

# **Latest Trends in Multidisciplinary Research & Development**

**(Volume - 2)**

**Chief Editor**

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# Chapter - 1

## A Study on Effectiveness of Production and Operation Management at Bisleri

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### Abstract

Operations Management (OM) has a long history, with this in mind, the traditional OM research was largely dominated by mathematical / analytical methods, which later, after World War II, evolved into research-based methods. Despite these mathematical approaches over the past century there are many studies that use different, non-mathematical research methods, in the OM instruction. Those studies include other factors such as organizational behaviour in OM research studies. These studies include, but are not limited to, quality research techniques focused on dynamic data collection from interviews, mixed methods such as using questionnaires to gather evidence-based data validating new research models, and more. The latest practice is data processing; therefore, a random data management system is an emerging theme. Social media data is an example of such informal data.

The purpose of this paper is to explore the appropriate way to analyze the communication data of OM applications. The main purpose is to help identify features / themes / issues from social media content and conduct collective analysis. The growing popularity of Facebook, Twitter, YouTube and other social media platforms has led to the acquisition of a large number of important information. As a result, such forums have become an important source of public information, as well as researchers. In short, corporate social networking sites are a platform for customers to exchange ideas, perhaps even corporate interests. The information is particularly useful in analyzing consumer behavior, which may be helpful in developing a business strategy. However, how to use knowledge effectively is a challenge. In addition, the use of communication data in the OM study was not well attended.

**Keywords:** Analysis, Behavior, Operations, Management, Social Media.

## 1. Introduction

As demonstrated by the Bureau of Indian Standards there are 1200 sifted water creation lines all over India (of which 600 are in Tamil Nadu). In excess of 100 brands going after Rs.1000 crore (Rs.10 billion) separated water feature and are hard selling their things all around better edges to merchants, strong publicizing and engaging mottos. In such a circumstance the strategist explores how everything started with Bisleri and how Ramesh Chauhan, executive, Parle Bisleri made a market out of unadulterated water.

"Regardless, three decades back, what could association says about a class that had no market? We didn't understand our goal gathering. By then, since separated water is dull, insipid and odourless it was not a basic thing to advertise". "Along these lines, the less difficult brand building attempts focused on BISLERI being strong with acceptable minerals. The Italian name added a dash of class to it. The primary print advancement fight got the overall essence and exhibited a head hireling with a tie, holding two compartments of BISLERI".

Since 1995 Mr Ramesh J Chauhan has started expanding BISLERI assignments significantly and the turnover has copied in abundance of different occasions over a period of 10years and the typical improvement rate has been around 40% over this period. Before long association has 8 plants and 11 franchisees all over India. They have need of covering the entire scope of India. In future undertakings they would like to set up 4 extra plants. Association headings 60% bit of the pie of Bisleri and the manner in which that we initiated sifted water in India has made a synonymous to mineral water and an ordinarily perceived name, when we think 'BISLERI'. The manner of expression was "BISLERI is phenomenal" (the spelling of peak was expected to get the client's thought). The campaign was viable and being viewed as someone who considered the prerequisite for secured, sound drinking water. BISLERI International Pvt Ltd is a head ISO 1991, BIS and W.H.O guaranteed mineral water Company in India and second most trusted in brand for cold refreshments in India. It is a four decades association conveying mineral water for India.

The PARLE Group, set up by Jayantilal Chauhan, began creating soft drink flies in 1949. BISLERI, an Italian mineral water association, was pushed in Mumbai in the year 1965. The Parle Group obtained BISLERI from the Italian agent Signor Felice BISLERI in 1969. Thus, BISLERI recognized the opportunity had arrived to move to the accompanying measurement i.e., the mass area. A couple of business establishments had no passage to piped water. BISLERI exploited this piece by introducing the 12-liter holder, trailed by the 20-liter can. The mass area moreover chopped down the expense per litre from Rs 10-12 a litter to about Rs3 a litre. At present, the mass bit involves 60 to 70 percent of offer and it intends to extend it to 80 percent in the accompanying two years. With water deficiency in a couple of urban territories, even nuclear families are mentioning sifted water now. The home pack was made all the more straightforward by exhibiting pouring spouts and compartments with wholesalers. Meanwhile, BISLERI continually looking for better ways to deal with tap the market and saw that in the midst of wedding social occasions, the more prepared guests (more than 50 years of age) generally maintained a strategic distance from solidified yogurt, soft drink pops, and so forth.

Subsequently, association exhibited free examining of BISLERI at the table where the more seasoned guests would sit. After a short time customers were mentioning separated water on remarkable occasions. By and by, the use of sifted water is far in bounty of soft drink flies on such occasions. At present, the use of separated water is far in excess of soft drinks on such occasions.

## 1.1 Importance of Study

To understand the operating procedures and processes practiced at the bottling unit and also to get an idea of supply chain and logistics activities carried out in bottling the various size of water bottles by the company.





**Fig 1:** Different types of water bottles processed by Bisleri plant

## 2. Literature Review

Bart Rouwenhorst, V Stockrahm, 2012 in the title “Warehouse Design and Control” revolves around framework and classification of warehouse design it just not only revolve around warehouse design but also showcases the warehouse controlling and problems that arises during controlling warehouse. It has diplected information about warehouse system and indicate some important gaps.

Amik Garg, SG Deshmukh, 2006, in the article “Maintenance Management” has posted more specification on limited classification on maintenance management. It in detail exhibits the various areas and sub areas in classification of maintenance management. Hand in hand all the recent trends have been published in this article which will fulfil all the research gap.

Stefan Gold & Philip Beske, 2010, in the article “Sustainable Supply Chain Management and Inter Organisational Resources” has overall information is on the basis of a content analysis that states the role of sustainable management and showcases the valuables of inter organisational resources. It highlights the possible sustained interfirm competitive advantage via collaboration on social problems and environmental issues. Interfirm resources and capabilities emerging from supply chain wide collaboration are

prone to become sources of sustained inter-firm competitive advantage, since they are socially complex, casually ambiguous and historically grown and hence particularly difficult to imitate by competitors.

Jaiprakash Bhamu & Kuldeep Singh Sangwan, 2016 in the article “Lean Manufacturing in bottling Industry” highlight various objectives scopes theories and practices of lean manufacturing in production and operation management. Implication of factor that affects the lean manufacturing is simultaneously shown how its adaption of leanness in supply chain has been expressed.

Alessandra Marasco,2008, in the article “Third- party logistics” reviewed few logistics research paper and third party logistics paper it is identified that in most of the manufacturing organisation third part logistics has become the most important in carrying out their operations. In this article various suggestions have been given on future of third party logistics and its recent trends.

Kannan Govindan & Sivakumar Rajendran, 2015, in the title “Multi criteria decision making approaches for green supplier evaluation and selection” depicts the solution for most of the organisation in decision making in current scenario in large and growing body of the organisation face huge issue in evaluation and selection of vendors or suppliers. Here various factors, evaluation techniques and scope that can be utilised by company’s at the time of decision making for selection of vendors have been specified.it has also specified various green supply management information in this article which is further helpful for the company’s in environment management.

Andrew Manikas & Oliver M, 2013, under the title “A review of operations management literature: a data-driven approach” looks upon significant research in Production and operations management for many years. However, other than an educated guess by researchers in the field or a perusal of textbook chapter titles, the major topics and their trends over time are not well established. This study provides a comprehensive review of production and operations management literature using a data-driven approach.

Andy Tsay, 2016, in “A Review of Production and Operations Management Research on Outsourcing in Supply Chains: Implications for the Theory of the Firm” reviews the state of the art in Productions and Operations Management (POM) academic research regarding outsourcing in supply chain contexts. We first acknowledge the “Theory of the Firm” [ToF], the venerable and vast body of thought regarding where the firm draws the boundary between what it performs in-house and what it outsources. Despite the clear linkage between outsourcing and POM, the ToF literature is most closely

associated with the fields of strategy and economics.

### **3. Research Methodology**

Research comprises defining and redefining problems, formulating, hypothesis or suggested solutions, collecting, organizing, and evaluating data, making deductions and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis at Bisleri.

#### **3.1 Problem Statement**

After some years many bottled water limited came into existence. As a result, lot of competition arrived in the marketing for the purchase and sale of bottled water in satisfying the customers. Now a day's Bisleri is facing lot of problems in the market due to existence of more competitors. Soo every now and then Biseleri is working on their new innovative products gto introduce into the market with maintaining good quality within existing product also. Therefore Production and operation Management is most required. This study is taken to study and analyse the effectiveness of Production and Operation Management at Bisleri.

#### **3.2 Objectives of the Study**

- To know the effectiveness of production and operation management
- To know the inventory management in BISLERI.
- To study factors affecting the Production and operation management in BISLERI.

#### **3.3 Scope of the Study**

- The study is conducted at BISLERI Bangalore for the purpose and performance of knowing the production and operation management.
- This study is also filled up with the techniques to the level of financial performance of the BISLERI.
- The study is also filled up with the reasons for the fluctuation analysis.

#### **3.4 Sampling Design**

The technique that is used is questionnaire method. Through the percentage graphs are prepared. The survey is done on employees of Bisleri International Pvt ltd.

**Sampling Size:** A population of 50 employees was surveyed for the purpose of the study.

## **Sources of Data Collection**

The study is based on both primary data and secondary data.

### **Primary Data**

Primary data are those, which are collected fresh for the first time and thus happen to be original in character. It is the original data, which the researcher directly collects from the employees of the organisation. It is collected through structured questionnaire with close ended and open ended questionnaires with the employees in personal.

### **Secondary Data**

Secondary data is the information that already exists for some purpose. The secondary data is collected through text books, company website, company manuals, journals from library.

## **3.5 Tools for Data Collection**

Structured questionnaires are administered to employee in order to collect the information and through observation.

### **1. Questionnaire Method**

The questionnaire method of data collection is quite popular particularly in case of big enquiries. It is being adopted by private individual, research workers, private and public organisations and even by governments. In this method a questionnaire is sent or given to persons concerned with a request to answer the questions and return the questionnaire. It consists of number of questions printed or typed in a definite order on the form or set of forms. It includes open and close ended questions with multiple choices.

### **2. Observation Method**

Observation method is the method where the information can be captured only through observing various aspects. It cannot be recorded nor be re-observed. It is an unplanned activity and unexpected gathered information.

- Websites.
- Books.
- Magazine.

