construction dispute adjudication under international federation of consulting engineers conditions of contract and the dispute adjudication board.* *Journal of professional issues in engineering education and practice*, 131(2), 149-157.
9. Gibbs, D. J., Emmitt, S., Ruikar, K., & Lord, W. (2013). An investigation into whether building information modelling (BIM) can assist with construction delay claims. *International Journal of 3-D Information Modeling (IJ3DIM)*, 2(1), 45-52.
10. Janků, M. (2015). Contractual penalty and the right to payment for delays caused by force majeure in Czech Civil Law under the New Civil Code. *DANUBE: Law, Economics and Social Issues Review*, 6(4), 259-269.
11. Bruner, P. L. (2000). Force Majeure and Unforeseen Ground Conditions in the New Millennium: Unifying Principles and "Tales of Iron Wars". *INTERNATIONAL CONSTRUCTION LAW REVIEW*, 17(1), 47-101.
12. Wright, W. C. (2006). Force Majeure Delays. *Constr. Law.*, 26, 33.
13. Buffalow, G. C. (2011). The force majeure defense-recent cases, boilerplate and analysis. *J. Mar. L. & Com.*, 42, 211.
14. Prasath, D. S., & Selvakumar, A. (2015). A Novel Iris Image Retrieval with Boundary Based Feature Using Manhattan Distance Classifier. *International Journal Of Innovative Technology And Creative Engineering (Issn: 2045-8711) Vol, 5.*

ANALYSIS OF PAYTM'S GROWTH IN INDIA**Ishank Chandra**

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ABSTRACT

In the recent years, the Indian Government has offered several strategy structures, such as Digital India, Startup India, Make in India along with an impactful drive demonetization and the launch of UPI afterward. All of these gave the previously slowly growing digital payment industry a powerful drive. Paytm, although existing since 2010, was swift to monetize the opportunity created by the post-demonetization countrywide cash crunch and transformed the retail sector by ensuring its availability with every small to large local shop and Kirana stores. Currently, owing to the latest Covid-19 pandemic outbreak, many more transactions may seek for contactless digital payments. Many studies have been done on Paytm in the past, ranging from its use and difficulties faced by Indian consumers to their acceptance by them finally. This research paper highlights Paytm's journey in empowering the cashless economy while concentrating on reviewing the previous literary works and articles written about the leading market player in the Indian e-wallet industry. A brief study of consumers, with in-depth interviews of few regular and non-users, was also conducted to gain a better understanding of its future scope and implications in the post-COVID India.

Keywords— Digital Payments, Paytm, Cashless Economy, Demonetization, Unified Payment Interface

Introduction

In the 21st century, mobile wallets take on new dimensions and become a common mechanism for making payments. India is rising rapidly when it comes to mobile payments, especially through the usage of mobile wallets. Indian government promoted cashless transactions by launching in November 2016 the demonetization of high-value currency ₹500 and ₹1000. Due to the cash crunch situations at ATMs and Banks, this has resulted in a very high growth in digital payments. There are many leading wallet players in the industry, such as Paytm, Freecharge, and Mobikwik, who have been marketing mobile payment services across India through wallets. Because of the prepaid paradigm, the growth and increase of scalable creativity among individuals across the world has expanded to a large degree. Due to this all sections of society follow the fiscal administrations and have proven to be exceedingly secure with the flexible cash system. For the banks, a fresh opportunity was created for the middle class and the poor leveraging the latest invention with the introduction of specialized wallets in the 90s introduced with the dream of Satyan P. For specific user requirements, an easy GUI to use, having the capacity to perform securely in the virtual world was needed, which eventually arrived in the form of application wallets.

National Payments Corporation of India (NPCI) introduced the Bharat Interface for Money (BHIM) software that offers UPI-based interfaces that have enabled wallet businesses to further improve the wallet market. The Paytm is classified as "Pay Via the Smartphone" was launched by One97 Communications Ltd as a prepaid cell recharge website founded by Vijay Shekhar Sharma in Delhi in August 2010. Paytm is India's first leading payment gateway providing robust consumer and retailer payment services. It provides more than 7 million retailers electronic payment applications and allows customers to make integrated mobile purchases through Wallets, Bank Accounts, and Digital Credit. Paytm introduced Paytm Payment Banks which aim to provide Indians with banking and financial services. Following demonetization announcement on November 8, 2016, Paytm's usage has increased significantly and recorded more than 7 million transactions worth 120 crore, including one million fresh saved credit/debit cards within 2 days of demonetization, and millions of customers and retailers around the country have first opted for mobile payments on their website. Although there are numerous e-wallet providers, Paytm's revenue model, diversification, has worked with other financial service providers to expand their service to consumers.

Contextual Background

Paytm recognized the importance of a contrasting alternative to the existing transactions of money and offered an extraordinarily simple scalable smartphone application-based protected mechanism of advanced transaction process, the position where potential untruths exist. A market center model and a revenue-based display that offers consumers the ability to save money options, energize, bill payments, cashback, payment plans, Digital Money, Paytm Bank, and e-wallet. Featuring a friendly dealer shopping center, Paytm is the first Indian company to obtain a mobile wallet of 120 million customers and 2 million transactions per day. Income from this subcategory is created by the dealers as expenditures and commissions for the modified class of products. Paytm has concentrated increasingly on digital currency so it can raise its brand loyalty by improved delivery, advertising, and marketing strategies. Wallet that can be used in computerized fashion to store money and can also be used to acquire goods from stores or charities that have a clear arrangement for the company to accept such installment instruments. Paytm wallet won't require currency withdrawal. Customer deposits cash in the Paytm Wallet is stored by Paytm on an Escrow account based on the RBI rules and Paytm collects premium and this is known as a deal between the bank and Paytm. Accepts deposits and offers loans for the deposited money. Unable to offer loans to Paytm. Here QR codes are used for payment in both rural and urban areas and are now accessible in every store. Debit cards now on Paytm are valid. Internet Payments are accepted and there are no support costs for the payment option but there is a benefit break for every order. Originally Paytm only recharged services and the attitude of people was that Paytm was only for recharge, but now things have changed with Paytm, we can also pay educational fees and bills as well. Paytm still serves as an alternative means of cash transaction for both buyers and sellers, and offers both consumers and marketers a convenient, safer and secure use on mobile applications. Innovation attainment is the stage at which a buyer understands an object and administration over a business relies on another heap of benefit exchanged at a price or profit.

Paytm's day to day life gathered popularity and significance.

A. Funding

One97 Communications Ltd., the parent organization of Paytm, in 2007, was able to attract SAIF Partners as their first venture capital investment. This was the stepping stone before a series of institutional investments in Paytm began in 2015 later. To start with, in March 2015, Paytm obtained its financing from Alibaba Group, the Chinese biggest e-commerce firm headquartered in Hangzhou, China. It took place via a strategic deal under which Ant Financial Services Group, a subsidiary of the Alibaba Group, took a 25% interest under One97. It soon received support from Ratan Tata, the Tata sons' MD. Subsequently, it released a 'Paytm for Market' software in 10 Indian regional languages, enabling such merchants to easily look after their transactions and regular settlements. In August 2015, the RBI approved Paytm's permission 'in theory' for Payments Bank. The company launched the Paytm Payments Bank in 2017 with the aim of providing access to half-a-billion underserved and under-served Indians through banking and financial services. Paytm introduced an app the same year for payments for Canadian cell phones, television, telephone, power, and water bills. In 2018, Paytm Money was developed to create investment and wealth management deals for its users. This company was intended to introduce direct mutual funds and money market funds to the people of India. In August 2016, Paytm received capital from Mountain Capital, one of the venture funds in Taiwan-based MediaTek estimated at over \$5 billion. Paytm raised its biggest funding round in May 2017 from a single investor – SoftBank, which also has a major interest in Alibaba, taking the company's value to an unprecedented \$10 billion. Berkshire Hathaway invested \$356 million in Paytm in August 2018 for 3 per cent-4 percent interest, while Berkshire Hathaway clarified that Warren Buffett was not involved in the deal.

B. Major Source of Revenue

Revenue generated by Paytm comes from multiple sources. This cover:

- Profit obtained from the escrow account kept in a nationalized bank (4-6 percent)
- Advertisements on their websites
- Utility fees and recharges fee
- 1 percent fee to move money from e-wallets to their bank accounts [1].

The gross revenue for the year 2015-16 was 3360 million, which in the previous year was more than 2100 million. However, it reported a loss of 3370 million in 2015-16.

C. Investments and Acquisitions

Paytm purchased Plustxt in 2013 for roughly \$3 million. Plustxt was established by IIT graduates Pratyush Prasanna, Parag Arora, Lokesh Chauhan, and Lohit V who permitted quick texting in any language of India. In 2015 Paytm invested \$5 million in Jugnoo, a self-rickshaw aggregator and hyperlocal distribution service. The funds were intended to allow Jugnoo to extend its operations across the country and increase the productivity of its driver. It also acquired the Shifu platform, based in Delhi and Near.in, a local service startup, to predict consumer behavior. In 2016, Paytm was investing in logistics companies like LogiNext and XpressBees. In April 2017, Paytm invested in QorQL, a healthcare company that uses artificial intelligence (AI) and big data to help doctors boost their effectiveness and standard of treatment and make it easier for patients to properly monitor their wellbeing. It bought a majority interest in online ticketing and entertainment site Insider.in in July 2017, backed by A Far Louder (OML) event production firm and MobiQuest, a smartphone rewards startup. Paytm bought Little & Nearbuy the same year, and combined both. The business purchased the project Cube26 in June 2018.

D. Promotions and Marketing

One97 Communications, the corporation controlling the Paytm name, secured the title sponsorship rights for India's domestic and foreign cricket matches at home in July 2015, for a four-year term beginning in August 2015. The benefits provide series sponsor signage of the main sponsor emblem, series title sponsor recognition, venue coverage, and television endorsing privileges. It also covers all competitive BCCI tournaments in India (Ranji Trophy, Duleep Trophy, etc.). Paytm had

previously purchased the sponsorship rights during the Indian Premier League 's 8th season. It has also worked on a Sony TV network as an affiliate sponsor (which has the telecast rights for IPL) and was the official collaborator of the Mumbai Indians IPL squad. Paytm was named the IPL's Umpire Partner for five years in March 2018.

Literature Review

There have been several literary works done in the field of digital payments, its inclusion in the Indian financial scenario, and acceptance of the mobile wallets. A basic concept of financial exclusion is the failure to access the financial system in a suitable manner [2]. Financial institutions are seen as a group of depositors offering a variety of resources for low-income and subsisting communities of developed countries who handle funds mainly through informal networks lying out of the formal financial structure [3]. The marketers and digital businesses will use mobile wallets to engage with customers. Regardless of such mobile wallets' industry position, advertisers will take advantage of developing opportunities [4]. In a report [5], the relative advantage of mobile payments was found to be linked to the unique advantages offered by the latest mobile technologies, such as time and location independent payments, easy and seamless access to payment systems, eliminating lines, complementing cash payments, etc. It was also observed that access to mobile payments plays a crucial role in some circumstances such as sudden need for payment, time constraint, and shortage of cash or loose change. The researcher also indicated that there are several other considerations and determinants such as reliability, sophistication, prices, network expansion, confidence, and perceived protection. Since the mobile wallet belongs to the field of digital payments, the analysis concluded that the results were either partly or fully valid for mobile wallet adoption. Another study [6] tried to understand the acceptance of the mobile wallet by consumers. The approach adopted was the concept of Unified Theory of Acceptance and Use of Technology (UTAUT), with stability, confidence, social control, and self-efficacy constructs. For the development of a predictive model of attitudes towards the

mobile wallet, structural equation modeling was employed. The responses of individuals to questions about attitude and intention to adopt a mobile wallet were collected and analyzed with different factors modified from usefulness and ease of use are key antecedents of UTAUT. Although the framework indicated the conventional function of acceptance factors for technology (i.e., apparent to users' attitude), the results also explained the intentions of consumers affected by perceived security and trust. The moderating effects of demographics on the relationship between variables were therefore found to be statistically significant in the extended version. Another research [7] sought to explain the use of wallet money undertaken by various companies as well as the different factors that determine the consumer's desire to adopt digital payments. This exposed the growing threats and problems confronting consumers of mobile wallets. The results revealed that the consciousness of mobile wallet usage spread among the citizens of India due to government demonetization policy and this as strongly induced the use of mobile wallet and also stated that risk factors are considered to be reduced which would ensure the acceptance and tremendous rise of digital wallets in the coming years. The implications of the demonetization and the opportunity created grabbed by Paytm has been discussed [8], its usage easiness, issues, and concerns, etc. have been examined [9], the success story of Paytm, as well as its expansion in e-retail and e-commerce, has been examined [10], and the satisfaction of levels of Paytm users based on different parameters has been studied [11] in the past.