## **3.6 Limitations of the Study**

1. The major limitation is that it is not an exhaustive one and it is representative study.
2. This study was only based on the data given by the reports of

## BISLERI.

3. Time constrain was the major issue.
4. To undertake these problems of financial analysis, the time duration was only 2 months.
5. Data was relevant it is only for a particular period, it may change in future.

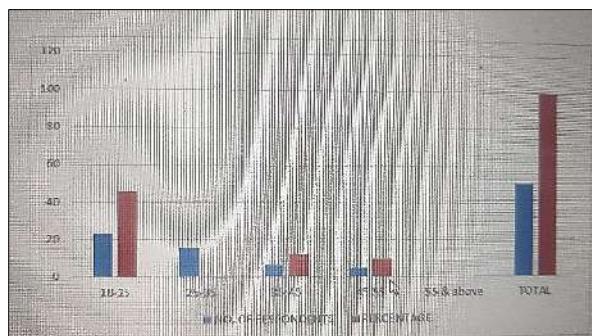
### 4. Data Analysis/Interpretation

**Table 4.1:** Showing the age of respondents

Response	No. of Respondents	Percentage
18-25	23	46%
25-35	15	30%
35-45	6	12%
45-55	5	10%
55 & above	0	0%
<b>TOTAL</b>	<b>50</b>	<b>100%</b>

### Analysis

From the above table we can analyse that the age group between 18-25 years is the highest with 46%, after which comes the age group between 25 - 35 with 30%, followed by respondents of the age group between 35- 45 is 12% and 45-55 years is 10%.



**Fig 4.1:** Showing the age of respondents

### Interpretation

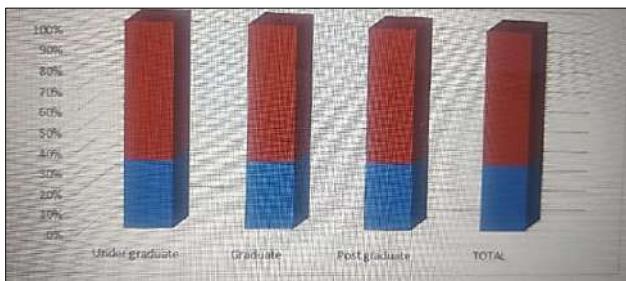
From the above we can infer that majority of the employees working in the factory are between the age group of 18-25 years. It is evident that they have great determination to work.

**Table 4.2:** Showing the educational qualification of respondents

Options	No. of Respondents	Percentage
Under graduate	20	40%
Graduate	25	50%
Post graduate	5	10%
Total	50	100%

### Analysis

From the above table we can analyse that 50% of the respondents are graduates, 40% of them are below graduate and the remaining 10% of them are post graduates.



**Fig 4.2:** Showing the educational qualification of respondents

### Interpretation

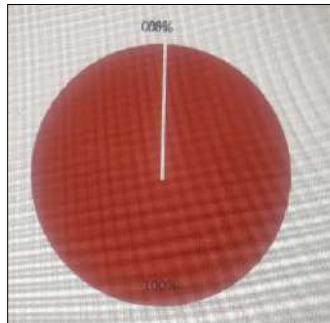
The above graph reveals that the respondents are graduates hence it can be inferred that employees at 'BISLERI' International PVT ltd are educated and qualified. It is good sign for the factory development.

**Table 4.3:** Showing the type of Production system adopted by the company

Options	No. of Respondents	Percentage
Mass Production	0	0
Batch Production	50	100%
Job Production	0	0
Process Production	0	0
<b>Total</b>	<b>50</b>	<b>100%</b>

### Analysis

From the above table it states that 0 % of respondents states that the mass production, job production, process production is not used in the company and 100% of respondents states that they use batch production system.



**Fig 4.3:** Showing the type of production system adopted by the company

### Interpretation

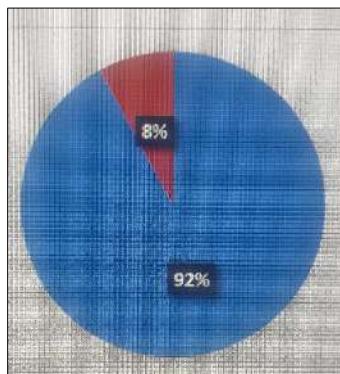
From the above graph all the respondents agree that they use batch production in their organisation has this is the only convenient production system for the bisleri products.

**Table 4.4:** Showing whether the production process supports the company's USP (Unique Selling Proposition)

Options	No. of Respondents	Percentage
Yes	46	92%
No	4	8%
Total	50	100%

### Analysis

From the above table 92% respondents agrees and 8% doesn't agree that the production process supports the company's USP.



**Fig 4.4:** Showing whether the production process supports the company's USP (Unique Selling Proposition)

## Interpretation

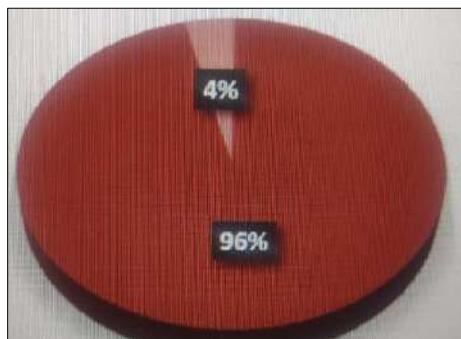
From the above graph it states that majority of respondents agree that the production process supports the company's USP (Unique Selling Proposition) as the quality of product depends on the production process and the one of the factor of USP is also depended on quality.

**Table 4.5:** Showing the quality control in an organisation

Options	No of Respondents	Percentage
Yes	48	96%
No	2	4%
Total	50	100%

## Analysis

From the above table, 96% respondents agree that their company have a quality control whereas 4% of the respondents disagrees that their company have quality control.



**Fig 4.5:** Showing the quality control in your organisation

## Interpretation

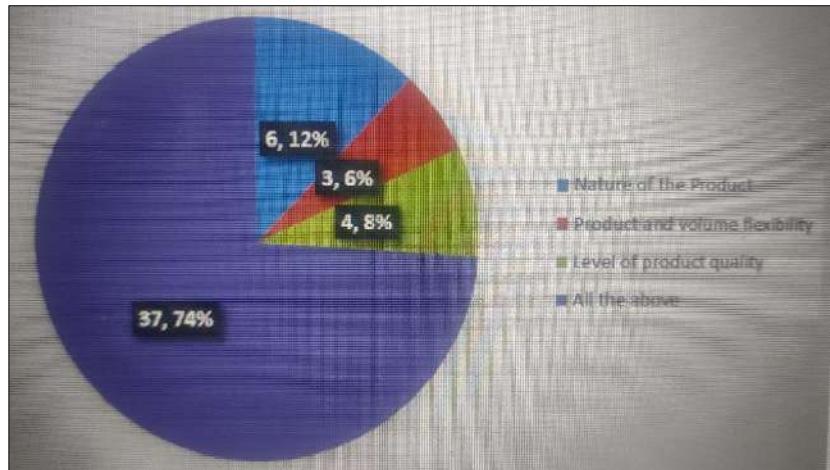
From the above graph majority of respondents state that they use quality control in their organisation as they use many quality control tools like six sigma, total quality management in their organisation.

**Table 4.6:** Showing the factors that affects the production process

Options	No. of Respondents	Percentage
Nature of the Product	6	12%
Product and volume flexibility	3	6%
Level of product quality	4	8%
All the above	37	74%
<b>Total</b>	<b>50</b>	<b>100%</b>

## Analysis

From the above table 74% of respondents agree that all the above factors affect the production process where as 12% of respondents agree nature of the product affects the production process and 6% respondents agrees product and volume flexibility that affects the production process and 8% respondents agrees that level of product quality affects the production process.



**Fig 4.6:** Showing the factors that affects the production process

## Interpretation

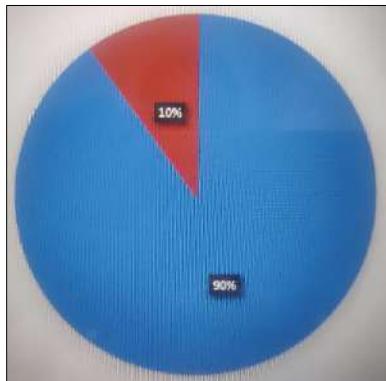
Majority of the respondents state that all the stated factors will affect the production process because every factor like nature of the product, Product and volume flexibility, level of product will equally contribute to product production

**Table 4.7:** Showing whether the inventory management is well organised

Options	No. of Respondents	Percentage
Yes	45	90%
No	5	10%
Total	50	100%

## Analysis

From the above table, 90% of respondents agrees that the inventory management is well organised in their company whereas 10% disagree that the inventory management is not well organised in their organisation.



**Fig 4.7:** Showing whether the inventory management is well organised

### Interpretation

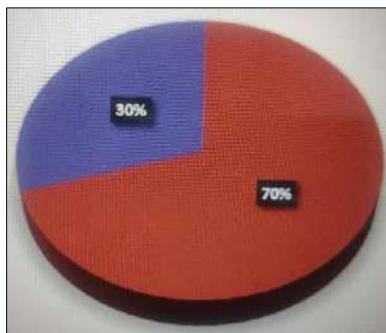
Majority of respondents agree that their organisation have well organised inventory management has their production process is directly and continuously connected with inventory department this showcases their organisation has well organised inventory management.

**Table 4.8:** Showing whether the organisation consists managing budget team

Option	No of Respondents	Percentage
Yes	35	70%
No	15	30%
Total	50	100%

### Analysis

From the above table 70% of respondents agrees that their organisation have managing budget team and 30% of respondents does not agree that their organisation have managing budget team.



**Fig 4.8:** Showing weather the organisation consists managing budget team

## Interpretation

Majority of respondents states that their organisation poses budget management team has without financial management no department can run in business.

**Table 4.9:** Showing the skilled level of labour force required in batch production system

Options	No. of Respondents	Percentage
Highly Skilled	48	96%
Semi-Skilled	2	4%
Unskilled	0	0
All the above	0	0
<b>TOTAL</b>	<b>50</b>	<b>100%</b>

## Analysis

From the above table, 96% of respondents states that they require highly skilled labour force in batch production system and 4% of respondents states that they require semi-skilled labour force in batch production system and 0% of respondents states that they do not require unskilled and all the above for the labour force in batch production.