In the difficult COVID times, Paytm has also contributed to India's fight by its number of initiatives. Paytm is behaving like a mature and responsible firm instead of just being a successful Indian startup. From its offices being disinfected and sanitized to providing services round the clock even in work from home mode, Paytm is focusing on the financial inclusion of all the Indian citizens now more than ever [12]. Paytm has joined hands with the largest player of Indian FMCG industry Hindustan Unilever and the foundation started by Indian famous cricketer Yuvraj Singh, YouWeCan. Paytm has enabled its platforms, both the website and the Android application, to raise funds for the

supply and distribution of the most valuable assets to fight against coronavirus: soaps and handwash. It has also invited the innovative minds all across India to work on their unique and new solutions to overcome the issues of medical equipment, beds, and ventilators shortages.

It is a public knowledge that Paytm has a history of being successful during the times of crisis. From a business point of view, Paytm is seeing the COVID times also in the same manner as it did during demonetization. Because of the unprecedented pandemic situation, Paytm, as an innovative firm, is well aware of how these situations can, in reality, catapult its growth. With people avoiding human contact, they are turning towards digital and cashless payments now more than ever. It has come up with new offerings [13] for its core revenue source, i.e. the business users. Features like All-in-One QR, Payment Link & Business Khata, and new ways to Promote your Shop have been introduced by Paytm for its small-scale merchant users to increase traffic over its networks. As per a report published [14], an in-store ordering solution has been developed by Paytm which will help restaurants and food businesses to minimize the physical contacts at various points.

Research Methodology

The research draws on our results from personal interviews conducted with 2 major customer segments, the first comprising of young customers and shoppers from the urban regions and the other comprising of street vendors in the suburban Indian markets. Under the urban youth category, the in-depth telephonic interviews were conducted with people from both the sub-categories, i.e. regular users and non-users of the application. The sub-segment of young regular users interviewed comprised of 8 IT employees and 6 students from 2 different universities. The usage of Paytm with this segment was found to be majorly in day-to-day retail shopping, online payments, and e-commerce. The other sub-segment of young non-users was found to be a relatively much smaller segment, under which in-depth telephonic interviews of 3 students from the same 2 universities were conducted. Similarly, under the other major segment of suburban

market's street hawkers, small retailers and vendors, in personal interviews of 12 merchants from a mix of eateries, grocers, auto components repair shops, stationery, clothes, shoes, etc. were conducted who were using Paytm in their everyday dealings and transactions as a payment mechanism. Along with that, 5 merchants who were not found to be using Paytm in their business transactions from the same markets were also interviewed. The selection of respondents was done based on random and convenience sampling. The interviews were focused on the degree of recognition of the Paytm wallet by the respondents and their use of the wallet in their everyday activity. The primary goals of the interviews were to encourage respondents to help clarify their everyday personal and business activities to unravel the socio-economic factors behind Paytm's use or non-use, and to derive the degree of comfort with Paytm use for both industrially and personally. The selected samples touched on discussions regarding interest, duration, and meaning of transactions. The history of Paytm wallet acceptance, financial relationships with other vendors, and suppliers of raw materials were also examined to understand the ultimate integration of Paytm into the street market ecosystems. During interviews, usability issues were also noted as involving Paytm as a digital platform.

To derive valid and reliable results out of our qualitative research and to remove personal bias in the study, random as well as convenience sampling was done and customers of various segments were included. All the Paytm platforms were taken into consideration while conducting the interviews of the relevant audience. Paytm website and Android and iOS applications for normal (retail users in business parlance), as well as Paytm for Business application for retailers, hawkers, and street vendors, were discussed. The interviews were conducted twice with the same set of people to ensure the test-retest reliability and validity of our data points. The questionnaire in the interviews was changed in structure and words but pointed to the same constructs both the times. It helped in concluding that the selected sample and the results from the study will be

completely valid, reliable, and relevant for Paytm as well as the future researchers.

Results and Recommendations

A comparative analysis of the e-wallet players, i.e. Paytm, Freecharge, and Mobikwik, has been done. In November 2016, the Reserve Bank of India (RBI) announced a shooting development of digital payment firms such as Paytm, Mobikwik & FreeCharge spurred by demonetization, witnessing PPI payments worth a whopping INR 13 billion worth across 59 million transactions. To prepare the way for commercial growth, Paytm had to stand strong in the face of the challenging threat raised by the demonetization process. With competitors waiting for the right opportunity to leap, Paytm was quick enough in that regard to gain the first-mover advantage. Paytm was highly rewarded with rapid post-demonetization development thanks to a spike in device installs of 300 percent, an improvement of around 6 times in the amount of transactions per consumer per week over three weeks, and a 1000 percent increase in money added to his m-wallet. Since demonetization was announced on 8 November 2017, Paytm has registered over 5 million users with a total user base of 150 million people. Support from the government for digital wallets has given these m-wallet players much impetus. Similarly, in a statement issued on November 22, 2016, Mobikwik represented a device update increase of 40 percent. Mobikwik currently has more than 35 million active customers. Mobikwik's target for its total transaction value increased 10-fold to

\$10 billion in 2017. As far as FreeCharge was concerned, the m-wallet giant operated by Snapdeal announced they are having a new merchant every 30 seconds and plan to hit more than 1 million merchants in a 12-month timeframe. From the above data, it can be found that all three major m-wallet competitors, i.e. Paytm, Freecharge and Mobikwik, have seen a remarkable increase in their total value, but somehow Paytm has managed to be the market's leading player not only because of its aggressive advertising campaigns but also because of the attractive offers that were part and parcel of its promotional campaign.

During our study, we were able to find some strengths and weaknesses of Paytm in the Indian

consumer market and the opportunities and threats present in the industry for Paytm. Starting with its strengths, Paytm was India's first online payment firm to develop operations. Paytm's biggest advantage was its timing. Their business started in the same period when the smartphones were becoming famous. The 24x7 operation and easy payments and fund transfer from any place increases its level of comfort with its users. It makes it widely embraced by an affluent community that depends on online shopping for even items of everyday usage. Paytm can be used for purchases throughout India with more than 3 million merchants and the amount is expected to rise every day. That makes Paytm an easy shopping option for most customers regardless of their business background or education. Most of what you want to do online can be done through Paytm. Besides the Paytm Wallet, today the brand has online reservation facilities, online retail, and online recharge, and you don't need to go through payment gateways. Paytm was able to grab and keep consumer interest largely owing to the never-ending bid stream it was announcing. These are specially built for the Indian mentality in the picture and hence work like magic to zoom in revenue.

Coming to weaknesses, it starts with the need for better IT infrastructure in the country. If Paytm functions are to be reliable there must be sufficient connectivity and speed. This may be present in most cities in India but might not be the case in remote areas or even tier 2 towns. Most consumers are ignorant about what Paytm will do for them and are uncertain regarding how to use the device. The lack of understanding of technological technologies and the innate apprehension of having incorrect purchases is deteriorating matters. Most Indians are used to cash purchases and are also not used to cashless transactions. However, things are supposed to pick up with digitization and demonetization and that would benefit online wallet services. One critique levied at Paytm is its weak customer support.

There is a huge opportunity for Paytm in India. Aggregators and intermediaries are in demand everywhere today. With the growing use of technology, people prefer to make most payments out of the convenience of their homes. This has increased the role of payment

aggregators in India. One of the services that heavily benefited from the demonetization drive of the Indian government was online payment services and Paytm was one of the biggest beneficiaries. These providers should have more incentives to come their way in a push to digitize the world. The number of working professionals is increasing profusely. This means that it is scarce to make them more rely on home delivery services for their sustenance for most couple's time. There will also be a similar spike in the payment channels as competition for online shopping rises. Some threats for Paytm in the market were also observed during the study. Each new entrepreneur is trying to integrate offerings, with lower entry barriers. There are several internet platforms, such as Pay payments, Mobikwik, etc. and also mobile service companies such as Airtel and Vodafone provide electronic payment gateways. There are today negative images of the security of information and tracking of shopping habits. These are still increasing questions over how secure the details sent to payment portals are, and the extent of oversight of these portals or payments received via them. The usage of Paytm is studied as a sustainable digital channel for monetary transactions in the Indian scenario. The diverse segment selection of the study helped in recording a composite and heterogeneous adoption characteristic of the Paytm regular customers and its potential new customers. The major findings of the study can be categorized under the following subheaders.

E. Features and Usability

The usability of Paytm was found to be relatively simple and cotemporary. A new user has to register with a mobile operator and complete Know Your Customer (KYC) verification to get enabled to do digital transactions. There are many ways in the updated Paytm application, such as sending to a registered mobile number, using a QR code scanner, and Unified Payments Interface (UPI) transfer. With the introduction of Paytm Payments Bank, money can also be digitally transferred to the same to get financial instruments benefits such as savings bank interest, fixed deposits etc. There are minimum and maximum cap amounts per transaction and

per day for all the transactions between the Paytm wallet and the bank. Merchants can also signup Paytm for Business to get more generous capping amounts.

F. Paytm: Not just an e-wallet

Soon after the demonetization, when the Indian government introduced UPI, it was considered to be an end of the e-wallet era, but unlike its contemporary mobile wallet competitors, such as Freecharge and Mobikwik, Paytm was quick to capitalize the new opportunity space. With the launch of Paytm UPI, inherently based on the similar functionality as that of the government's Bharat Interface for Money (BHIM) application, Paytm once again revolutionized the digital payment industry. Sharing the new competitive space with the big brands such as Google Pay, Paytm has proven to be a mature and an expert market player. Not long ago, Paytm also introduced its Paytm Payments Bank with the earlier mentioned banking benefits also. Recently, Paytm Postpaid is also launched for the customers, this is in line with another champion OLA in yet another booming cab-hailing industry in India. The respondents from the youth regular user segment in the study were centered on this point majorly. How has been the journey of Paytm from earlier being a mere temporary storage of money to now acting as a small pocket bank? The respondents also compared the application with Google Pay and believed that since with a single Paytm application, they were able to scan and pay to any QR of either a UPI or the basic Paytm wallet, they preferred using Paytm as compared to the latter. Moreover, the students interviewed positively spoke about the cashback and coupon offers in Paytm. Since Paytm is not only a payment application now, but can also be used for online shopping, booking travel tickets, movies, etc., the cross-linked offers were found to be major exciting points about Paytm among the college-goers.

G. Financial Literacy of the Under-privileged

One major deduction during the study was that although the business plan of Paytm was top class, the timing of the execution of the plan and the environmental factors acting at those times have played a much bigger role in Paytm's success. With the advent of Jio, the telecom

industry of India was revolutionized with much affordable internet rates. Ever decreasing smartphone prices and all-time low-priced data packs paved a stepping stone in enabling the Indian rural and suburban population to beget an online presence. And around those times only, the GOI's demonetization drive also came into effect creating a vast potential for the cashless economy. Paytm grabbed the opportunity with open arms, enabling the cashless financial transaction availability for even the smallest of the local street vendors. Earlier, the e-wallet got a boom in the non-cash transactions, while later with the access to bank accounts by the government's Jan Dhan Yojana, Paytm introduced the UPI and banking environment for the underprivileged and a vast number of small retailers and shopkeepers. Paytm targeted its business from the bottom-most section of the wealth pyramid and was undoubtedly successful in tapping those markets. The local vendors interviewed were majorly of the positive opinion and outlook for the digital payment industry and Paytm. The few vendors who were non-users of Paytm were also interviewed. It was found that, in general, those hawkers do not use any kind of non-cash transaction medium, let alone with Paytm. All such 5 retailers interviewed were relatively much poor and were based on their daily wages for living, with no intention or possibility of savings soon. Since, their usage strictly restricts to cash only medium, there was no concern for Paytm as an application to not being used by the particular segment. However, one recommendation can be derived that Paytm can mark this segment as 'potential segment' and tap it with its credit facilities and hence, onboard them as customers.

H. Performance Concerns

The research was able to identify the root cause of the non-usage or ex-usage of Paytm among its customers. The findings of this section are majorly derived from the urban youth non-user segment. There were a few concerns and issues enlisted by the respondents of this segment. These were Problem with/Delay in QR scanning, Application hang issue, Failure in payment gateway, Slow Paytm server, Account auto-logout and Privacy, and security concerns. The respondents were not ready to share or link

their bank accounts with Paytm because of these trust issues. They opined that their banks' native mobile banking was more reliable and trustworthy as compared to Paytm. Since Google Pay launched its UPI much before Paytm, they also did not face the need to switch their UPI application. The same concerns and issues were also taken into consideration while interviewing the urban youth regular user segment and it was found that these issues were not non-existent but had been adopted by them as part and parcel or the side effect of the large number of benefits of using Paytm. Major recommendations can be drawn by Paytm here. Performance has not to be compromised if Paytm wants to regain its exited customer base or tap onto novel potential customers.

1. Managerial Implications

If the results of the research are critically examined and looked from the right perspective, there are both explicit and implicit implications for the Paytm's management. If we think of the whole brand opportunity framework in terms of brand awareness and industry/category growth, the digital payment industry will still come under the emerging category and not under the established category. The reason for doing so is both simple and straight-forward. People in extremely rural India and in small towns where the illiteracy rate is very high, use only cash as their payment mode even today. Although the steps taken by the players of this industry can impact and educate the retailers and small businesses of such locations, the layman is still not considered for digital literacy by them. The common people are being left in the hands of the local retailers to instigate the usage of digital payments. With an ever-increasing demand for contactless payments, that particular sector of society should be tapped by Paytm to increase its top line. This will not only inflate the category of digital payments as a whole, but also increase the brand awareness of Paytm among the newly onboarded customers, which will eventually help Paytm to grab a major portion out of the increased pie of digital payments industry. Moreover, Paytm's management should also not turn away from its existing customer base and try to drive them further below in the consumer engagement funnel, towards customer loyalty. Starting with

the concerns currently raised by its users related to performance, application crash, and other payment failure issues, to eventually make their experience even more engaging and enriching, Paytm must take significant steps to make its products (platforms) more robust and adaptive.

Summary and Conclusion

The study detailed in about Paytm's story, its journey, and strategies followed. The comparative analysis of how Paytm succeeded over its competitors was also done in the paper. The study was also able to explore the positive and negative aspects of Paytm in the consumers' minds. The study was based on two different types of demographical segments, one based on location (urban and sub-urban), another based on income level or occupation or simply profile (IT professionals, college students, and street vendors). The study was done from all the mentioned perspectives and individual segment-wise responses were discussed. Some major areas of improvement were also highlighted, along with a strategic angle for potential customers was also discussed. The low performance of Paytm was found out to be the major pain point of the non-users, which can be mitigated by necessary actions at Paytm's end to update, upgrade and maintain both hardware and software regularly, and to prevent slow server cases and complete system breakdown by having back storage. The paper also outlined financial literacy which is the underlying base of increasing business in the huge untapped section at the bottom of the wealth pyramid of the country. To summarize the results and findings of the research, it can be said that there is a lot of positive notion for the growth of Paytm among its customers, and since due to current pandemic situation of COVID-19, the whole industry of digital payments is going to grow rapidly, for non-users of the application also, there seems to a wide scope for Paytm to capture. On a demotivating side for Paytm, however, it was found that its users are not satisfied with the performance-related issues of the application. Now, with even more traffic expected to be routed towards almost every digital payment mode and Paytm being the leader of the category, the need to upgrade the customer experience has increased even more for Paytm. It has to ensure a robust platform

offering for both its loyal customers as well as the new prospects. On the other hand, the steps currently being taken by Paytm to increase financial literacy and inclusion during the pandemic times in India are being praised and good word of mouth is also getting generated.

Limitations and Future Scope of Study

The study did not involve a comparative analysis with the UPI applications such as Google Pay and BHIM UPI and majorly focused on e-wallet industry players, which opens the scope for further researches. Also, the study was descriptive with interviews involving open-ended questions. These limitations were

due to less availability of respondents in the current COVID situations. As a prospect, the more stringent statistical studies can be done to more clearly map the benefits and concerns of the Paytm's customer base with its existing features and offerings. The current study was confined to limited geographical locations of India, which can be further broadened to get a country-wide holistic picture of the customer base of the application. The study did not focus on any specific business problem of Paytm, which can be derived as a future scope of study, while referring to the current study as the major literature framework.

References

- Joshi, T., Gupta, S. S., & Rangaswamy, N. (2019, May). Digital Wallets 'Turning a Corner' for Financial Inclusion: A study of Everyday PayTM Practices in India. In International Conference on Social Implications of Computers in Developing Countries (pp. 280-293). Springer, Cham.
- Joshi, T., Gupta, S. S., & Rangaswamy, N. (2019, May). Digital Wallets 'Turning a Corner' for Financial Inclusion: A study of Everyday PayTM Practices in India. In International Conference on Social Implications of Computers in Developing Countries (pp. 280-293). Springer, Cham.
- Shukla, T. N. (2016). Mobile wallet: present and the future. *International journal in Multidisciplinary and academic research*, 5(3), 1-22.
- Mallat, N. (2007). Exploring consumer adoption of mobile payments—A qualitative study. *The Journal of Strategic Information Systems*, 16(4), 413-432.
- Shin, D. H. (2009). Towards an understanding of the consumer acceptance of mobile wallet. *Computers in Human Behavior*, 25(6), 1343-1354.
- Manikandan, S., & Jayakodi, J. M. (2017). An empirical study on consumers adoption of mobile wallet with special reference to chennai city. *International Journal of Research-Granthaalayah*, 5(5), 107-115.
- Athique, A. (2019). A great leap of faith: The cashless agenda in Digital India. *new media & society*, 21(8), 1697-1713.
- Vikas, D., & Kumar, A. A. (2018). What Indians Think About Paytm. *World Scientific News*, 110, 184-196.
- Khan, S. R. (2018). Paytm's Growth in India as A Digital Payment Platform. *Journal of Retail Marketing & Distribution Management*, 2(2), 39-40.
- Gawade, M. G., & Marathe, M. A. Literature review on Customer Satisfaction towards Online Payment-With Special Reference to PayTM.
- Singh, T. (2020). Fintech adoption: a critical appraisal of the strategies of Paytm in India. *IUP Journal of Management Research*, 19(4), 7-17.
- Singh, T. (2020). Fintech adoption: a critical appraisal of the strategies of Paytm in India. *IUP Journal of Management Research*, 19(4), 7-17.
- Prasath, D. S., & Selvakumar, A. (2015). A Novel Iris Image Retrieval with Boundary Based Feature Using Manhattan Distance Classifier. *International Journal Of Innovative Technology And Creative Engineering (Issn: 2045-8711) Vol, 5*.
- Aroulanandam, V. V., Latchoumi, T. P., Balamurugan, K., & Yookesh, T. L. (2020). Improving the Energy Efficiency in Mobile Ad-Hoc Network Using Learning-Based Routing. *Rev. d'Intelligence Artif.*, 34(3), 337-343.

IMPLEMENTATION OF HEALTH RISK MANAGEMENT IN HIGHER EDUCATIONAL INSTITUTIONS OF INDIA: AN ISO 45001 AND QUALITATIVE APPROACH

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ABSTRACT

The purpose of the study is to understand the role of ISO 45001 in implementation of health risk management in higher educational institutions of India. The respondents for the study were heads of higher educational institutions, academic staff, students, ISO 45001 certified internal and external auditors as well as doctors. The data was collected through theoretical sampling method and continued till a point of theoretical saturation was reached. The received responses were subjected to thematic analysis from which health risk management concepts related to implementation of ISO 45001 in higher educational institutions emerged. The different elements of ISO 45001 are leadership, planning, support and operations, performance evaluation and continual improvement. Leadership relates to designing the safety policy and ensuring commitment to implement the process across educational institutions. Planning involves designing objectives, forming task force for implementation, identifying health risks and risk mitigation and designing standard operating procedures for institutional departments. Support and operations represent implementation of safety guidelines across various departments. Performance evaluation relates to monitoring of health and well-being through internal and external audits while continual improvement relates to periodic improvement of healthcare system.

Keywords— safety, quality, higher education, health, qualitative

Introduction

Risk management is related to dealing with different types of uncertainties [20]. Health risk management involves health risk analysis and mitigation across an organization [2]. Health risk management has gained importance in all spheres of life including education [21][15]. It deals with the various risks within an organization and taking preventive and corrective action to ensure safety at place of learning and work [41] [3]. Published literature has shown that most of the research done in the area of ISO 45001 implementation is with respect to corporate organizations and hospitals [24] [33] [49]. There is scant literature on health risk management in academic institutions (Phelps et al., 2016).

Higher education and promotion plays a very important role in social and economic development of countries [34]. Higher education is a global phenomenon as students travel across the globe to get enrolled at premium institutions for a better future [65]. Due to internationalization of higher education, there is a huge migration of students from one country to another [61]. The migration of students has raised concerns about their well-being as they do not have a family support in another country [28] [60]. Global pandemics have further raised concerns about health of

academic staff and students in academic institutions [5]. Hence there is a dire need for health risk management initiative which confirms to global standards. Research on higher education in India and developing countries has shown that the institutions are focused on improving the quality of education and fostering growth [23]. Introduction of a health standard will provide a structured approach to transforming healthcare in higher education institutions [44].

Occupational health and safety assessment series (OHSAS 18001) is an international standard by International Organization of Standardization (ISO) that deals with health related risks at workplace and provides solutions to mitigate the risks and ensure safety of workforce [26]. The main objective of the standard is to make workplaces safer by identifying and mitigating health oriented risks and ensure well-being of the employees which results in enhanced productivity [11]. The revised version of OHSAS 18001 is ISO 45001 which came into practice in 2018 (International Standards Organization, n.d.). ISO 45001 was implemented in several industries and there is a demand for its implementation in educational institutions [9]. This has created the need to do more research on this topic.

Studies can be qualitative or quantitative in nature. Most studies on healthcare have adopted

a qualitative approach in order to gather better insights on healthcare systems [10] [43] [74]. Since the purpose of the current study is to gather insights on implementation of health risk management, an inductive approach would be preferable. [43] [63] [39]. This will help to generate themes which can represent concepts of health risk management. Hence, thematic analysis will be the most preferred approach as is related to the origin of scientific thoughts through qualitative data analysis [36].

Research Question

How can health risk management in higher education institutions of India be implemented using ISO 45001 and qualitative approach?

Review Of Literature

Health risk management is a widely researched topic. Researchers [72] discussed the health risk management in automobile industry. Some authors [25] researched upon the health risk assessment from heavy metal pollution in south China. A group of researchers [66] monitored the health risks associated with air and noise pollution in shopping malls and academic institutions. Recent studies on health risk management in education relate to students facing mental health problems in business schools of United Kingdom [40]. Another study relates to health risks faced by Japanese students while studying abroad [77]. The health risk management needs a more effective implementation through quality oriented approach by meeting international standards of health risk assessment and management. Hence ISO 45001 approach to managing health risks is recommended for higher institutions.

Higher education has been a topic of research since the last two decades [49]. Recent literature has shown the growing importance of higher education in India. A study [70] researched upon the privatization of higher education. Trends in financing of higher education were also studied [55]. Internationalization of higher education has been another important area [76]. Higher education has also been the epitome of sustainable development in India [51]. The growth of higher education has raised concerns about health issues of academic fraternity. Therefore, the need to carry out research on health risk management has become important.

Literature on higher education revealed the importance of providing safe and healthy environment for learning [37]. A researcher [22] studied the importance of safety on education campuses. Another researcher [45] studied the campus safety experience of college students. A study on the importance of safety in student residences was also done [32]. Another researcher [58] emphasized the importance of safety climate in laboratories of higher education institutions. A group of researchers [19] explained the role of disaster risk management education in ensuring safety. However, these studies have highlighted the lack of quality assurance in education. A better approach would be possible through implementation of ISO principles of health and safety.

The purpose of ISO is to ensure that institutions follow quality standards in order to make their processes more effective and efficient [64] [73]. The processes are designed as per ISO guidelines and periodic audits are done by certification bodies to ascertain continual improvement of processes leading to quality certification [71] [75]. ISO 45001 belongs to the ISO standards related to health risk management at workplace (International Standards Organization, n.d.). In ISO 45001, the emphasis is on risk identification, assessment and risk mitigation [30]. The standard encourages risk based thinking and also deals with emergency preparedness [27]. Research has shown that implementation of safety standards across several industries has led to employee well-being and performance enhancement [78]. A study [29] showed that organizations with health certification had a safer environment compared to those who did not undergo certification. However, ISO cannot be implemented without commitment from leadership of the organization [53]. Stakeholder participation is equally important for its success [30].

The major elements of ISO 45001 framework are role of leadership, planning, support and operations, performance evaluation and continual improvement [9]. Planning includes framing of safety objectives, creating standard operating procedures for implementation and identifying roles and responsibilities of the people involved [27]. Role of support and

operations in the ISO standard is very critical as it involves creation of organization culture to facilitate the process of implementation of health and safety guidelines as documented in the standard operating procedures [45]. A task force comprising of key personnel will provide support in implementation of risk management processes in academic institutions [31]. This involves creating awareness, training the staff for implementation and working alongside the staff designated by each department for smooth implementation [16] [48]. Performance evaluation through feedback, internal and external audits is important to ensure compliance and continual improvement in ISO [8].

Recent literature has shown application of thematic analysis in knowledge management of healthcare [12]. A researcher [35] applied thematic analysis to understand student learning in medical education. Another study [18] used thematic analysis to understand patient response in Parkinson's disease. The current study also proposes to use thematic analysis in order to develop themes related to different aspects health risk management in higher education and correlate the themes with ISO 45001 framework. This will provide a more structured approach to implementing health risk management in higher education.

Research Methodology

Qualitative research methodology helps to provide new insights in different research areas [7]. The popularly used qualitative methodologies are ethnography, phenomenology, grounded theory and thematic analysis [54]. A qualitative approach will help to generate themes from the gathered data and relate them to different aspects of ISO 45001 model of health risk management for higher educational institutions. Thematic analysis was introduced by Holton and is widely used in healthcare research [62]. Hence thematic analysis is considered as the most appropriate methodology to carry out the current study.