## Interpretation

Majority of respondents states that highly skilled employee are required to carry out the batch production activity as it requires technicality in using batch production system.

## 5. Findings, Suggestion & Conclusion

### 5.1 Findings

- From the above we can infer that majority of the employees working in the factory are between the age group of 18-25 years. It is evident that they have great determination to work.
- The above graph reveals that the respondents are graduates hence it can be inferred that employees at 'BISLERI' International PVT ltd are educated and qualified. It is good sign for the factory development.
- From the above graph all the respondents agree that they use batch production in their organisation has this is the only convenient production system for the bisleri products.
- From the above graph it states that majority of respondents agree that

the production process supports the company's USP (Unique Selling Proposition) as the quality of product depends on the production process and the one of the factor of USP is also depended on quality.

- From the above graph majority of respondents state that they use quality control in their organisation as they use many quality control tools like six sigma, total quality management in their organisation.
- Majority of the respondents state that all the stated factors will affect the production process because every factor like nature of the product, Product and volume flexibility, level of product will equally contribute to product production.
- Majority of respondents agree that their organisation have well organised inventory management has their production process is directly and continuously connected with inventory department this showcases their organisation has well organised inventory management.
- Majority of respondents states that almost 75 -100% effectively the operation team will take care of inventory as their inventory management is well organised and they have adapted too many inventory management technique this will have an impact on operation of inventory.
- Majority of respondents agrees that customer contact affects the production process has the consumers are the final end user of the product produced in the organisation that is the reason consumer contact affects the production process.
- Majority of employees are just satisfied with the budget management within organisation
- Majority of respondents states that highly skilled employee are required to carry out the batch production activity as it requires technicality in using batch production system.
- Majority of respondents are just satisfied with the plant layout used for production and operation management this shows that the organisation have well planned and structured plant layout which will influence on production as well as operations of the organisation.
- Majority of the respondents that the requirement of capital investment for batch production because batch on batch factors for production will be differing this will contribute towards capital investment.
- Majority of the respondents agrees that both increasing sales ratio

and increasing profit and decreasing inventor contributes to return on investment has both elements are most important in contributing towards profit.

- Majority of respondents follow central piece inspection for plant layout has it is the most suitable inspection for batch production system.
- All the respondents states that organisation uses ABC analysis is used has the inventory management technique has it is suitable for batch production.
- Majority of the respondents are satisfied with the year on year increase in sales because company's product are well recognised and accepted in the market.

## 5.2 Suggestions

- Maintaining the quality in the organisation has given the unique for its product so using this USP the organisation can introduce new products into the market.
- Even though the organisation is using N number of quality control tools like 6 sigma, total quality management the organisation has to concentrate on acquiring new quality control tool which can be utilized throughout the production process as a single tool.
- As the respondent states that they have well organised inventory management in their organisation it was found that no new technique and instruments were adapted in the inventory department the organisation can adapt planogram software as a part in inventory management.
- Consumer contact will affect the production process so if the organisation adapts more customer interactive marketing communication will fetch them more loyal customers and also by taking customer contact feedback changes expected from the customers can be adapted in the next upcoming project.
- Employees in the organisation are just satisfied with the budget management in the organisation so the organisation should provide enlightenment regarding budget management to employees and the budget management team should also tune in their budget management with the other production departments.

## 5.3 Conclusions

The study reveals that the production and operation management is most

crucial part in an organisation because they play a huge role in the business has it creates the highest level of efficiency within the organisation production process as well as operation system.

Majorly missing aspect is that in the quality management in the organisation has these days in the market customer expectation and perception is completely influenced by quality of the product. As BISLERI products like Bisleri water Bisleri beverages belongs to food products so the customers think twice before making the purchase and majorly look forward for the quality of product so few of the quality control technique like KAIZAN, etc quality control techniques should be updated.

The factory sales are increasing year on year due to their innovation in products as well as in their production process this symbolizes the progress of company is in peak.

Production and operation management is also the one who runs the overall business to make it successful and achieve and excellent result.

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# Chapter - 2

## A Study on Tax Planning and Management at Everblue Apparels Limited

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### Abstract

With the improvement of the tax law and the increase in the cost of tax evasion, taxpayers' legal awareness is getting stronger and stronger. This article mainly analyses the management of corporate tax planning in Everblue Apparels Limited. The results show that the reduction of tax burden, the company can establish branches in other countries and regions with lower income tax rates, making it should The profits of companies in high income tax areas can be effectively transferred, so that the total income tax payable by the company will be reduced, reducing the cost of taxation for the company. Companies can use commercial discounts when carrying out sales activities to reduce the value-added tax burden that companies should pay. After the enterprise reformed its tax planning, the value-added tax rate changed from the original business tax rate of 5% to 6%. This research is helpful to the reasonable planning of corporate taxation.

### 1. Introduction

#### Indian Textile Industry

India's textiles sector is one of the oldest industries in the Indian economy, dating back to several centuries. The industry is extremely varied, with hand-spun and hand-woven textiles sectors at one end of the spectrum, while the capital-intensive sophisticated mills sector on the other end. The decentralized power looms/ hosiery and knitting sector forms the largest component in the textiles sector. The close linkage of textiles industry to agriculture (for raw materials such as cotton) and the ancient culture and traditions of the country in terms of textiles makes it unique in comparison to other industries in the counter. India's textiles industry has a capacity to

produce wide variety of products suitable for different market segments, both within India and across the world.

## **Market Size**

India's textiles industry contributed seven per cent of the industry output (in value terms) in FY21. It contributed two per cent to the GDP of India and employed more than 45 million people in FY21. The sector contributed 15 per cent to India's export earnings in FY21. Textiles industry has around 4.5 crore employed workers including 35.22 lakh handloom workers across the country. The domestic textiles and apparel market stood at an estimated US\$ 100 billion in FY21. The production of raw cotton in India is estimated to have reached 36.04 million bales in FY22. During FY21, production of fiber in India stood at 1.44 million tones (MT) and reached 1.60 MT in FY22 (till January 2020), while that for yarn, the production stood at 4,762 million kgs during same period.

## **Investment**

The textiles sector has witnessed a spurt in investment during the last five years. The industry (including dyed and printed) attracted Foreign Direct Investment (FDI) worth US\$ 3.44 billion from April 2000 to March 2020.

## **Government Initiatives**

Indian government has come up with a number of export promotion policies for the textiles sector. It has also allowed 100 per cent FDI in the sector under the automatic route. Initiatives taken by Government of India are:

- Under Union Budget 2020-21, a National Technical Textiles Mission is proposed for a period from 2020-21 to 2023-24 at an estimated outlay of Rs 1,480 crore (US\$ 211.76 million).
- In 2020, New Textiles Policy 2020 is expected to be released by the Ministry of Textiles.
- CCEA approved mandatory packaging of food grains and sugar in jute material for the Jute Year 2019-20.
- In September 2019, textiles export witnessed a 6.2 per cent increase post GST as compared to the period pre-GST.
- The Directorate General of Foreign Trade (DGFT) has revised rates for incentives under the Merchandise Exports from India Scheme (MEIS) for two subsectors of Textiles Industry - readymade garments and made-ups - from two per cent to four per cent.
- The Government announced a special package of US\$ 31 billion to

boost export, create one crore job opportunity and attract investment worth Rs 80,000 crore (US\$ 11.93 billion) during 2018-2020. As of August 2018, it generated additional investments worth Rs 25,345 crore (US\$ 3.78 billion) and exports worth Rs 57.28 billion (US\$ 854.42 million).

- The Government of India has taken several measures including Amended Technology Up-gradation Fund Scheme (A-TUFS), estimated to create employment for 35 lakh people and enable investment worth Rs 95,000 crore (US\$ 14.17 billion) by 2022.
- Integrated Wool Development Programmed (IWDP) was approved by Government of India to provide support to the wool sector, starting from wool reader to end consumer, with an aim to enhance quality and increase production during 2017-18 and 2019-20.
- The Cabinet Committee on Economic Affairs (CCEA), Government of India approved a new skill development scheme named 'Scheme for Capacity Building in Textile Sector (SCBTS)' with an outlay of Rs 1,300 crore (US\$ 202.9 million) from 2017-18 to 2019-20. As of August 2019, 16 states signed pacts with the Ministry of Textiles to partner with it for skilling about four lakh workers under the scheme.

## Achievements

As of 2019, 348 technical textiles products were developed according to Bureau of Indian Standards (BIS). I-ATUFS, a web-based claims monitoring and tracking mechanism was launched on April 21, 2016. 381 new block level clusters were sanctioned. Under the Scheme for Integrated Textile Parks (SITP), 59 textile parks were sanctioned, out of which, 22 have been completed. Employment increased to 45 million in FY19 from 8.03 in FY15.

## Importance of the Study

I have gained good knowledge of the tax planning and management isolation in project and also some techniques used in project. The knowledge and information I have obtained in plant as training was enormous. My exposure to the industry through this training enabled me to understand the subjects practically rather than studying books.

## 2. Literature Review

**Indian Taxation Inquiry Committee (1924):** Appointed by the Indian Government to look at the burden of taxation and to advocate alternative sources of taxation below the chairmanship of Charles Todhunter. The committee advocated the following measures to enhance profits taxation.

Losses incurred in one year have to be capable of being carried forward and offset the subsequent year. If private businesses are created totally to avoid tax with the aid of withholding dividends, these agencies must be dealt with as corporations. The supervisor needs to be allowed to calculate the duties of unregistered corporations as though he has been registered in special cases if he deems it reasonable.

**Kaldor (1956):** In 1955, the Indian authorities invited the Indian authorities to study non-public and corporate taxes inside the Indian tax machine to growth the assets of India's second biggest manufacturing quarter. The items and services tax gadget have the capability to boost up this growth, especially if you function a small commercial enterprise. With its simplified tax shape and its effect on interstate income, the GST can help your business lessen expenses and emerge as greater competitive. Understand in detail the impact of the GST on the manufacturing quarter in India. Therefore, he counseled apportioning the arrears of wages acquired in the following few years in preference to the past few years. He endorsed that the tax fee structure be stabilized for many years, the surcharge may be abolished, and the private tax exemption restriction may be raised to Rs 7,500, whilst the HUF will be extended by way of Rs 10,000 and the non-public allowance may be terminated. He believes that 53 public members of the family officers have to be added to facilitate taxpayers. Nishitha Gupta (2014): In her study stated that implementation of GST in the Indian framework will lead to commercial benefits which were untouched by the VAT system and would essentially lead to economic development.