Theoretical sampling

In qualitative research, theoretical sampling is a widely accepted method [69]. In theoretical sampling, data collection and analysis starts with the very first response and continues till no new insight is forthcoming i.e. till a point of

reaching theoretical saturation. The researchers have the flexibility to select respondents based on the context of the study [10] [14]. For current study, data collection and analysis started with the first participant and progressed to further participants based on emerging analysis till a point of theoretical saturation was reached which occurred with data collection from 32 respondents. The respondents were heads of institutions (H), academic staff (AS) and students (S) in Indian institutions of higher education. In addition, responses were collected from external auditors (EA), internal auditors (IA) and medical staff i.e. doctors (Dr) who had been part of ISO 45001 implementation for various organizations. A small sample size for qualitative research is sufficient for effective analysis as a large sample size will not permit in-depth analysis [46]. Sufficiency of sample size also depends on the nature of study [14]. Structured interviews were conducted with the respondents. Different questions were asked to each category of respondents since each category had a different role to play in implementation of ISO 45001.

The major questions that were asked have been listed:

- (1) Heads of institutions
 - (a) What is the role of leadership in implementation of ISO 45001?
 - (b) What are the challenges in implementation of ISO 45001?
 - (c) How will you ensure that academic staff and students follow ISO 45001 norms?
 - (d) How will you ensure commitment to implementation of ISO 45001?
- (2) Academic staff and students
 - (a) What is your expectation with respect to health and safety in higher educational institutions?
 - (b) How role can you play in mitigation of health related risks?
 - (c) How can you help others in smooth implementation of health risk management?
- (3) Internal and external auditors
 - (a) What is the role of auditors in implementation of ISO 45001?
 - (b) What are the important steps in implementation of ISO 45001 across higher educational institutions?

(c)How will you maintain control over the processes?

(4)Doctors

(a)What are the different initiatives to ensure safety and well-being of academic fraternity?

(b)How will you support in implementation of ISO 45001?

(c)How will you ensure preparedness in case of medical emergencies?

(d)How will you spread awareness amongst the academic fraternity?

The responses were video recorded with the permission of the respondents and later transcribed for data analysis. The collected responses were analysed to identify the sub themes and relating the sub themes to the main themes using thematic analysis [36]. The main themes were borrowed from the existing ISO 45001 framework. The themes relate to role of leadership, planning, support and operations, performance evaluation and continual improvement [27]. The biases were reduced by verifying the results from the respondents through triangulation method [42].

TABLE I: Profile of Respondents

Sr. No.	Profile of respondent	Abbreviation	Number of respondents
1.	External Auditor	EA	4
2.	Internal Auditor	IA	7
3.	Doctor	Dr	3
4.	Head of Institution	H	5
5.	Academic Staff	AS	6
6.	Students	S	7
	Total		32

TABLE II: Role Of Leadership In Iso 45001

Role of Leadership	Respondents
safety policy on health management	H1
participation by academic staff and students in implementation	IA1
review of existing safety guidelines	H2
commitment by top leadership for implementation	H3

Inference

The role of leadership is very critical to implement ISO 45001. It starts from designing

the safety policy with respect to educational institutions (H1). Implementation is possible if there is participation by all the academic staff and students in implementation (IA1) and commitment of head of the institution in facilitating the process (H3). The existing safety guidelines provided by universities will have to be reviewed and risk mitigation with respect to pandemic will have to be included.

TABLE III: ROLE OF PLANNING IN ISO 45001

Planning	Respondents
designing risk management SOPs	EA1
risk analysis	S1
framing SOP content for safety	S2, S3, AS2, S4, S5, S6, AS4, AS5, Dr3, H4
defining objectives	H5
understanding expectation of stakeholders for a safe environment	S7
roles and responsibility	IA7

Inference

The first step in the whole process is Planning. The major expectation of stakeholders is a safe environment for working and learning (S7). This will lead to defining the objectives to achieve 0 % tolerance and 100 % safety (H5). In order to achieve the objective, the academic institutions will have to carry out a risk analysis of each functions to identify the risks and the risk mitigation strategies (S1). The different risks associated with spreading diseases are person to person contact including visitors, contact with different types of surfaces, working in closed spaces, lack of hygiene and not following safety guidelines (S1). Standard operating procedures (SOP) of every department will have to be reviewed to include risk management (EA1). The SOPs should take into account all aspects of hygiene and social distancing related to academic block, hostels, washrooms, student movement outside the campus, regular safety drills and emergency preparedness by medical teams (S2, S3, AS2, S4, S5, S6, AS4, AS5, Dr3, H4). A task force comprising academic staff, auditors and doctors should be appointed for preparing the plan and roles and responsibility to be determined (IA7). Table IV: Support And Operations In ISO 45001

Support and Operations	Respondents
teamwork for implementation	IA2
maintaining vigilance	IA3
implementation of safety instructions at institute	Dr1
creating awareness	AS3
prompt reporting and action	IA4
designating roles and responsibilities	IA6

Inference

Support and operations relate to implementation of safety guidelines. For effective implementation, regular orientation and awareness sessions on safety should be conducted for all so that the safety instructions are followed (AS3). Teams should be formed for effective implementation of SOPs in all functions of academics and hostels (IA2). Flow charts can be displayed at all prominent locations so that everyone follows it and prompt reporting and action is taken on detection of a case (IA4). Roles and responsibilities of key personnel in all the functional areas should be clearly stated and communicated (IA6). Vigilance should be maintained through technology and security personnel to ensure non violation of safety norms (IA3).

TABLE V: Performance Evaluation IN ISO 45001

Performance Evaluation	Respondents
periodic medical check up	Dr2
periodic feedback from academic staff and students	EA2
Internal and external audits of educational institutions	IA5
technology based monitoring	EA3
satisfaction of academic staff and students	AS6

Inference

Performance evaluation relates to monitoring the results and taking preventive and corrective action wherever necessary. It also relates to identifying opportunities for continual improvement. In the ISO 45001 standard, taking periodic feedback from academic staff and students will help in measuring the robustness of the system (EA2). Measuring satisfaction is equally important (AS6). Technology based health monitoring through the tracking app, video cameras within the institute to check movement of personnel will help in effective monitoring (EA3). This should

be followed by periodic medical check-up of all employees and students (Dr2). Monthly internal audits and quarterly external audits will further help in monitoring the results and create opportunities for further improvement (IA10).
Table VI: Continual Improvement In ISO 45001

Continual improvement	Respondents
Mitigate older risks, identify forthcoming risks and risk mitigation strategies	EA4

Inference

The sole purpose of continual improvement is to overcome the existing shortcomings and identify new areas of health risk management. The higher educational institutions should eliminate the older identified risks completely over a time period and identify new areas of health risk management (EA4).

Validation

In qualitative studies, triangulation is the most preferred method of validation where a combination of methods is used for validation [17]. According to researchers [42], the widely used methods of triangulation are (1) peer debriefing i.e. validation from experts in the concerned area and (2) member checking i.e. validation from participants.

Peer debriefing

Peer debriefing is the method where peer reviews are taken from experts in the concerned area on a continuous basis [42]. For the current study, two experts who were ISO 45001 certified auditors were appointed for review during the beginning of the study. Periodic guidance was taken from the experts throughout the study. The experts provided their criticism and suggestions which helped to make improvements in the study. The experts also validated the findings of the study.

Member checking

Member checking is the process where the data interpretation is reviewed by the participants for correctness [42]. Due to lockdown situation, it was not possible to physically meet the participants. Hence, a copy of the findings was shared with the participants through email for review. An online video conferencing through Google Meet was arranged with the participants at a mutually convenient date and time and the

findings were discussed. The findings were approved unanimously after discussion and certain clarifications.

Conclusion and Implications

The results clearly highlight the application of ISO 45001 in higher educational institutions. Leadership provides motivation and commitment in implementation [4] [59]. Safety objectives, standard operating procedures, roles and responsibilities need to be determined in the context of academic department, examination department, administration, student hostels and cafeteria [1]. Performance evaluation can be achieved through periodic feedback of academic staff, students, health workers and auditors working with educational institutions (Rodríguez-Mantilla *et al.*, 2019). Internal and external audits will give way to continual improvement of healthcare systems in higher educational institutions [8].

Educational institutions attract students and faculty from all over the globe and they enter a new environment which can affect their health and well-being [40]. The success of ISO depends on the involvement and participation of all the stakeholders and the role of leadership in supporting the initiative of healthy and safe environment. The intentions of leadership have to be communicated very clearly to the organization [13]. Previous studies have clearly indicated the importance of well-being as a driver of progress in higher education [68] [6]. ISO 45001 as an indicator of quality in health risk management will provide an assurance of healthy environment.

The research will play an important role in implementing health risk management across educational institutions in developing countries. It will enable institutions to frame a health risk policy that deals with pandemics. Health and well-being are important issues in developing countries [38]. The research is also important for education policy makers of developing countries since ISO 45001 can set international quality standards for educational institutions in the field of healthcare. The research is also important for ISO implementation agencies since they get a ready framework of health and safety customized to educational institutions. The research will help them to understand expectations of educational institutions and reduce challenges in implementation of the standard.

Limitations of study and future research direction

The study has adopted an inductive approach since the purpose was to understand implementation of ISO 45001 rather than generalize the findings. Further improvement would be to adopt a deductive approach in order to strengthen the external validity. The study is limited to academic institutions where a health risk management has not yet been implemented. Future research will relate to developing a healthcare model based on ISO 45001 for preventive healthcare in order to minimize the risks. Both qualitative and quantitative approach can be adopted to develop the model.

References

1. Abdullah, H. H., & Siam, M. (2014). The influence of organizational structure and organization culture on the organizational performance of higher educational institutions: The moderating role of strategy communication. *Asian social science*, 10(13), 142-154.
2. Al-Qatawneh, L. (2017). Framework for establishing records control in hospitals as an ISO 9001 requirement. *International journal of health care quality assurance*.
3. Alshehri, S. Z., Byrne, J., & Grace, M. (2019). Saudi Arabian university students' perceptions of health risk behaviours. *Health Education*.
4. Anderson, M. (2017). Transformational leadership in education: A review of existing literature. *International Social Science Review*, 93(1), 4.
5. Anderson, R. M., Heesterbeek, H., Klinkenberg, D., & Hollingsworth, T. D. (2020). How will country-based mitigation measures influence the course of the

- COVID-19 epidemic?. *The Lancet*, 395(10228), 931-934.
6. Barrable, A., Papadatou-Pastou, M., & Tzotzoli, P. (2018). Supporting mental health, wellbeing and study skills in Higher Education: an online intervention system. *International journal of mental health systems*, 12(1), 1-9.
 7. Barradell, S., & Peseta, T. (2017). Putting threshold concepts to work in health sciences: insights for curriculum design from a qualitative research synthesis. *Teaching in Higher Education*, 22(3), 349-372.
 8. Basir, S. A., & Davies, J. (2018). ISO 9000 maintenance measures: the case of a Malaysian local authority. *Total Quality Management & Business Excellence*, 29(1-2), 185-201.
 9. Bayram, M. (2020). Factors affecting employee safety productivity: an empirical study in an OHSAS 18001-certified organization. *International journal of occupational safety and ergonomics*, 1-14.
 10. Beardmore, A. (2019). Working in social prescribing services: a qualitative study. *Journal of health organization and management*.
 11. Bevilacqua, M., Ciarapica, F. E., & De Sanctis, I. (2016). How to successfully implement OHSAS 18001: The Italian case. *Journal of Loss Prevention in the process Industries*, 44, 31-43.
 12. Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589-597.
 13. Brown, A. (2020). Communication and leadership in healthcare quality governance: Findings from comparative case studies of eight public hospitals in Australia. *Journal of health organization and management*.
 14. Charmaz, K. (2008). Grounded theory as an emergent method. *Handbook of emergent methods*, 155, 172.
 15. Chawak, S., Chittam, M., Aswini, S., Varghese, D., & Epton, T. (2020). Predictors of health behaviours among Indian college students: an exploratory study. *Health Education*.
 16. Conde, M. A., Colomo-Palacios, R., García-Peñalvo, F. J., & Larrucea, X. (2018). Teamwork assessment in the educational web of data: A learning analytics approach towards ISO 10018. *Telematics and Informatics*, 35(3), 551-563.
 17. Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into practice*, 39(3), 124-130.
 18. Weintraub, D., David, A. S., Evans, A. H., Grant, J. E., & Stacy, M. (2015). Clinical spectrum of impulse control disorders in Parkinson's disease. *Movement Disorders*, 30(2), 121-127.
 19. Delicado, A., Rowland, J., Fonseca, S., de Almeida, A. N., Schmidt, L., & Ribeiro, A. S. (2017). Children in disaster risk reduction in Portugal: policies, education, and (non) participation. *International Journal of Disaster Risk Science*, 8(3), 246-257.
 20. Dionne, G. (2013). Risk management: History, definition, and critique. *Risk management and insurance review*, 16(2), 147-166.
 21. Dooris, M., Farrier, A., Powell, S., & Holt, M. (2019). Whole system approaches to health in higher education: An evaluation of the UK Healthy Universities Network. *Health Education*.
 22. Doss, D. A. (2018). A decade after Virginia Tech: considerations of campus safety and security for higher education institutions. In *Homicide and Violent Crime*. Emerald Publishing Limited.
 23. Dubey, A., Mehndiratta, A., Sagar, M., & Kashiramka, S. (2019). Reforms in technical education sector: evidence from World Bank-assisted technical education quality improvement programme in India. *Higher Education*, 78(2), 273-299.
 24. Egan, B. M., Lackland, D. T., & Cutler, N. E. (2003). Awareness, knowledge, and attitudes of older Americans about high blood pressure: implications for health care policy, education, and research. *Archives of Internal Medicine*, 163(6), 681-687.

25. Fei, J. C., Min, X. B., Wang, Z. X., Pang, Z. H., Liang, Y. J., & Ke, Y. (2017). Health and ecological risk assessment of heavy metals pollution in an antimony mining region: a case study from South China. *Environmental Science and Pollution Research*, 24(35), 27573-27586.
26. Fernández-Muñiz, B., Montes-Peón, J. M., & Vázquez-Ordás, C. J. (2012). Occupational risk management under the OHSAS 18001 standard: analysis of perceptions and attitudes of certified firms. *Journal of cleaner production*, 24, 36-47.
27. Foulke Jr, E. G. (2019). What You Need to Know About ISO 45001. *Risk Management*, 66(5), 12-13.
28. Gan, J., & Forbes-Mewett, H. (2019). International student migration and mental health. In *Vulnerability in a mobile world*. Emerald Publishing Limited.
29. Ghahramani, A. (2016). An investigation of safety climate in OHSAS 18001-certified and non-certified organizations. *International journal of occupational safety and ergonomics*, 22(3), 414-421.
30. Ghahramani, A., & Salminen, S. (2019). Evaluating effectiveness of OHSAS 18001 on safety performance in manufacturing companies in Iran. *Safety science*, 112, 206-212.
31. Giatman, M. (2015). Optimization of implementation QMS ISO 9001: 2008 in the education and training vocational education (TVET) Professional.
32. Gopal, N., & Van Niekerk, C. (2018). Safety in student residences matters!. *South African Journal of Higher Education*, 32(3), 172-188.
33. Hall, J., Kay, T., McConnell, A. K., & Mansfield, L. (2019). Implementation of sit-stand desks as a workplace health initiative: stakeholder views. *International Journal of Workplace Health Management*.
34. Harris, M., & Holley, K. (2016). Universities as anchor institutions: Economic and social potential for urban development. In *Higher education: Handbook of theory and research* (pp. 393-439). Springer, Cham.
35. Hill, M., Peters, M., Salvaggio, M., Vinnedge, J., & Darden, A. (2020). Implementation and evaluation of a self-directed learning activity for first-year medical students. *Medical education online*, 25(1), 1717780.
36. Holton, G. (1988). *Thematic origins of scientific thought: Kepler to Einstein*. Harvard University Press.
37. Forbes-Mewett, H. and international students.
38. Shivji, N. A., Lymn, J. S., Meade, O., & Watts, K. (2021). Hearing the unheard voice-puberty experiences of young Pakistani men: A qualitative study. *Journal of Adolescence*, 88, 36-47.
39. Ravari, Z. K., & Tan, K. E. (2019). A qualitative investigation of strategies and experiences of non-native students writing master's theses. *Journal of Applied Research in Higher Education*.
40. Ravari, Z. K., & Tan, K. E. (2019). A qualitative investigation of strategies and experiences of non-native students writing master's theses. *Journal of Applied Research in Higher Education*.
41. Kotera, Y., Conway, E., & Van Gordon, W. (2019). Mental health of UK university business students: Relationship with shame, motivation and self-compassion. *Journal of Education for Business*, 94(1), 11-20.
42. Li, F., Zhang, J., Jiang, W., Liu, C., Zhang, Z., Zhang, C., & Zeng, G. (2017). Spatial health risk assessment and hierarchical risk management for mercury in soils from a typical contaminated site, China. *Environmental geochemistry and health*, 39(4), 923-934.
43. Lincobi, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury.
44. Liu, L. (2016). Using Generic Inductive Approach in Qualitative Educational Research: A Case Study Analysis. *Journal of Education and Learning*, 5(2), 129-135.
45. MacLeod, M. L., Hanlon, N., Reay, T., Snadden, D., & Ulrich, C. (2019). Partnering for change: How a health authority, physicians, and communities work together to transform primary

- healthcare services. *Journal of health organization and management*.
46. Maffini, C. S. (2018). Campus safety experiences of Asian American and Asian international college students. *Asian American journal of psychology*, 9(2), 98.
47. Marshall, B., Cardon, P., Poddar, A., & Fontenot, R. (2013). Does sample size matter in qualitative research?: A review of qualitative interviews in IS research. *Journal of computer information systems*, 54(1), 11-22.
48. Meegahapola, P. A., & Prabodanie, R. R. (2018). Impact of environmental conditions on workers' productivity and health. *International Journal of Workplace Health Management*.
49. Tolinggi, S. O. R. (2020). Pengembangan Kurikulum Bahasa Arab Berparadigma Integrasi-Interkoneksi Mengacu KKNI dan SN-DIKTI. *Al-Ta'rib: Jurnal Ilmiah Program Studi Pendidikan Bahasa Arab IAIN Palangka Raya*, 8(2), 177-200.
50. Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International journal of qualitative methods*, 16(1), 1609406917733847.
51. Parvez, N., & Agrawal, A. (2019). Assessment of sustainable development in technical higher education institutes of India. *Journal of cleaner production*, 214, 975-994.
52. Viray, M. N. (2019). Importance of Strategic Management and Cultivating a Culture of Engagement and Collaboration in the Implementation of Evidence-based Home Visiting Program (Doctoral dissertation, California State University, Northridge).
53. Pilbeam, C., Doherty, N., Davidson, R., & Denyer, D. (2016). Safety leadership practices for organizational safety compliance: Developing a research agenda from a review of the literature. *Safety science*, 86, 110-121.
54. Ploeg, J. (1999). Identifying the best research design to fit the question. Part 2: qualitative designs. *Evidence-Based Nursing*, 2(2), 36-37.
55. Rani, P. G. (2017). Financing higher education and education loans in India: interstate differentials and determinants. *Journal of Social and Economic Development*, 19(1), 42-59.
56. Rissanen, V. (2000). Quality system based on the standard SFS-EN ISO 9002 in Kuopio University Hospital. *International journal of health care quality assurance*.
57. Prasath, D. S., & Selvakumar, A. (2015). A Novel Iris Image Retrieval with Boundary Based Feature Using Manhattan Distance Classifier. *International Journal Of Innovative Technology And Creative Engineering (Issn: 2045-8711) Vol, 5*.
58. Aroulanandam, V. V., Latchoumi, T. P., Balamurugan, K., & Yookesh, T. L. (2020). Improving the Energy Efficiency in Mobile Ad-Hoc Network Using Learning-Based Routing. *Rev. d'Intelligence Artif.*, 34(3), 337-343.
59. Rodríguez-Mantilla, J. M., Fernández-Cruz, F. J., & Fernández-Díaz, M. J. (2019). Comparative analysis between management team and teachers on the impact of ISO 9001 standards in educational centres. *International Journal of Quality and Service Sciences*.
60. Salehzadeh, R. (2019). The effects of leaders' behaviors on employees' resilience. *International Journal of Workplace Health Management*.
61. Sawang, S., Chou, C. Y., & Truong-Dinh, B. Q. (2019). The perception of crowding, quality and well-being: a study of Vietnamese public health services. *Journal of health organization and management*.
62. Seeber, M., Meoli, M., & Cattaneo, M. (2020). How do European higher education institutions internationalize?. *Studies in Higher Education*, 45(1), 145-162.
63. Sezgin, D., O'Donovan, M., Cornally, N., Liew, A., & O'Caomh, R. (2019). Defining frailty for healthcare practice and research: A qualitative systematic review with thematic analysis. *International journal of nursing studies*, 92, 16-26.
64. Sezgin, D., O'Donovan, M., Cornally, N., Liew, A., & O'Caomh, R. (2019). Defining frailty for healthcare practice and research: A qualitative systematic review

- with thematic analysis. *International journal of nursing studies*, 92, 16-26.
65. Shi, Y., Lin, W., Chen, P. K., & Su, C. H. (2019). How can the ISO 9000 QMS improve the organizational innovation of supply chains?. *International Journal of Innovation Science*.
66. Singh, D., Kumar, A., Kumar, K., Singh, B., Mina, U., Singh, B. B., & Jain, V. K. (2016). Statistical modeling of O₃, NO_x, CO, PM_{2.5}, VOCs and noise levels in commercial complex and associated health risk assessment in an academic institution. *Science of The Total Environment*, 572, 586-594.
67. Skład, A. (2019). Assessing the impact of processes on the Occupational Safety and Health Management System's effectiveness using the fuzzy cognitive maps approach. *Safety science*, 117, 71-80.
68. Stewart-Brown, S., Evans, J., Patterson, J., Petersen, S., Doll, H., Balding, J. and Regis, D. (2000), "The health of students in institutes of higher education: an important and neglected public health problem?", *Journal of Public Health*, Vol. 22 No. 4, pp. 492-499.
69. Tafreshi, M. Z., Pazargadi, M., & Saeedi, Z. A. (2007). Nurses' perspectives on quality of nursing care: a qualitative study in Iran. *International Journal of health care quality assurance*. Tilak, J. B. (2018), "Private higher education in India", In *Education and Development in India* (pp. 535-551). Palgrave Macmillan, Singapore.
70. Tomic, B., & Brkic, V. K. S. (2019). Customer satisfaction and ISO 9001 improvement requirements in the supply chain. *The TQM Journal*.
71. Velardo, S., & Drummond, M. (2019). Qualitative insight into primary school children's nutrition literacy. *Health Education*.
72. Vitner, G., Nadir, E., Feldman, M., & Yurman, S. (2011). ISO 9001 in a neonatal intensive care unit (NICU). *International journal of health care quality assurance*.
73. Wadhwa, R. (2016). New phase of internationalization of higher education and institutional change. *Higher Education for the Future*, 3(2), 227-246.
74. Yanar, B., Robson, L. S., Tonima, S. K., & Amick III, B. C. (2020). Understanding the organizational performance metric, an occupational health and safety management tool, through workplace case studies. *International Journal of Workplace Health Management*.

BENCHMARKING OF MAJOR INDIAN PORTS AND DEVELOPING A ROAD MAP FOR THEIR TRANSFORMATION FOR SUSTAINING GROWTH IN TRADE AND COMMERCE.

Kritika Sharma

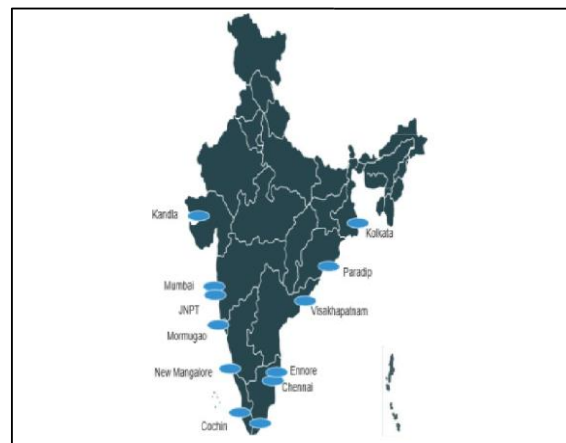
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ABSTRACT

India has a coastline spanning 7516.6 kilometers, forming one of the biggest peninsulas in the world. Rapid economic growth in India demands quality logistical services, implying that seaports, would play pivotal roles. Indian ports would require significant improvement in port performance with the increasing cargo volume at ports the purpose of this paper is to benchmark the operational, financial, environmental and safety parameters of the major Indian seaports to help derive useful insights to improve their performance and operational efficiency. This paper analyses the performance of major Indian ports for the year 2014-18. An attempt is made to assess the operational performance of ports in terms of vessel, container and total traffic handled during the last decade. It has been seen that various major international ports perform very well in the competitiveness of global ports as compared to the major Indian ports. So, a detailed study has been done to understand the factors that influence these major international ports in port competitiveness and contrasting them with the Indian ports. The Weighted Score Method has been adopted for ranking major Indian ports. The weights are derived from the factor loadings of the Principal Component Analysis. On the basis of operational performance indicators and physical facilities indicators, the ranking for major Indian ports are done. The paper also provides a feedback to the ports about its status and ongoing improvement strategies. The objective of this research is to develop a method of benchmarking ports authorities and apply to compare the Indian port management with International ports.