**Kumar, Nagar and Samanta (2007):** An attempt to have a look at the effectiveness of direct tax control in India by applying an econometric version. They considered the gathering of private income tax and company tax inside the pre-evaluation and submit- assessment phases. The Tax Execution Index become built by means of applying essential element analysis from 1986-87 to 2003. They found that TDS and prepaid taxes deemed to be voluntary compliance accounted for 33.88% and 45. Forty – five percent of the private income tax and corporate tax sales, respectively. Residual earnings are collected via regular tests, fines and hobby recovery. The writer believes that the prejudice of the tax machine, the complexity of the tax law and the dearth of fairness inside the punishment machine, and the susceptible taxpayer education plan are the main reasons main to voluntary compliance. The take a look at similarly emphasizes the need to establish suitable statistics systems and databases to enhance the effectiveness of earnings tax management. Finally, the researchers advocate retaining the suitable stability among the

taxpayer's offerings and the implementation of tax laws to sell voluntary compliance.

**Amar Bhide (2004):** India's monetary problems stem from a poorly designed and poorly administered tax system. Personal and corporate income tax charges and policies appear affordable with the aid of international standards. Nevertheless, the Indian authorities levies income taxes representing best about three.7 percentage of GDP, approximately half that of South Korea and different Asian tigers. His opinion on the Indian authorities' subsidies things like higher education unnecessarily. If a special tax is levied on those who choose public and tax funded higher education then it will reduce the burden on government a lot. Similarly, agriculture income needs to be taxed. This along with simplification of indirect tax and investment in tax collection mechanism will be required to increase tax.

**Das Gupta (1995):** The collection of income taxes was very low during the year 1970-1990 covering about 2.2% of the GDP with an average per capita income below 35 dollars. He also analyzed empirically the compliance development over time and found that compliance declined over the period 1970s- 1990 contrary to the positive trend of the income tax revenues. An increase in the average tax rates reduced tax compliance. Interestingly they found the prosecution activities are ineffective for increasing compliance.

**Acharya Shankar (2005):** This paper sketches the contours of India's tax reform story from the mid-1970s to the present and finds that enormous progress has been made in the last thirty years, judged by the standards of economic efficiency, equity, built in revenue elasticity and transparency. However, key issues for the further reform include the plethora of complex exemption plaguing customs tariff, low buoyancy of excise, integration of central vat with state VAT and the broad basing of direct taxes. Sustaining programs to deploy IT and modern risk management methods in tax administration will be critical, for the dictum 'tax administration is Tax policy' is quite true.

**Gardon & Li (2009):** Conducted while the revenue from corporate income taxes varies substantially by region; corporate income taxes provide major sources of revenue in many countries. Generally, the poorer country is the greater proportion of total income tax revenues from corporate and relative to personal income taxes.

**Jayakumar (2006):** In his article "direct tax reform –An overview" reviewed about the various committees looked in the tax reforms and model of tax reforms. He suggested that to maximize the tax revenue it is the crying

need of the hour to bring the rural rich into the tax net and the tax department should be provide better services and also for the early assessment.

**Veena Rani (2014):** When the Indian financial system faced an exceptional macroeconomic disaster in 1991, financial consolidation become a chief goal of the policy reaction. To this stop, it has come to be vital to enhance tax and non-tax sales, increase modern-day prices, restructure public area enterprises, which includes investment, enhance fiscal and financial coordination and deregulate the system. Monetary. The need to improve fiscal practices caused the promulgation of the Fiscal Responsibility and Budget Management (FRBM) Act 2003, which plunged the Indian economic system into an generation of economic consolidation primarily based on fiscal policy policies. The tax reforms introduced by the government in view that 1991 have ended in a easy structure, based totally on slight tax fees, but primarily based on a broader base and better enforcement. In addition, they helped accurate structural imbalances inside the tax device. They are tender inside the industry to create a new investment climate and make India competitive the world over. By lowering tax rates, the government expects fast business development. The U.S.A. Is looking forward to the implementation of the Direct Tax Code (DTC) and the Goods and Services Tax (GST) on the country wide degree. The GST is the maximum bold indirect tax reform in India. The loss of political consensus hinders the development and implementation of the GST. This document vividly describes the recent reforms of the Indian tax system as part of the continued liberalization and globalization of the Indian financial system.

Pandey (2002) Attempted to examine the issue relating to widening of tax base in India in the light of various measures taken by government in this direction. The study highlighted that one by six scheme for compulsory filing of return increased the number of asseses due to filing of return by those who did not have taxable income. It increased the paper work for department and taxpayers, without contributing to tax revenue. It was further observed that tax buoyancy which was 2.64 in 1991-92 decreased to 1.67 in 2000. The author suggested bringing the agriculture sector in the tax net, computerization of Income offices in the country, selective use of search and seizure operations and developing a friendly atmosphere by income tax department for increasing tax base. It was further recommended that for widening the tax base, government should not merely concentrate on lower or middle categories of asseses, but also ensure that persons in higher income group discharge their tax obligation faithfully and correctly.

**Rajaraman (1995):** Evaluated different indicators for applying

presumptive taxation in India. It was opined that production-based indicators were better as compared consumption-based indicators. She emphasized the need for good governance for the success of presumptive taxation and suggested that the self-declared income should be cross checked. She further opined that in case of hard to tax sectors, norms could be developed for each occupation and all nits could be scrutinized. Finally, she suggested that widening of TDS coverage, elimination of exemptions and creating a strong information network should be practiced for successful application of presumptive taxation.

### **3. Research Methodology**

Tax planning is the analysis of a financial situation or plan from a tax perspective. The purpose of tax planning is to ensure tax efficiency. Through tax planning, all elements of the financial plan work together in the most tax-efficient manner possible. Tax planning is an essential part of an individual investor's financial plan. Reduction of tax liability and maximizing the ability to contribute to retirement plans are crucial for success.

#### **3.1 Problem Statement**

Payment of tax is responsibilities of every organization a proper planning of tax can reduce tax burden so that it can extend its functions by meeting, legal requirements that is payments of tax at right time. A study regarding tax planning and management can provide better ways to reduce tax burden.

#### **3.2 Objectives of the Study**

To analyse the effect on change in tax on manufacturing (i.e. Excise) due to introduction of GST.

To study the trend in deferred tax or liability due to gap between cash and accrual basis.

To analyse the existing tax structure as well as future tax requirements.

#### **3.3 Scope of the Study**

#### **3.4 Sampling Design**

**Primary Data:** To generate primary data for analysis, discussion was made with company assistant managers, accountants and other officials from the accounts department. The data collected from such discussion are coordinated, analyzed and integrated in this study.

**Secondary Data:** Secondary data is the data which is already collected by someone and accomplished for different purpose which are used in research for this study.

- Company websites
- Annual reports
- Accounts books
- Newspapers and journals

The data interpretation will be done on the basis of simple statistical tools like bar diagram, pie chart etc. and simple financial tools like ratio analysis, comparative statements etc.

#### 4. Data Analysis/Interpretation

#### Income Statement of the Everblue Apparels Ltd.

Particulars	2020-2021(Rs in crores)
Investment	75.588
Sales	440.904
Less: Variable cost	301.188
Contribution	139.704
Less: Fixed cost	104.988
PBDT	34.704
Less: Depreciation	10.128
PBT	24.567
Less: Tax (30%)	7.368
PAT	17.196
Add: Depreciation	10.128
Cash flow from operation	27.336
PVIF, 8%, 10 and 11 years	8.053
Present value of cash flows PVCF	183.567
Net present value	107.856

#### When Investment (fixed assets) is varied at Time

When the company wants to change their investment by 15% increase and 15% decrease, then the NPV of the company and tax of the company will be following.

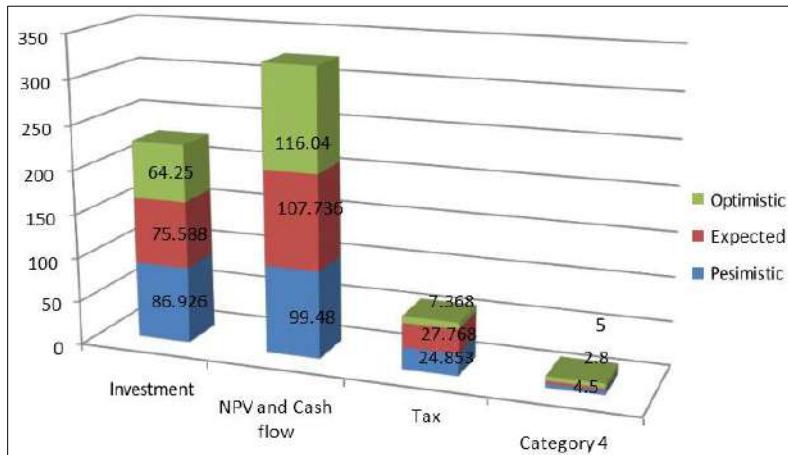
Particulars	2020-21(Rs in crores)		
	Pessimistic	Expected	Optimistic
Investment (1)	86.926	75.588	64.25
Sales	440.904	440.904	440.904
Less—Variable Cost	301.118	301.118	301.118
Contribution	139.704	139.704	139.704

Less—Fixed Cost	104.988	104.988	104.998
PBDT	34.704	34.704	34.704
Less—Depreciation	12.76	10.128	8.604
PBT	23.064	24.567	26.1
Less—Tax (30%)	6.924	7.368	7.836
PAT	16.14	17.196	18.264
Add—Depreciation	12.76	10.128	8.604
Cash Flow From Operation (PBDAT)	27.78	27.324	26.868
PVIFA, 8%, 10 Years	8.052	8.052	8.043
Present Value of Cash Flows (PVCF) ---(2)	184.008	183.336	180.288
Net Present Value (1-2)	99.48	107.7376	116.04

Table showing, when the investment increased by 15% and decreased by 15%, then the net present value and tax value will change as follow.