Introduction

Globalization of world economy has encountered a fast development in delivery industry and product exchange. Ocean ports take a long incubation period for arranging and advancement which includes a colossal monetary information and assets. During 2014, a significant grid lock on the harbors of world highest level ocean ports of Asia and America experienced traffic clog. Due to traffic clog there were delay in shipments and mismanagement on the harbors, Thus, the developing countries have indicated enthusiasm for sophisticating their framework to improve the operational productivity through motorization and to contend in Global Oceanic industry. India is one of the greatest peninsular on the planet, which is served by 13 significant ports and 187 minor ports which encourage worldwide and Indian product exchange. The eastern and western coast lines have seven and six ports individually. The development in India is undoubtable; as it is set among the best five developing countries with appropriate goals in the trade world.



The service in shipping sector has revealed that the limit usage through 2017–18 was around 69 percent and the turnaround time of 2.11 days which take just hours in different economies (north America, china). This demonstrates a positive picture in the growth and improvement of Indian ports, yet its profitability share was 1.7 percent in world throughput which is well underneath the benchmark of global profitability.

This paper is focused on the financial matters of Indian ports as one significant marvel in Indian monetary geology, and its dating with nearby improvement. With developing transparency of

the monetary framework and absence of an included inclusion closer to send out transportation network, there might be a decrease in trade power and rising home seaside site guests in India

Purpose Of Research

In the most recent decade, the delivery business and the worldwide seaborne exchange has seen a fast development because of globalization in economy, blast in universal exchange and conjectures without any refined borders. By way of rivalry midst universal ports has heightened, the assessment of port functioning effectiveness has gotten progressively essential to empower singular ports to consider its present the norm and comprehend their qualities and shortcomings in the serious condition. This examination intends to research the specialized and scale productivity of significant holder ports in the locality in Asia. The examination utilizes the Information Investigation without any parameters procedure to benchmark and assess the working execution of significant compartment ports and produce effectiveness positioning. The aftereffects of this examination can demonstrate conceivable improvement(s) in port administration and functioning arranging at nearby and nationwide levels.

Port restriction is a muddled thought which is propelled with the guide of changes inside the market condition and contention between administrators inside the equivalent port, among neighboring ports, between multi-port passage regions and among entire port degrees. Port want choices with the guide of shippers and forwarders additionally performs essential effect on port rivalries. There isn't any very much portrayed thought for port rivalry in light of its convoluted nature. In any case, port seriousness is the idea wherein ports universally or broadly contend among themselves as far as procuring exchange, where port administrators and specialists draw in and make openings in improving the equivalent. This nature and attributes of rivalry rely on the sort of port included like; entryway port, nearby port, trans-shipment port, compartments and fluid mass. Other powerful factors for the intensity of a port are summed up as proficiency, hinterland openness, efficiency, quality, load creating

impact, notoriety, dependability, and ocean and hinterland separations. Under such a serious situation, port productivity has become a fundamental part for a country to accomplish globally upper hand.

In India there are 13 significant ocean ports, out of which 12 are controlled by governments and 1 is corporate. These ports principally handle fare and import of materials, synthetic substances, oil, iron, hardware, autos, coals, minerals, espresso, lumber logs and others. Here three significant ports have been talked about to be specific, Jawaharlal Nehru Port, Mumbai, Encore/Kamarajar Port, Chennai and Kandla Port, Gujarat. These ports have been talked about in light of the fact that they have been accounted for to deal with the most traffic and have contributed towards significant exchange economy. In addition, these ports have likewise wanted to raise their traffic and limit up to 10 million TEUs.

The expanding scene yield and coming about extension in world product exchange the period of globalization has subsequently requested productive oceanic framework for worldwide calculated administrations. Ports being the nodal focuses in the worldwide strategic framework are ready with the test of taking care of expanding volume of universal exchange payload. In this specific situation, the consistent improvement in port execution turns into a significant supporter of a country's universal intensity and assumes a huge job in exchange arranged monetary improvement.

Exact when ports wherever all through the world are expanding huge centrality in the hour of globalization with the progression in world trade, the volume of payload circulation at Indian ports is also developing essentially. The advancement design in volume of payload traffic at Indian ports suggests that, in solicitation to satisfy the cargo dealing with need in future, Indian ports fragment would require a tremendous augmentation in breaking point and improvement in port execution.

The admissions relating to the headway of maritime ports are in the Seventh Plan of the Constitution and along these lines come under the area of both the centre and the state governments. The 12 critical ports of India are set in the affiliation overview of the Constitution and are such lawful bodies

(believes) coordinated by the Administration of Transportation under the courses of action of the Huge Port Trusts Act, 1963 and Indian Ports Act, 1908. The Indian Ports Act (1908) chiefly depicts the regulatory powers of the port position. It sets down standards as for security of conveyance and insurance of ports for the entire port fragment and controls matters identifying with association of port commitments, pilotage and various charges. Along these lines, the Exhibit loosens up normally to all ports and parts of safe conduits and networks inciting the ports paying little heed to class (major and minor). The CPA(Critical Port Trusts Act-1963) permits the port to lead its governing similarly as business limits. It sets out the institutional framework for the huge ports in India. In like way each critical port is spoken to by a main gathering of trustees chose by the council now and then as set some place around the Showing. Routinely, the term of the main gathering of trustees continues for quite a while. The nominated people from the trusts are replaced by new people as and when opening rises. This is restricted to the port suitable of the huge ports. The non-critical ports (minor ports) are set in the synchronous once-over of the Constitution and as such fall inside the ward of the specific state gov-ornaments and are managed by the Indian Ports Act 1908. The working conditions of port work are directed by the Dock-Workers (Rule and Business) Act-1948, which indicates the terms and environments of port work and use mint, organization rules measures and other government help issues in the interest of port and dockworkers. The Exhibition is incredibly cautious of workers' benefits and reaches out to them complete business opportunity security. Under this order, various ports have set up their different Dock Work Sheets (dB) which nimbly work to the stevedoring associations and besides to the port experts. The managerial structure of the ports in India similarly consolidates laws like Seller Transportation Act 1958 and common rules (Condition Security Act 1986). The latter is overseen by the Administration of Condition and Woodlands. It saves and announces the ocean side rule zones (crus) of the country. Under the Show, port endeavors whether old or new, also attract plans of other condition related

laws like Untamed life Security Act 1972, Water (Evasion and Control of Tainting) Act 1974, Forest Conservation Act 1988 and Air (Contravention and Control of Sullyng) Act 1981. All of these shows are commonly principal for the smooth working of the port division in India. Further these shows are amended once in a while by the Parliament, to fit and combine new rules and rules obtained in light of globalization, privatization and competition in the economy. Additionally, there are in like manner various acts, for instance, the In-land Vessels Act 1917, the Floating Vessels Act 1838, the Inland Courses Authority of India Act 1985, etc. These are also material to the ports and maritime vehicle when all is said in done at various motivations behind time and they should be clung to, so the ports fill in as a singular unit furnished with full powers of an affiliation.

The remainder of the ports (non-major, minor, transitional and private) are under the administrative control of the specific maritime state governments. A few maritime states, for instance, Maharashtra, Gujarat and Tamil Nadu have set up State Ocean Sheets for the smooth working and the administrators of minor ports in their states. Various other ocean states have not yet set up these sheets, yet the board and control of their minor port's rests under their ports and fisheries workplaces. The advancement ministration of minor ports changes from state to state. For each and every helpful explanation the administration, control and course of these minor ports starts from their different state governments.

As indicated by the rundown of busiest holder ports made by AAPA World Port rankings, the main ten ports have a place with Asia. Investigating the rundown, the busiest port of Europe is Port of Rotterdam, Netherlands and North America is Los Angeles Port, USA. In any case, as referenced before in the audit of writing the busiest ports of Asia and Europe have been represented to get the components that make them the busiest ports and to decide their seriousness. Nonetheless, Port of Colombo, Sri Lanka has additionally been considered to achieve the components that have made them invaded the Indian ports over the long haul. Shanghai port, which is the world's biggest holder port since 2010 has a net benefit

of RMB28.7bn. In excess of 2,000 compartment ships withdraw from the port each month to North America, Europe, the Mediterranean and different areas. It is situated at the centre of the 18,000km- long Chinese. These ports on differentiating have been found to have developed to more noteworthy reach out because of better arranging and execution towards framework, benefits, limit, execution and effectiveness. In addition, the Asian port's survey actualizes that area and shipper's association are a persuasive factor alongside better foundation and freight load limit. Surveying the European ports, it very well may be inferred that these ports have developed indeed and is anticipating more intensity against other European ports by actualizing better strategies and approaches and furthermore expanding the port's ability and framework. The port of Colombo has been considered as the third quickest developing port on the planet. This is fundamentally a direct result of the area, foundation and shipper's inclusion and these has made them surpassed other South-Asian ports in the opposition.

Variables influencing seriousness of ports

There are different components the impact the intensity of the ports. They make the ports financially productive for the individual nation. Additionally, different articles and investigates depicts the variables how they impact port's intensity.

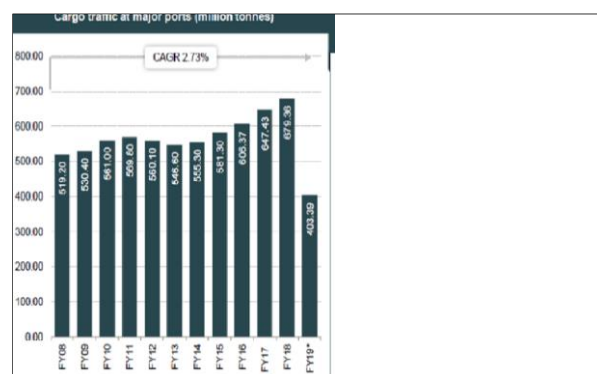
Limit of Ports: This is a significant factor that drives the seriousness of the ports. It has been seen that significant driving ports have consistently focused in building up the compartment and freight traffic of the ports. It has been seen that vessels ought not hang tight for billets and it ought to be the other path round. Different ports have hugely advantageous geological area yet because of low limit of capacity and billets they don't get a lot of traffic. In this manner, it tends to be suggested that limit of the ports is driven by the compartment size, traffic upkeep of the ports, profundity and bowl.

Methodology

The study has two principal objectives. The first indicators and compare the performance of the ports second objective is to empirically

measure factor productivity (top) of major ports. Performance of a port depends upon several factors such as physical, technological, institutional factors. However, performance of a several indicators: operational performance clued turnaround time, pre-berthing time, solute cargo handled, growth rate, capacity utilisation, performance indicators which include operating in expenditure, operating surplus, operating indicators which include berthing facilities, cargo handling facilities, etc; and institutional number of employees, operating income per cargo handled.

Cargo traffic at major ports in India: as shown in Figure 1



Source: Ministry of shipping, Indian Ports Association

Evolution of Non-Major Ports: as shown in Figure 2

Non major ports are ahead in gaining shares and a chief mass of circulation has shifted from major ports to non major ports. The influence of non major port's traffic to total traffic rose to 42 % in financial year 2018.

Cargo traffic at non-major ports is Estimated at 491.85 million tonnes in financial year 2018. Increased at 9.0 percent (CAGR)between financial year 18-19.

Estimating off ocean port/terminal execution as effectiveness and profitability has been an enthusiasm of analysts. Be that as it may, concentrates on benchmarking of ports/terminals have begun as of late and are restricted in number. It is fascinating to take note of that a lion's share of existing investigations on benchmarking in this part have considered holder ports/terminals. At the scenery of privatization activities over the world and resultant improvement in world exchange, presence of powerful and solid ports has become a need to help remote exchange of

countries over the world. The two dealers and transportation industry are hoping to ports and terminals that have solid hinterland availability and backing in protected and fast development of their payload. Privatization of this segment has cleared path for foundation of more ports/terminals and brought about extreme rivalry among the players. This has commanded presence of principles for execution that go about as benchmarks for the different partners in the segment. Subsequently, port specialists, regardless of possession model followed, are deciding on benchmark their exhibition against the best entertainer to ad lib on their wasteful aspects. De Lange (2015) in the report on benchmarking of ports, argued that inside next five years port execution benchmarking covering both productivity and adequacy vectors, with or without the participation of port specialists, will occur as clients began increasing comprehension and estimating start to finish flexibly bind execution in order to improve their own seriousness and make esteem expansion for their own clients. While Wang and Cullinane, (2016) felt that non-presence of exhaustive quantitative benchmarking for port driven examinations is a significant requirement and reliance on subjective correlations or potentially gauges created in interpersonal organization investigation has come about in non-thought of 'coordinated' and 'weighted' arrange highlights of oceanic compartment transportation. Analysts, Valhi and Lucite (2016) proposed abide time as basic for characterizing situations of port intensity and benchmarking, as it might be to a great extent diminished by usage of pre-leeway forms. An endeavour to set benchmark norms for Hong Kong Port was taken up, Marine Office (2006) by considering 20 holder ports, including Hong Kong Port, for investigation. The examination has not utilized any procedure to decide norms yet dissecting chosen holder terminals of the world with factors, for example, costs caused, physical highlights, and utilization of IT. While Caradon, Racquet, and Carver (2004) proposed procedure of investigation and assessment with various groupings and stages, procedures, and measurements for benchmarking at a port. The operational exhibition of the ports is more powerful than their money related execution for

the ports the board. In this examination, the exhibition of significant ports as far as select pointers, for example, all out traffic, holder traffic and vessel traffic dealt with for as far back as 10 years from 2004 - 05 to 2013-14 was evaluated by Elucidating insights and their development was estimated by Intensified Yearly Development Rate (CAGR). The presentation yield is the all-out payload dealt with by the ports in association with the operational data sources like compartments, stockpiling limits and the types of gear in ports. The Information Envelopment Examination (DEA) model was applied to quantify the port proficiency which was a famous and acknowledged model for estimating the port effectiveness in prior investigations like Danijela perceive and Aleksandar Radonjic (2011), Stefano Maria Osorio Ingra (2010) Ahmed Salem Al-Iraqi, Carlos Pestoni Barros and Adli Mustafa (2007).