Particulars	Pesimistic	Expected	Optimistic
Investment	86.926	75.588	64.25
Net present value (NPV) cash inflows	99.48	107.736	116.04
Tax	24.853	27.768	7.368

#### 4.1 Graph Representing The, When The Investment Increased By 15% And Decreased By 15%



From the above chart, the investment amount increase by 15%, i.e. 86.926, then the net present value decreased from 107.73 to 99.48 and there is

no change in the tax payment, tax amount will remain same when investment amount increased. When investment amount decreased by 15% i.e. 75.58 to 64.25 then the net present value increase from 107.73 to 116.04, here also there is no change in the tax payment, tax is remains same 7.36, when investment amount decreases.

#### 4.1 When the Sales is Varied at Time

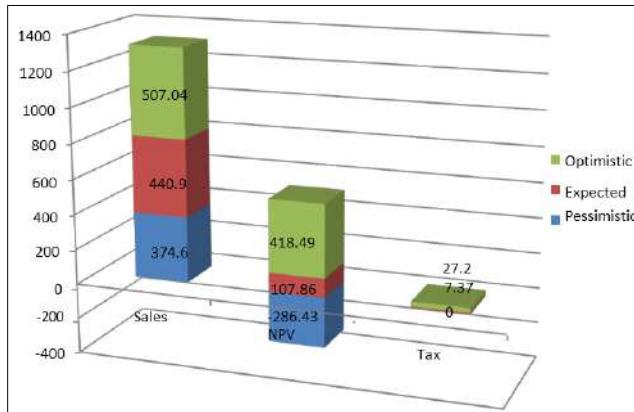
When the company changes their sales value by 15% increase and 15% decrease, then the NPV of the company and tax of the company will be following.

Particulars	2018-19		
	Pessimistic	Expected	Optimistic
<b>Investment (1)</b>	<b>75.588</b>	<b>75.588</b>	<b>75.588</b>
Sales	374.6	440.90	507.04
Less—Variable Cost	301.19	301.19	301.19
Contribution	73.41	139.71	205.85
Less—Fixed Cost	104.99	104.99	104.99
PBDT	(31.47)	34.70	100.80
Less—Depreciation	10.13	10.13	10.13
PBT	(41.57)	25.47	90.71
Less—Tax (30%)	-	7.368	27.204
PAT	(41.56)	17.196	63.49
Add—Depreciation	10.13	10.13	10.13
Cash Flow From Operation (PBDAT)	(34.42)	27.34	73.63
PVIFA, 8%, 10 Years	8.053	8.052	8.052
Present Value of Cash Flows (PVCF) (2)	(210.84)	183.46	494.09
Net Present Value (1-2)	(286.43)	107.86	418.49

Table showing, when the sales increased by 15% and decreased by 15%, then the net present value and tax value will change as follows.

Particulars	Pesimistic	Expected	Optimistic
Sales	374.6	440.90	507.04
Net present value cash Inflows	(286.43)	107.86	418.49
Tax	-	7.37	27.20

#### 4.2 Graph Representing, When the Sales Increased by 15% and Decreased by 15%



from the above chart showing, the sales are increased by 15%, from 440.094 to 507.04 crores then the net present value of the company also increased from 107.86 crores to 418.49 crores and the tax amount also increased from 7.37 to 27.20. and the sales are decrease by 15% the amount also decreased from 440.904 to -286.43 crores. Here chart showing if sales decreased NPV will be negative, then tax amount will be decreased to nil, because NPV will in under the loss.

#### 4.2 When Variable Cost Varied Attime

When the company wants to change their variable cost by 15% increase and 15% decrease, then the NPV of the company and tax of the company will be following.

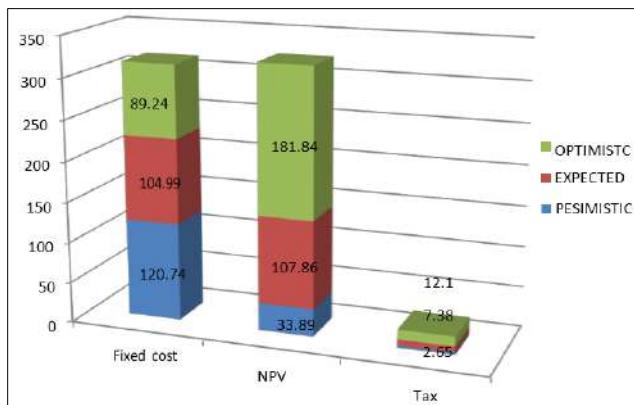
Particulars	2018-19		
	Pessimistic	Expected	Optimistic
<b>Investment (1)</b>	<b>75.59</b>	<b>75.59</b>	<b>75.59</b>
Sales	440.90	440.90	440.90
Less—Variable Cost	346.37	301.19	256.37
Contribution	94.53	139.71	184.53
Less—Fixed Cost	104.99	104.99	104.99
PBDT	(10.46)	34.72	79.54
Less—Depreciation	10.13	10.13	10.13
PBT	(20.59)	24.59	69.41
Less—Tax (30%)	-	7.38	20.82
PAT	(20.59)	17.21	48.59
Add—Depreciation	10.13	10.13	10.13
<b>Cash Flow From Operation (PBDAT)</b>	<b>(10.46)</b>	<b>27.34</b>	<b>58.72</b>

PVIFA, 8%, 10 Years	8.052	8.052	8.052
Present Value of Cash Flows (PVCF) ---(2)	(70.21)	183.46	395.65
Net Present Value (1-2)	(145.81)	107.86	320.06

The table showing, when the variable cost increased by 15% and decreased by 15%, then the net present value and tax value will change as follows.

Particulars	Pesimistic	Expected	Optimistic
Variable cost	288.64	250.99	213.64
Net present value cash inflows	(121.51)	89.88	266.72
Tax	-	6.14	17.43

**Graph representing, when the fixed cost increased by 15% and decreased by 15%**

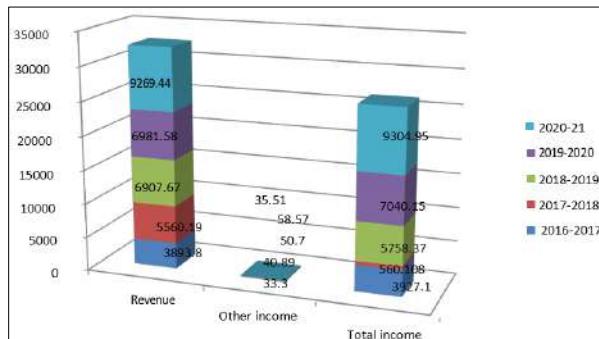


when company changes their fixed cost amount from 104.90 to 120.74 crores then the net present value of the company will be decreased from 107.86 to 33.89 crores, this effects to company profit and also this case reduces the tax amount from 7.39 to 2.65. When company changes fixed cost amount from 104.99 to 89.24 that increases company profit and net present value from 107.86 to 181.84 and also increase tax amount from 7.36 to 12.10.

#### 4.5 Table Showing that Total Incomes of the Company

Particulars	2016-2017	2017-2018	2018-2019	2019-20	2020-21
Revenue from operations	3893.8	5560.19	6907.67	6981.58	9269.44
Other income	33.30	40.89	50.70	58.57	35.51
<b>Total incomes (A)</b>	<b>3927.1</b>	<b>560.108</b>	<b>5758.37</b>	<b>7040.15</b>	<b>9304.95</b>

#### 4.6 Graph Representing that total Incomes of the Company

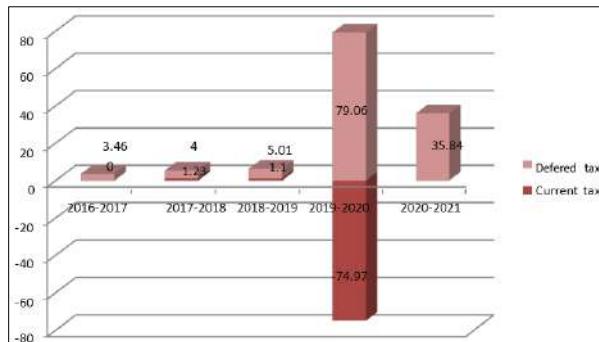


**Analysis and interpretation:** The above bar chart showing that in the year 2016-17 revenue from operation is 3893.8 lakh and other incomes is 33.30 lakh, in the year 2017 -18 the revenue from operation and other income is 560.08 lakh respectively, in the year 2018 – 19 revenue from operation and other incomes is 5758.37 lakhs, in the year 2017- 18 the revenue from operation and other incomes are 7040.15 lakhs and in the year 2020-21 the revenue from operation and other incomes are 9304.95 lakhs respectively. From the year 2016 -17 to 2020- 21, every year the revenue from operation and other incomes are increased, means total incomes are increased in every year by 1500 plus lakhs

#### 4.7 Table Showing that Total Tax of the Company

Particulars	2016-17	2017-18	2018-19	2019-20	2020-21
Current tax	0	1.23	1.1	-74.97	0
Deferred tax	3.46	4.00	5.01	79.06	35.84
<b>Total tax</b>	<b>3.46</b>	<b>5.23</b>	<b>6.11</b>	<b>4.09</b>	<b>35.84</b>

#### Graph representing that total Tax of the Company



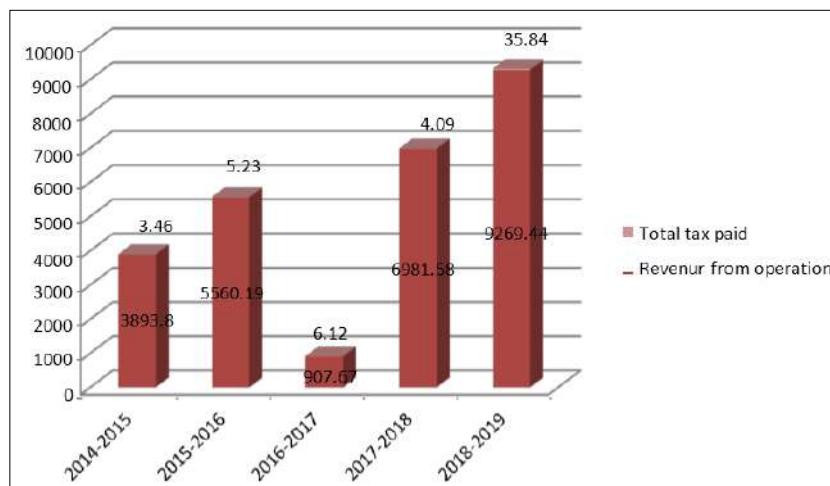
## Analysis and Interpretation

The above bar chart showing that in the year 2016- 17 the company paid total tax is current tax 0 lakhs and 3.46 deferred tax. In the year 2017- 18 the company paid current tax and deferred tax is 1.23 and 4.00 respectively, in the year 2018- 19 the company paid current tax and deferred tax is 1.1 and 5.01 respectively, in the year 2019- 20 the company paid tax is -74.97 and 79.06 respectively and in the year 2020- 21 the company paid current tax and deferred tax is 0 and 35.84 respectively. In every year company tax is increased because every year profit ratio of the company also increased. In the year 2020- 21 company paid more tax and in the year 2017- 18 company paid more tax.

### 4.7 Table showing that How Much Revenue from the Operation and Total Tax Paid

Particulars	2016-2017	2017-2018	2018-2019	2019-20	2020-21
Revenue from operations	3893.8	5560.19	6907.67	6981.58	9269.44
Total Tax	3.46	5.23	6.12	4.09	35.84

### 4.8 Graph Representing the How Much Revenue from Operation and Total Tax Paid



## Ratio Analysis

**Current Ratio (CR):** Current Ratio = Current assets/Current Liabilities  
2021

Current assets = 17,272.10 Current Liabilities = 7,664.95

Current Ratio = 17,272.10/7,664.95 = 2.251

2020

Current assets = 15,717.61 Current Liabilities = 6,751.10

Current Ratio = 15,707.61/6,975.10 = 2.25:1

**Liquid Ratio (LR):** (Current assets – stock) / Current Liabilities

2021

Current assets = 17,272.10

Stock = 9,431.78

Current Liabilities = 7,664.95

Liquid Assets = (17,272.10-9,431.78) / 7,664.95 = 1.02:1

2020

Current assets = 15,717.61

Stock = 4,032.80

Current Liabilities = 6,975.10

Liquid Assets = (15,717.61-4,032.80) / 6,975.10 = 1.67:1

## 5.1 Findings

- This study reveals the income statement by using scenario analysis and change the investment amount by 15% increase and 15% decrease but that investment amount will effects on the tax.
- In the same study, I change the sales amount by 15% increase and 15% decrease, when sales increase net present value and tax also increased, when sales decrease NPV and tax also decreases.
- When changes the variable cost by 15% increases and decrease, when variable cost amount increases, then the NPV and tax is decreases and when variable cost decreases, tax and NPV will be increase.
- When changes the fixed cost by 15%. When fixed cost amount increases NPV and tax are decreases, when fixed cost amount decreases, NPV and tax will be decreases.
- From the above study, when depreciation increases NPV also increases but tax amount will be decreases. When depreciation decreases, NPV also decreases and tax will increase.

- From the above study, total incomes of the company increased in every year by year constantly
- In the study, the excise duty and revenue from the operation has a variation before the GST, after that revenue from operation and excise duty are constant, analyzed by trend analysis.
- Analyzed the total revenue trend and total tax trend, before GST both has a variation after the GST, both is moving constantly

## 5.2 Conclusions

The Everblue Apparels Limited is one of the leading manufacturers of Enclosures Company in the world. It is also a largest manufacturing enclosure. An industry which is the largest producer of enclosures in India also concentrates on more on CSR activities apart from enclosure manufacturing process. Today group emphasizing more towards of safety of its employees and contract employees associated with them in the present changing market scenario. In this study I should conclude that the tax planning and management of the company helps to control the tax in good manner, And helps to pay the tax to government in a correct time.

Everblue Apparels Limited is the company which has always given importance to the policies and procedures set up by the government and have maintained its growth, positions in the market by concentrating on quality assurance. And also the study will shows that company is good in the payment of tax to government.

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# Chapter - 3

## Analyzing the Impact of ERP on Improving Business Operations Using Oracle

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### Abstract

Nearly every company's record-keeping and business process management relies on an enterprise resource planning (ERP) system. It is critical to the smooth operation of a company's accounting and finance departments. ERP can help handle inventories and logistics in production and distribution. Some businesses use it to manage human resources tasks such as personnel tracking, payroll, and related costs. As a result, the goal of this research is to create a system process improvement plan that will result in the streamlining of Procurement Service business processes and the realignment of the ERP process flow to the present organizational architecture. PS-DBM must be realigned with the current organizational structure and business processes in order to properly utilize the system. To accomplish so, an evaluation of business processes is required.

Oracles ERP solutions allow companies to gain a better understanding and visibility of their business operations. They may use this data to make vital business decisions and keep a competitive edge in their market, regardless of how big or tiny the competition is. The companies design enables you to install exactly what you require when you require it. You choose the pace and decide which aspects of your business are prioritized, such as updating your financials, assisting with company-wide planning, or optimizing your logistics. That's it! Once each location is live, that's it! You'll never have to go through another upgrading project with them.

Cloud ERP has a quick return on investment, and this delivery approach saves money on IT while also increasing staff productivity for a wide range of businesses. Other key benefits of ERP on the cloud for small and medium

businesses include higher inventory accuracy, improved customer happiness, and increased revenue.

**Keywords:** Cloud, Record Keeping, Planning, Solutions

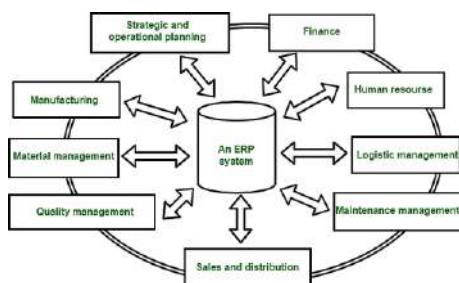
## 1. Introduction

ERP systems are a type of software that is used to manage an organization's data. ERP systems assist various companies in dealing with various departments inside a company. Various departments, such as receiving, inventory management, customer order management, production planning, shipping, accounting, human resource management, and other business functions.

Basically, the process of combining an organization's planning, manufacturing, sales, and marketing efforts into a unified management system is known as integration. It combines all the company's databases into a single database that is easily accessible to all employees. It facilitates the automation of tasks related to the completion of a business process.

### 1.1 Understanding ERP

When we think of ERP the first thing that comes to our mind is an ERP can be compared to the glue that holds a large corporation's many computer systems together. Without an ERP system, each department's system would be customized to meet its specific requirements. Although each department has its own system, ERP software allows all of them to be accessed through a single application with a single interface. ERP software also makes it simpler for various departments to communicate and share information with the rest of the company. It collects information about the activities and state of various divisions and makes it available to other parts of the organization so that it can be used profitably. Before an ERP system, several departments maintained their own databases. Employees in one department are unaware of what is going on in the other.



**Fig 1:** ERP tools

After the ERP, the databases of several departments are handled by a single system known as the ERP system. It keeps track of the entire system's database. Employees from one department have access to information from the other departments in this scenario.

## 1.2 Advantages & Disadvantages of ERP in Business Operations

### Advantages

**Increased Efficiency:** One of the most significant benefits of ERP is that it enables businesses to automate manual and regular tasks. Employees may now concentrate on more revenue-generating tasks while also standardizing common business procedures. Improved demand forecasting, fewer manufacturing bottlenecks, shorter lead times, and a more transparent and responsive supply chain, not to mention enhanced business growth and the capacity to remain ahead of rivals, are all benefits of increased efficiency.

**Improved Collaboration:** ERP solutions also help teams work together, which improves communication and employee engagement. Every authorized employee gets on-demand access to operational systems with an ERP system, allowing them to understand all the company's moving components and their roles.

**Real-time Data & Enhanced Reporting:** One of the most significant features of ERP is that it functions as a powerful data hub. An ERP system helps you to collect, store, and analyze data from all your activities in one place, giving you a single source of truth and the visibility, you need to operate more strategically. Because of the centralized data, a company may access real-time data and develop more valuable reports.

**Cloud Accessibility:** In recent years, cloud ERP software has grown in popularity. Cloud ERP offers a few advantages, including decreased IT workload, dedicated data security, and mobility. When you choose a cloud-hosted ERP solution, you may access the system from anywhere, at any time, on any device if you have an internet connection.

### Disadvantages

**Upfront Costs:** When adopting an ERP system, particularly an on-premises system, there are certain upfront expenses to consider, such as the cost of setup, maintenance, training, and possible third-party software add-ins. However, if you choose a cloud-hosted ERP solution, the expense is easy to manage. You'll be paying overtime for cloud ERP systems that function on a monthly subscription basis.

**Training:** Proper training is required to get the most out of ERP software.

Training should cover all the functionality of the ERP system, with sessions based on business processes. IT staff should also be taught to manage the system's technical components. An organization would be wise to invest time in creating ERP training programs, manuals, and other tools for new team members to rapidly become comfortable with the system to avoid knowledge loss when trained individuals leave the company.

**Buy-in:** Making changes to a firm takes time and needs a lot of back and forth between stakeholders. This is especially true when it comes to implementing new technologies. This approach normally needs top-down permission and support, which can be difficult if the people you're trying to convince don't see the advantages of ERP. It may be tough to get some staff on board with using the system and understanding how to effectively use its capabilities once it has been introduced.

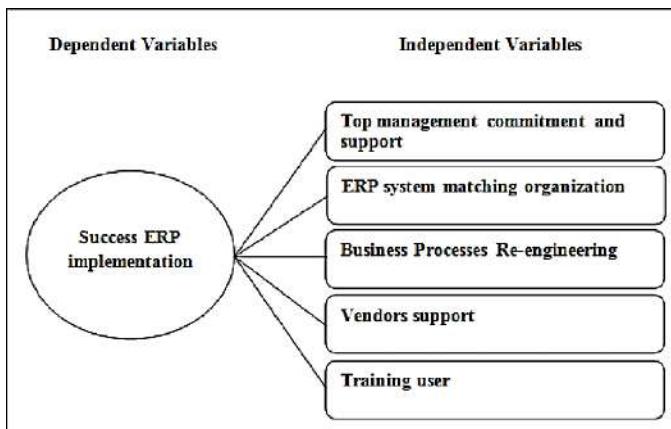
**Customization:** A system should be perfectly alright to a company's demands to order to fully achieve ERP benefits. Whether it's a ready-to-use system or one that's been custom-built, customizing it to match your company's goals and procedures is vital to its success. Each company must be willing to invest the effort necessary to verify that an ERP system has all the features it requires and none that it does not. ERP is not a good investment in any other case.