In FY19 (until Nov-18) traffic in cargo touched 461.23 million tonnes . Being at 689.36 million tonnes in FY-18, with a growth of (CAGR) of 2.74% from financial year(2018-19).

In March 2017 and 16 scanners for new cargo were fitted across major ports in India. In the first phase, fifth of the thirteen major ports i.e. Kamarajar-Ennore , New Mangalore, JNPT, Kolkata(Haldia) and Vizzag scanners will be received in future.

Literature Review

Jose L. Tenzin (1994) structured a model to decide port execution and productivity, in which two factors are taken; one is terminal effectiveness and the other is port execution techniques. It was demonstrated that terminal effectiveness is the noteworthy supporter of improve the port execution and there are different elements like financial action, topographical area and recurrence of boat calls. Patrick Forteau (2000) alluded the World Bank report which has characterized the essential method of estimating port exhibitions by encircling certain nuts and bolts like use of port types of gear, for example, cranes and quay activities with their performing limits, normal turnaround time of the boat and lead time taken for a specific shipment. The items took care of can be fragmented as dry mass, break mass, fluid mass and containerized freights for the

estimation of their activities in a specific compartment or quay.

Marlow P. what's more, Paavola (2002) applied the Information Envelopment Investigation for eight Japanese ports for a long time in which Tokyo was seen as predictable in its productivity though Yokohama, Kobe and Osaka were seen as wasteful. The ports info and yield factors obviously characterized the proficiency which looked like the prior investigations.

George Kobina van Dyck (2015) had picked six significant ports of West Africa to evaluate the efficiencies through DEA model. The compartment throughput levels were distinguished as yield variable. The terminal territory, quayside cranes, number of yards, arrive at stackers, billet length of the terminals were taken as the info factors. Port of Lagos, the biggest regarding size and throughput among the example, came about with 76 percent of effectiveness though the three landlocked ports were profoundly productive in their presentation. It inferred that the West African ports are sensibly productive with the given assets.

Bench-marking the competence of ports in contradiction of biosphere greatest training can support openings to set up approaches and management practices with a view to obtain and keep a aspect within the marketplaces. Competence- bench-marking is high to workers in allowing them to act ex-ante by using becoming positive in functioning updates, as opposed to ex-publish, by using appearing on extrapolation from shippers answers and pointers (Wang 2005). Therefore, port competence literature has gained impetus within the past period with several programs with the Data- Envelopment-Analysis (DEA) approach. The concept of competence analysis started with the functions of Koopmaans and Debbreu and Farrell who produced the primary efforts at guesstimating proficiencies to get a hard and fast of found manufacturing components. DEA is a method for determining the qualified competences of standardized apparatus that habit comparable outputs withholding to the outputs and inputs are insufficient flora to be provided by inputs data for economic reports that it will leave the DEA process operational. After Roll - Hayuth's 1993

DEA hypothetical work on vents, several pragmatic revisions have used DEA to degree methodical competence of vents. branded the 26 ports into 3 groups; especially, 'extreme complexity', 'average complexity' and 'truncated complexity' ports. After examining the efficiency of these ports the use of DEA-BCC versions, the authors conclude that the vents of 'extreme complexity' are connected with excess competence, as compared with the moderate and intermittent competence located in various businesses of vents. utilized both DEA+CCR and DEA+additive versions to analyse the effectiveness of four Australian and twelve other worldwide box vents for the calendar year-1996. Overwhelmed by the small sample size larger vents that are green inefficient vents are recognized. Park De 20 04 of the four stage D-E-A investigation hired each consistent and variable returns to scale analyses because of the presence of economies of scale within vents.

Estimating of sea port/terminal execution as efficacy and profitability has been an enthusiasm of analysts. Be as it may, concentrates on benchmarking of ports/terminals have started as of late and are limited in amount. It is fascinating to take note of that holder ports/terminals have been considered by a lion's share on benchmarking in this area, of present investigations. In the scenery of privatization actions on the planet and consequent improvement in world trade, presence of powerful and strong ports has come to be a need to help exchange of countries around the world. The two traders and transportation industry are expecting to ports and terminals which have strong hinterland accessibility and backing in speedy and protected development of their payload. Privatization of this section has cleared path for base of more ports/terminals and brought about intense rivalry among the gamers. This has commanded presence of principles for execution that move about as benchmarks for the partners in the section. Port experts followed, are deciding on benchmark their display contrary to the very best entertainer to ad lib in their aspects that are unsuccessful. De Langen (2015) in the report on benchmarking of ports, argued that within next five years jack execution benchmarking covering both

productivity and adequacy vectors, with or without the participation of port experts, will occur as customers began increasing comprehension and estimating start to finish flexibly bind execution so as to improve their own seriousness and make respect expansion for their clients. Even though Wang and Cullinane, (2016) felt that non-presence of exhaustive quantitative benchmarking for port driven examinations is a considerable necessity and dependence on subjective correlations or potentially gauges created in interpersonal organization investigation has come about in non-thought of 'coordinated' and 'weighted' arrange highlights of oceanic compartment transportation. Analysts, Vaghi and Lucietti (2016) proposed spend period as basic for characterizing situations of jack intensity and benchmarking, since it may be to a great extent diminished by utilization of pre-leeway forms. An endeavor to establish benchmark norms for Hong Kong Port was taken up, Marine Office (2006) by contemplating 20 holder ports, including Hong Kong Port, for investigation. The examination hasn't utilized any procedure to decide norms dissecting costs caused selected holder terminals of the world with factors, as an example, highlights that were bodily, and usage of IT. Even though Cuadrado, Frassetto, and Cervera (2004) proposed procedure of investigation and assessment with numerous groupings and phases, processes, and measurements for benchmarking in a port. Degree changed into found.

Furthermore, the problem of discerning the competent gadgets and effectiveness position remain deliberated less regularly in the harbor area works. This training is by using a way the most considerable observe on the performance of Asian-container stations en-compassing sixty nine container-terminals from seventeen Asiatic countries and could determine the productivity ranking of the field ports.

Analysis

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The operational exhibition of the ports is more powerful than their money related execution for the ports the board. In this examination, the exhibition of significant ports as far as select pointers, for example, all out traffic, holder traffic and vessel traffic dealt with for as far back as 10 years from 2004 - 05 to 2013-14 was evaluated by Elucidating insights and their development was estimated by Intensified Yearly Development Rate (CAGR). The

presentation yield is the all-out payload dealt with by the ports in association with the operational data sources like compartments, stockpiling limits and the types of gear in ports. The Information Envelopment Examination (DEA) model was applied to quantify the port proficiency which was a famous and acknowledged model for estimating the port effectiveness in prior investigations like Danijela perceive and Aleksandar Radonjic (2011), Stefano Maria Osorio Ingra (2010) Ahmed Salem Al-Iraqi, Carlos Pestoni Barros and Adli Mustafa (2007).

Table 1: Cargo Handled in Major Ports

Port Name	State	Cargo-Handled		Container-Traffic	
All Ports	India	679.38	4.87% ↑	9,238	7.68% ↑
Mumbai Port Trust	Maharashtra	62.86	-0.36%	49	-2.39%
Encore Port	Tamil Nadu	30.485	1.482% ↑	3	100.00%
Kolkata Port Rd. Shama Prasad Mukherjee Port-Trust	West Bengal	57.899	13.63% ↑	796	3.092% ↑
Pradip Trust Port	Odisha	102.061	14.70% ↑	7	71.49% ↑
Kochi Port	Kerala	29.149	16.58% ↑	556	11.70% ↑
Maruga Port	Goa	26.79	-18.95% ↓	32	6.265% ↑
Chennai Port Trust	Tamil Nadu	51.885	3.352% ↑	1,549.00	3.499% ↑
Visakhapatnam Port Trust	Andhra Pradesh	63.584	4.142% ↑	389	5.696% ↑
Deendayal Port Trust	Gujarat	110.17	4.424% ↑	117	95.79% ↑
V. O. Chidambaram Port Trust	Tamil Nadu	36.583	-4.92% ↓	698	8.025% ↑
New Mangalore Port Trust	Karnataka	42.063	5.287% ↑	115	17.39% ↑
Jawaharlal Nehru Port Trust	Maharashtra	66	6.230% ↑	4,833.00	6.889% ↑

PORTS 2018*	APRIL- TRAFFIC	MARCH 2017	% VARIATION AGAINST PREV. YEAR TRAFFIC
	Haldia Dock Complex	40496	34141
TOTAL: KOLKATA	57886	50951	13.61
PARADIP	102013	88955	14.68
VISAKHAPATNAM	63537	61020	4.12
KAMARAJAR (ENNORE)	30446	30020	1.42
CHENNAI	51881	50214	3.32
V.O. CHIDAMBARANAR	36583	38463	-4.91
COCHIN	29138	25007	16.52
NEW MANGALORE	42055	39945	5.28
MORMUGAO	26897	33181	-18.94
MUMBAI	62828	63049	-0.35
JNPT	66004	62151	6.2
KANDLA	110099	105442	4.42
TOTAL:	679367	648398	4.77

Table 2: Traffic handled at major ports Source (Shipping ministry/ ports association)

The absolute traffic dealt with by the significant ports of India is appeared in Table 2. The Port of Kandla has the most noteworthy mean score of 70206 tons followed by Vizag 60934 tons and JNPT 54603 tons though the Port of Kolkata has the least mean score of 12190 tons. Among the 13 significant ports, the high CV advised with Kamarajar port uncovers the irregularity in rush hour gridlock taking care of. while the low CV detailed by New Mangalore port uncovers the consistency in rush hour gridlock taking care of. The CAGR

investigation uncovers the ideal development pace of 23.59 percent achieved by Kamarajar port trust followed by Port of Pradip 17.70 percent and Port of Kandla 15.93 percent though, Port of Haldia and Moraga demonstrated a negative development with - 4.70 percent and - 17.47 percent individually.

Total Traffic Handled by Major Ports

Table 3: Descriptive Statistics for Total Traffic Handled by Major Ports (in tonnes)

Total Vessel Traffic

Year/Ports	Calcutta	Haldia	Paradip	Vizag	Chennai	Voc	Kamarajar	Cochin	New Mangalore	Mormugoa	Mumbai	Jnpt	Kandla
2004-05	9945	36262	30104	50147	43806	15811	9480	14095	33891	30659	35187	32808	41551
2005-06	10806	42216	33109	55801	47248	17139	9168	13938	34451	31688	44190	37746	45907
2006-07	12596	42454	38517	56385	53414	18001	10714	15257	32042	34241	52364	44815	52982
2007-08	13741	43541	42438	64597	57154	21480	11563	15810	36019	35128	57039	55756	64893
2008-09	12280	48000	46412	63908	57491	22011	11500	15228	36691	41681	51876	57281	72225
2009-10	13045	33378	57011	65501	61057	23787	10703	17429	35528	48847	54541	60763	79500
2010-11	12540	35005	56030	68041	61460	25727	11009	17873	31550	50022	54586	64309	81880
2011-12	12233	31012	54254	67420	55707	28105	14956	20091	32941	39001	56186	65727	82501
2012-13	11844	28084	56552	59040	53404	28260	17885	19845	37036	17693	58038	64490	93619
2013-14	12874	28511	68003	58503	51105	28642	27337	20887	39365	11739	59184	62333	87004
MEAN	12190	36846	48243	60934	54185	22896	13431	17045	34951	34070	52319	54603	70206
SD	1104	6876	12124	5856	5664	4805	5550	2562	2444	12204	7356	11911	18088
CV %	9.06	18.66	25.13	9.61	10.45	20.99	41.32	15.03	6.99	35.82	14.06	21.81	25.76
MAX	13741	48000	68003	68041	61460	28642	27337	20887	39365	50022	59184	65727	93619
MIN	9945	28084	30104	50147	43806	15811	9168	13938	31550	11739	35187	32808	41551
CAGR	5.30	-4.70	17.70	3.13	3.13	12.62	23.59	8.18	3.04	-17.47	10.96	13.70	15.93

Source: www.ipa.nic

The Table 3 uncovers the absolute vessel traffic took care of by the significant ports in India. The JNPT positions first with a most noteworthy mean estimation of 2740 vessels while Kamarajar port registers with 260 vessels, which was the least vessel traffic during the examination time frame. In any case, the Kamarajar Port has a CAGR of 23.4 percent which was developing quickly with high CV of 39 percent interestingly the Port of VOC and Maruga have enrolled a negative development pace of 3.15 and 6.92 individually.