### 1.3 Importance of this Study

- The study helps in a better understanding of ERP and the tools used in Business Organizations.
- How does it impact the business Operations?
- How ERP will grow business.
- Evaluate the outcome of the ERP in the operations of cooperatives

### 1.4 Need of the Study

This study's findings will contribute to the organization's benefit, considering that ERP plays a vital role in Supply Chain Management and business operations today. The greater demand for ERP tools justifies the need for more effective, easy approaches. Thus, organizations that apply the recommended approach derived from the results of this study will train organizations to perform better.



**Fig 2:** Conceptual framework of the study

## 2. Literature Review

Over the past two decades, enterprise resource planning (ERP) systems have become pervasive and are fundamental to the operation of large organizations (Dawson and Owens 2008). Worldwide, companies spent more than \$70 billion on ERP software licenses from 1997 to 2007 (Welch and Kordysh 2007), although 51% of ERP projects are considered failures and 30% far exceeded their budget and completion dates (Caruso 2007). Notwithstanding the cost of ERP systems and the potential for failure, small and medium-sized enterprises (SMEs) are increasingly adopting enterprise systems (Aberdeen Research 2004, AMR Research 2005, AMI Report 2007).

The benefits generally attributed to ERP are an increase in productivity, better warehouse management, a higher efficiency in the information flow, costs reduction and so on (Nonino and Panizzolo, 2007). Nevertheless, ERPs have high implementation costs; as a matter of fact, the cost range is about 2 to 6 percent of annual sales with the cost of the software being just a tip of the iceberg, as reported by Mabert *et al.* (2001). In large companies, the average cost of an ERP system implementation is approximately equal to 1 percent of the firm's turnover and the average lead time (from business process analysis to the go live) is about 20 months (PPRA, 2003).

Although commercial, off-the-shelf ERP packages dominate the market, interest in open-source ERP systems has been enthusiastically embraced (Johanson and Sudzina 2008). Large enterprises have primarily invested in proprietary ERP systems introduced by large vendors such as SAP and Oracle. These firms are not likely to migrate to open-source solutions due to their highly complex business processes and the significant investment already

expended implementing these systems; instead, SMEs are a more suitable candidate for open-source ERP systems due to their agility and flexibility (Kim and Boldyreff 2005).

It is believed that organizations adopt IT to improve their performance through the creation of competitive and strategic advantages (Mata *et al.* 1995). Zhang and Lado (2001) contend that in order for a firm to achieve such advantages, it must exploit IT in such a way that they leverage its unique operational resources and capabilities. Adoption and installation of ERP systems is an expensive and risky venture. Managers have many systems from which to choose and must decide how to best use their limited resources to ensure they invest in the best product. This is particularly true for SME firms with limited resources

**RQ1:** Does the implementation process impact the perception of ERP success during the post-adoption stage?

Taking off from this research question, we aimed to investigate if the implementation process (project phases) impacts the ERP's perceived success in the organizations during the post-adoption stage, also considering other variables which could provide an explanation of its variation. Consequently, we adopted a multiple case study research design with the objective to explore some variables and to offer a contingent view on how there is such an impact and in which type of setting it is more likely to occur.

### **3. Research Methodology**

The design of the study defines the study type (descriptive, semi-experimental, and correlation) and subtype (case studies, research questions, hypothesis data collection technique, and statistical analysis plan), as well as the study type (descriptive, semi-experimental, and correlation). "Descriptive research" in this study is concerned with conveying the viewpoints of all people, describing the impact of ERP in business operations, and determining the frequency with which something occurs or relates to different. Considers several points of view in a particular situation and suggests a test to make a more confident decision.

#### **3.1 Sampling Design**

This plan was formulated before any data is collected from the selected population's specified sample. This is used to collect data from a small number of people in a specific area. The 2 categories of sampling methods are

1. Probability sampling.
2. Nonprobability sampling.

This is a study on probability sampling and the sample random method is used in the study.

### **3.2 Problem Statement**

This study aims at identifying the gap between Analyzing the impact of the ERP on the operations of cooperatives and evaluating the outcome of the ERP in the operations of cooperatives

### **3.3 Research Objective**

The goal of this study firstly is to define what ERP (enterprise resource planning) is and how it operates. Secondly, it's to identify the level of impact it could have on cooperatives. Thirdly to investigate the success stories. Lastly, evaluate the number of qualitative studies.

### **3.4 Scope of Study**

- This study's findings will contribute to the organization's benefit, considering that ERP plays a vital role in Supply Chain Management and business operations today.
- The greater demand for ERP tools justifies the need for more effective, easy approaches.
- Thus, organizations that apply the recommended approach derived from the results of this study will train organizations to perform better.

### **3.5 Research Hypotheses**

#### **Statement 1**

**H0:** There is no significant benefits of Using Oracle ERP in Business Operations life.

**H1:** There is a significant benefit of Using Oracle ERP in Business Operations

#### **Statement 2**

**H0:** There is no significance in the oracle ERP system to fulfill Business Operations

**H1:** There is a significance in the oracle ERP system to fulfill Business Operations

### **3.6 Sample Size**

A total number of 30 respondents is considered for the study. The study included interviews with both genders i.e., male and female. The study

interviewed employees and company owners who have implemented ERP at their workplace.

### **3.7 Data Collection Methods**

**This Involves Mainly 2 Types of Collection I.E.**

- 1. Primary Data:** To collect primary data, a questionnaire with 12 questions is given out. The questionnaire asks respondents a series of questions, including multiple-choice questions, to obtain first-hand information.
- 2. Secondary Data:** Some of the secondary sources referred to during the study are textbooks of operations management, Introduction To Erp-An Overview- Author: Deepak Dembla, reference books, and the internet such things.

### **3.8 Questionnaire Details**

Questionnaire was prepared using a series of systematic questions related to the various aspects considered under the study.

**The Type of Questions which is considered in this Study are**

Close-ended questionnaire: Closed-ended questions are those that can only be answered by selecting one of a few possibilities. This type involves 2 types they are:

- Dichotomous Questions:** This includes 2 answers i.e., either yes or no or true or false.
- Multiple Choice Questions:** The employees are provided with 2 or more choices relating to the question which is been applied in the case.

### **3.9 Limitations of this Study**

**This Study is covered to Bangalore Office Only**

- Opinions given by respondents may be biased.
- The number of respondents chosen is 30
- The supervisor and employees had only limited time to spend because of their busy schedules of work.
- The study only covers the areas of companies using Oracle & others as ERP tools.

## **4. Data Analysis & Interpretation**

The study of tables and figures that are analyzed from the questionnaire

that was provided to the final employees/consumers to complete is known as data analysis and interpretation.

Tables and figures based on the information obtained are created and analyzed in terms of the number of respondents and percentages.

"Statistical facts in the raw just furnish factors for someone due to the rationale from," it might be defined as. When appropriately collected and understood, it can be incredibly beneficial. However, if talent statistical data is not managed carefully, it may appear to move things that are not quite true.

### **The Science of Statistics Involves 4 Major Steps**

- Collection of the data
- Presentation of data been collected
- Analysis of the data which is collected
- Interpretation through analysis.

The reporting of general findings to the general public based on scientific data analysis is the greatest effort that a statistician knows, and statistics analyzes. Data interpretation is a difficult task that requires a high level of talent, intelligence, and objectivity.

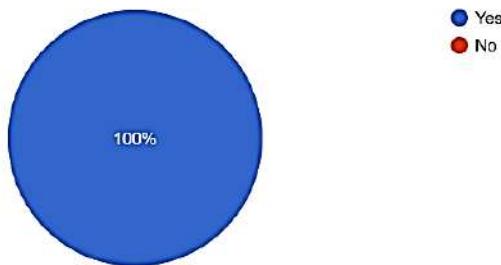
Does your company use Oracle ERP tools?

**Table 1:** ERP Usage

Response	Respondents	Percent	Valid Percent	Cumulative Percent
Yes	30	100	100	100
No	0	0	0	

Does your company use ERP tools?

30 responses



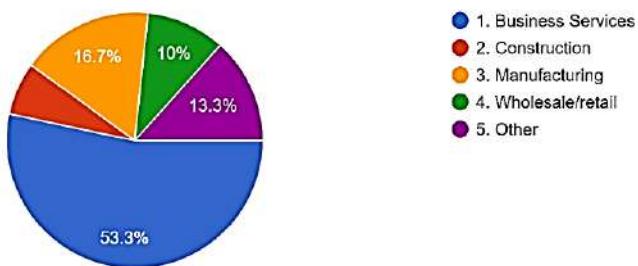
**Fig 3:** ERP Usage

**Table 2:** Does your industry or business sector belong to?

Response	Respondents	Frequency	Percent	Valid percent	Cumulative Percent
Business Services	16		53.3	53.3	
Construction	2		6.7	6.7	
Manufacturing	5		16.7	16.7	
Wholesale/retail	3		10	10	
Other	4		13.3	13.3	
Total	30		100	100	

Your industry or business sector belong to?

30 responses

**Fig 4:** Industry/business belongs to the sector.

The Above Data shows that most of the respondents work in the IT/business administration giving area, i.e., 53.3% half the proportion belongs to Business services, and from the previous survey question we can relate all of them using ERP tools in their organizations.

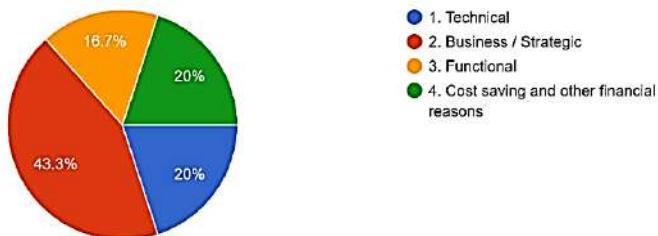
What is/was the motivation for ERP implementation in your organization?

**Table 3:** Motivation to use ERP

Response	Respondents	Percent	Valid Percent	Cumulative percent
Technical	6	20	20	63.3
Business/strategic	13	43.3	43.3	80
Functional	5	16.7	16.7	100
Cost-saving and other financial reasons	6	20	20	
Total	30	100		

What is/was the motivation for ERP implementation in your organization?