The CAGR of the port of Vizag is demonstrating a colossal development of 50.58 percent though the Ports of Mumbai and Kandla have enrolled a negative development of 29.4 and 30.3 percent separately. JNPT holds with consistent comes back to scale. The Table 5 shows the information yield factors taken for the examination and Chart 1 clarifies the outcomes with the effectiveness scores of the ports. The Ports Pradip, VOC, Kamarajar, New Mangalore, JNPT and Kandla are demonstrating 100 percent effectiveness, and in this manner, these ports are performing productively by ideal use of the accessible data sources and assets. The remainder of the Ports efficiency is more

the most elevated mean of 31523 TEU's and a greatest throughput of 57911 TEU's among all the significant ports in India. Further, the CAGR was 13.95 percent with a low Co-effective of Fluctuation of 32.07 uncovering the steadiness in the holder traffic throughput of JNPT. The Port of Chennai with a second most noteworthy mean estimation of 13563, CAGR of 23.49 percent demonstrates that it is rising as a receptacle captivating upkeep of harbor trust in Eastern-beach front lines of India close to Vizag.

DEA – Essential Spiral Model - Efficiency Estimation

The DEA essential model was applied to gauge the proficiency of ports by single period model for example the yield is more than the productive ports yet, they don't utilize the assets successfully.

Input Output	Berth	Storage (MT).	Equipment's (I)	Traffic (Tonnes)	Efficiency
Kolkata	33	328981	93	12874	16
(DMU 1)					
Haldia	19	921840	39	28511	48
(DMU 2)					
Pradip	18	2207476	14	68003	100
(DMU3)					
Vizag	23	3499988	44	58503	60
(DMU4)					
Chennai	24	596473	189	51105	77
(DMU5)					
Vizag	6	899645	20	28642	100
(DMU6)					

Kamarajar	15	1180964	0	27337	100
(DMU7)					
Cochin	20	273487	67	20887	41
(DMU8)					
New	16	109124	6	39365	100
Mangalore (DMU 9)					
Moraga	9	424380	11	11739	42
(DMU10)					
Mumbai	31	296290	65	59184	76
(DMU11)					
JNPT	12	4786562	513	62333	100
(DMU12)					
Kandla	27	1517824	31	87004	100
(DMU13)					

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DEA essential model was applied to gauge the proficiency of ports by single period model with consistent comes back to scale. The Table 5 shows the information yield factors taken for the examination and Chart 1 clarifies the outcomes with the effectiveness scores of the ports. The Ports Pradip, VOC, Kamarajar, New Mangalore, JNPT and Kandla are demonstrating 100 percent effectiveness, and in this manner, these ports are performing productively by ideal use of the accessible data sources and assets. The remainder of the Ports efficiency is more for example the yield is more than the productive ports yet, they don't utilize the assets successfully.

Discussion

Present Strategy For Ports In India

The IPA(Indian Ports Act – 1908) and the Significant PTA(Port Trusts Act- 1963), administer the significant parts. These Demonstrations consume adequate adaptability to allow isolated interest in the formation and activity of port offices. Be that as it may, he expanded private segment support in ports

infers a slow change in the job of port specialists towards transformation and automation.

Privatization Strategy

Private segment interest will be based on open serious offering. Assessment will be made based on standards set down unmistakably in the delicate archive and will be based on most extreme acknowledgment to the port utilizing Net Present Worth (NPV) investigations. The Port will give no ensure either for monetary return or for the traffic, which can be normal. Ports will keep on fixing the roof of levies until an autonomous Administrative Position to fix and Reconsider Port taxes is built up. Nonetheless, the levy will be reconsidered reasonably once like clockwork. The BOT model will for the most part be utilized for private division interest with the advantages returning to the Port after the concession time frame. The concession time frame would be chosen by the individual Port Trusts for each situation, with the greatest period not surpassing thirty years.

Zones of privatization:

- The accompanying zones have been distinguished for interest/venture by the private area.
- Renting out existing resources of the Port
- Development/Formation of extra resources
- Renting of gear for port dealing with and renting of coasting creates from the private area
- Pilotage
- Hostage offices for Port based ventures
- These are demonstrative in nature and individual ports can grow the extent of exercises after earlier interview with Focal Government.
- A few Realities about Indian Ports
- India has the huge coastline of 7,517 kms.
- 95% of India's remote exchange by volume includes ocean transportation.
- 45 others non – major/private ports should be routed to grow desperately to make Indian products serious in the universal market.
- Pre – berthing detainment on port record declined to 14 hrs in 2001 – 02 from 41 hours in 1997 – 98. Turn – around time of the boats demonstrated an abatement from

180 hours in 1997 – 98 to 98 hours in 2001 – 02. Day by day yield has expanded from 4,497 tons in 1997 – 98 to 6,700 tons 2000 – 01.

- Private port terminals are executing far better and reliably and setting innovative execution benchmarks that are nearly at standard with neighbouring worldwide ports.
 - Indian ports are still over the top luxurious than different ports on the planet and we need to attempt and decrease transportation cost.
- Highlights of the Indian Port Arrangement Change:
- Divestment of transportation enterprise of India.
 - Smooth out the procedure so as the whole transportation process and pertinent documentation is speedier through channels.
 - Association Financial plan (2002-03) gives different assessment concessions and monetary motivating forces to empower armada securing, modernization and development.
 - Decrease in expense will give a gigantic lift to payload taking care of circulation.
 - The immediacy of huge marketplace and a flourishing economy makes it a significant goal from the exchange and trade perspective.
 - Effectiveness and minimal effort are basic to sustain the delivery business.
 - New activities will be taken up to give better accessibility between our eastern and western coasts without going to Sri Lanka. These tasks lessen the intra – port expense of load development between 2-coasts and advance beach front delivery.
 - Need to grow inland water transference. Interest in beach front delivery will yield significant yields.
 - Beach front delivery can create as eco inviting and vitality effective option in contrast to street and rail transport. Load dealt with through seaside dispatching is multiple times more expense – compelling than some other modes.
 - Work changes will be accomplished by (privatization) yet will take some time.

- Advanced fiscal help provided to street network and decongestion of compartment traffic inside ports.

Transshipment centre points have additionally been proposed; new compartment terminals have likewise been built utilizing income distribution equation.

The cargo component in all out expense of Indian fares is a lot higher than somewhere else on the planet. This makes our fares uncompetitive. The need of great importance is to create ports as value focuses and serious driven basically by financial factor. The service of delivery has embraced a few cost cutting activities like:

Removal of surplus gear and substitution of most recent hardware.

Conclusion & Recommendation

Development in the product exchange is hugely expanding in intra organization exchange by MNCs as they seaward their creation to various pieces of the world relying upon the expense and other key contemplations. India is planning to be financial specialist's centre point particularly in the assembling business and the worldwide exchange flexibly chains extend quickly soon with the developing client needs which interest for up degree of the framework of the nation. Modernization of Indian framework and ideal limit use of assets in ocean ports are the need of great importance to adapt up to the world gauges. Henceforth, the ports and delivery industry will undoubtedly experience significant changes in their oceanic web. The investigation has estimated the presentation of the ports and has discovered that the effectiveness of the ports may not reflect in their operational yield. Further, the wasteful ports the board needs to focus on expanding their productivity by ideal usage of assets, limit enlargement plans, appropriate port improvement approaches, viable time the board techniques like decrease of normal turnaround time and inert chance to accomplish the benchmarks. Chinese port infrastructural improvement models were very testing through the method of private support in ports and delivery industry. This gives a course guide to India to achieve the worldwide norms in the foundation field.

The significant ports share percent was declining consistently from 2006-07 onwards, thus the non-significant ports were increasing more offer quite a long time after year. Consequently, the Port administration needs to set aside it as a high effort to manage the work performing systems and target situated approaches.

- The Holder taking care of ports like JNPT, Chennai and Vizag remain at top positions, can welcome private segment cooperation for improvement of the terminals to acquire traffic in future.
- The Port of Kolkata, Haldia, Cochin and Moraga were wasteful among the significant ports as their effectiveness scores were under 50 percent. In addition, these ports were not using the current assets like compartments, types of gear and extra room to an ideal level. The Key partnerships with encompassing non-significant ports will upgrade and empower asset incorporation yet shared reciprocal capacities should be possible just by persuading the little ports and less productive ports.
- The state can recognize the forthcoming ports and cause them to have practical experience in specific kind of freights dependent on the Assembling parts and businesses which do remote exchange that geological locale.
- Residential private capital might be supported for little and medium size ports, which can build up its foundation and further, share the enormous ports traffic and diminish port clogs and advance inland water transport

At long last, the outcomes show that the Malmquist Profitability Lists of significant ports vary generously from port to port. The mi levels go from - 5.1% for Maruga to 12.3% for Pradip, with a mean profitability record of 3.8% over the significant ports. Moreover, it ought to be noticed that a critical improvement has happened in the presentation of significant ports since 1991 (after the usage of financial changes in the nation and the National Vote based Coalition's alleged second era of monetary changes 2001 onwards). Still substantially more should be done in the port segment as far as getting current innovation in

rush hour gridlock dealing with. Throughout the years (during the significant piece of the arranging time) the administration has given minimal budgetary distribution to the ports, and more thoughtfulness regarding other vehicle modes. In any case, ports have gotten due consideration from our organizers just in the last a few plans or somewhere in the vicinity. The possibility of open private association (pop) was mooted after 1996 when the Rakesh Mohan Council presented its

reports on Indian foundation (nacre 1996). The report altogether manages foundation areas of the econ-my, and is of the view that a total redesign in framework and particularly in ports is the thing to address through pop. Hence, without dynamic government support as budgetary and plan assignment, giving a push to pop in the port segment, which has been in activity for 10 years at this point, would be a positive development.

References

1. van Dyck, G. K. (2015). Assessment of port efficiency in West Africa using data envelopment analysis. *American Journal of Industrial and Business Management*, 5(04), 208.
2. Munim, Z. H., Shakil, M. H., Tasnia, M., & Azam, M. K. G. (2014). Operational and Financial Performance Analysis of Chittagong Port Authority in Comparison with the Maritime and Port Authority of Singapore.
3. Pjevčević, D., Radonjić, A., Hrle, Z., & Čolić, V. (2012). DEA window analysis for measuring port efficiencies in Serbia. *Promet-Traffic&Transportation*, 24(1), 63-72.
4. Al-Eraqi, A. S., Barros, C. P., Mustafa, A., & Khader, A. T. (2007). Evaluating the location efficiency of Arabian and African seaports using data envelopment analysis (DEA).
5. Bichou, K. (2006). Review of port performance approaches and a supply chain framework to port performance benchmarking. *Research in Transportation Economics*, 17, 567-598.
6. Chandrasekhar, C. P., & Ghosh, J. INDIAN BANKING.
7. Prasath, D. S., & Selvakumar, A. (2015). A Novel Iris Image Retrieval with Boundary Based Feature Using Manhattan Distance Classifier. *International Journal Of Innovative Technology And Creative Engineering* (Issn: 2045-8711) Vol, 5.
8. Aroulanandam, V. V., Latchoumi, T. P., Balamurugan, K., & Yookesh, T. L. (2020). Improving the Energy Efficiency in Mobile Ad-Hoc Network Using Learning-Based Routing. *Rev. d'Intelligence Artif.*, 34(3), 337-343.
9. Fourgeaud, P. (2000). Measuring port performance. *The World Bank*, 1-18.
10. Marlow, P. B., & Casaca, A. C. P. (2003). Measuring lean ports performance. *International journal of transport management*, 1(4), 189-202.
11. Martinez-Budria, E., Diaz-Armas, R., Navarro-Ibanez, M., & Ravelo-Mesa, T. (1999). A study of the efficiency of Spanish port authorities using data envelopment analysis. *International Journal of Transport Economics/Rivista internazionale di economia dei trasporti*, 237-253.
12. Tongzon, J. L. (1995). Determinants of port performance and efficiency. *Transportation Research Part A: Policy and Practice*, 29(3), 245-252.
13. Talley, W. K. (1994). Performance indicators and port performance evaluation. *Logistics and Transportation Review*, 30(4), 339.
14. Mandić, N., Ukić Boljat, H., Kekez, T., & Luttenberger, L. R. (2021). Multicriteria Analysis of Alternative Marine Fuels in Sustainable Coastal Marine Traffic. *Applied Sciences*, 11(6), 2600.
15. Raghuram, G., & Shukla, N. (2014). Issues in PPPs in ports in India.