30 responses



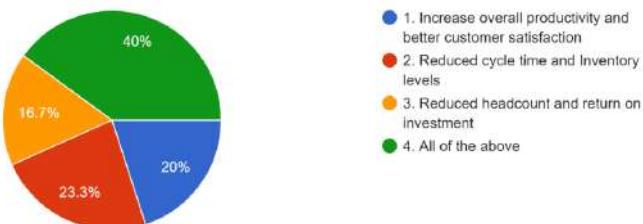
**Fig 5:** Motivation to use ERP

**Table 4:** Benefits employees for using ERP

Response	Respondents	Percent	Valid percent	Cumulative percent
Increase overall productivity and better customer satisfaction	6	20	20	40.3
Reduced cycle time and Inventory levels	7	23.3	23.3	60
Reduced headcount and return on investment	5	16.7	16.7	100
All of the above	12	40	40	
Total	30	100	100	

What were the benefits of the ERP system for the organizations?

30 responses



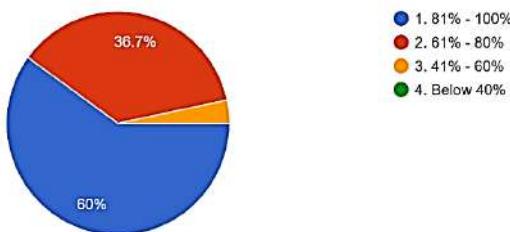
**Fig 6:** benefits employees for using ERP

**Table 5:** Percentage of effectiveness in business operations

Response	Respondents	Percent	Valid percent	Cumulative percent
81% - 100%	18	60	60	97.7
61% - 80%	11	37.7	37.7	100
41% - 60%	1	2.3	2.3	
Below 40%	0	0	0	
Total	30	100	100	

How much does the ERP system fulfill your company's business strategy?

30 responses



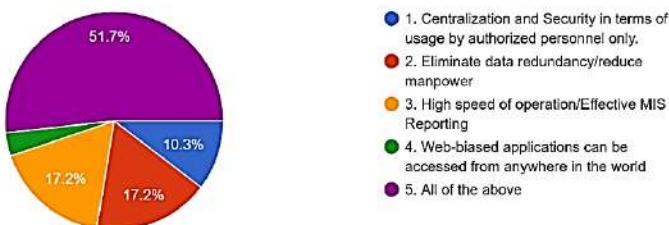
**Fig 7:** Percentage of effectiveness in business operations

**Table 6:** Benefits of ERP

Response	Respondents	Percent	Valid Percent	Cumulative
Centralization and Security in terms of usage by authorized personnel only	3	10.3	10.3	27.5
Eliminate data redundancy/reduce manpower	5	17.2	17.2	44.7
High speed of operation/Effective MIS Reporting	5	17.2	17.2	48.3
Web-biased applications can be accessed from anywhere in the world	1	3.6	3.6	100
All of the above	16	51.7	51.7	
Total	30	100	100	

What are the benefits of using ERP?

29 responses

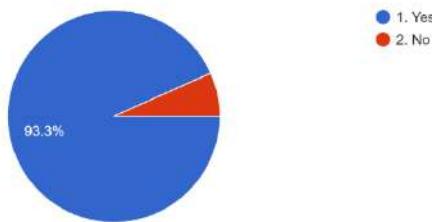


**Fig 8:** Benefit of ERP

**Table 7:** Does the management keep track of the activities in the organization due to ERP implementation?

Response	Respondents	Percent	Valid Percent	Cumulative percent
Yes	28	93.3	93.3	100
No	2	6.7	6.7	
Total	30	100	100	

Does the management keep track of the activities in the organization due to ERP implementation?  
30 responses

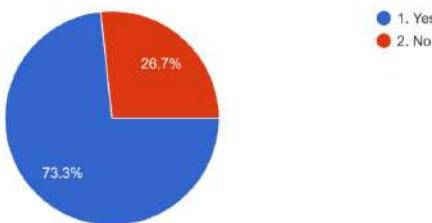


**Fig 9:** Management track of activities

**Table 8:** Do the problems resolve in an efficient manner with the help of the ERP Solution of the company?

Response	Respondents	Percent	Valid Percent	Cumulative Percent
Yes	22	73.3	73.3	100
No	8	26.7	26.7	
Total	30	100	100	

Does the problems resolve in an efficient manner with the help of the ERP Solution of the company  
30 responses



**Fig 10:** Does the problems resolve in an efficient manner with help of ERP solution.

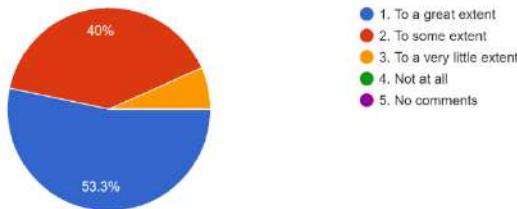
**Table 9:** Are you satisfied with information sharing within the organization due to ERP Solution Implemented in the organization?

Response	Respondents	Percent	Valid Percent	Cumulative
To a great extent	16	53.3	53.3	93.3
To some extent	12	40	40	100

To a little extent	2	6.7	6.7	
Not at all	0	0	0	
No Comments	0	0	0	
Total	30	100	100	

Are you satisfied with information sharing within the organization due to ERP Solution Implemented in the organization?

30 responses



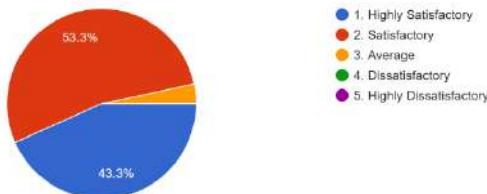
**Fig 11:** Satisfaction of Information

**Table 12:** Rate your satisfaction with ERP and Business Process Restructuring in the organization?

Response	Respondents	Percent	Valid percent	Cumulative
Highly satisfactory	16	43.3	43.3	96.6
Satisfactory	13	53.3	53.3	100
Average	1	3.4	3.4	
Dissatisfactory	0	0	0	
Highly Dissatisfactory	0	0	0	
Total		100	100	

Rate your satisfaction with ERP and Business Process Restructuring in the organization?

30 responses



**Fig 12:** Overall satisfactory

## 4.2 Hypotheses Testing Using 1-Sample T Test

### Statement 1

**H0:** There is no significant benefits of Using Oracle ERP in Business Operations life.

**H1:** There is a significant benefit of Using Oracle ERP in Business Operations

Questionnaire 6 “What were the benefits of the ERP system for the organizations “has been taken into account for performing this test, data are collected in the form of a survey from a random population.

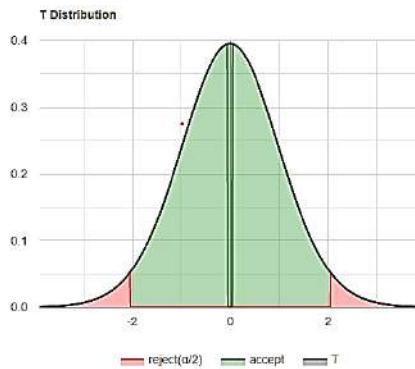
The Response Values are 6, 7, 5, 12

Significance level  $\alpha = 0.05$

1.  $H_0$  hypothesis since  $p\text{-value} > \alpha$ ,  $H_0$  is accepted. The average of Group-1's population is considered to be equal to the  $\mu_0$ . In other words, the difference between the average of the Group-1 and  $\mu_0$  is not big enough to be statistically significant.
2. P-value p-value equals 1.00000,  $(p(x \leq T) = 0.500000)$ . This means that if we would reject  $H_0$ , the chance of type I error (rejecting a correct  $H_0$ ) would be too high: 1.000 (100.0%). The larger the p-value the more it supports  $H_0$ .
3. The statistics the test statistic  $T$  equals 0.00000, is in the 95% critical value accepted range:  $[-2.0452: 2.0452]$ .  $x=7.50$ , is in the 95% accepted range:  $[6.3400: 8.6600]$ . The statistic  $S'$  equals 0.566.
4. Effect size the observed standardized effect size is small (0.0). That indicates that the magnitude of the difference between the average and  $\mu_0$  is small.

**Table 13:** Mean & SD

<b>Mean</b>	7.5	SEM	1.55
<b>SD</b>	3.11	N	4



**Fig 13:** T-distribution

Since the significance (0.173) is more than 0.05, the alternative hypothesis [H1] must be accepted and the null hypothesis [H0] must be rejected. Hence there are benefits of ERP using oracle more and improves the business operations.

## Statement 2

**H0:** There is no significance in the oracle ERP system to fulfill Business Operations

**H1:** There is a significance in the oracle ERP system to fulfill Business Operations

Questionnaire 7 “How much does the ERP system fulfill your company's business operations? “Has been taken into account for performing this test, data are collected in the form of a survey from a random population.

The response values are 18, 11, 1, 0

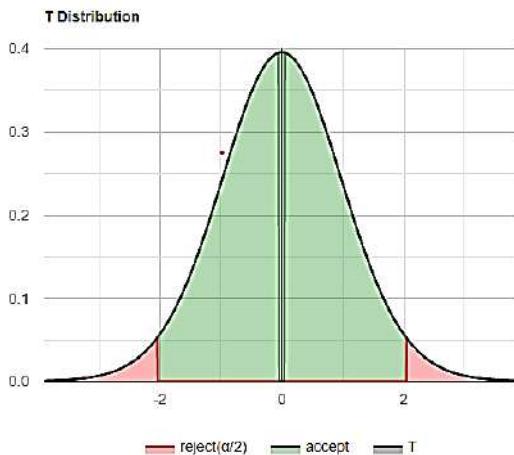
Significance level  $\alpha = 0.05$

1.  $H_0$  hypothesis since p-value  $> \alpha$ ,  $H_0$  is accepted. The average of Group-1's population is considered to be equal to the  $\mu_0$ .  
In other words, the difference between the average of the Group-1 and  $\mu_0$  is not big enough to be statistically significant.
2. P-value p-value equals 1.00000,  $(p(x \leq T) = 0.500000)$ . This means that if we would reject  $H_0$ , the chance of type I error (rejecting a correct  $H_0$ ) would be too high: 1.000 (100.0%). The larger the p-value the more it supports  $H_0$ .
3. The statistics the test statistic  $T$  equals 0.00000, is in the 95% critical value accepted range: [-2.0452: 2.0452].  $x=7.50$ , is in the 95% accepted range: [4.3000: 10.7000]. The statistic  $S'$  equals 1.566.

## 4.4 Effect Size

Mean	7.50	SEM	4.29
SD	8.58	N	4

The observed standardized effect size is small (0.0). That indicates that the magnitude of the difference between the average and  $\mu_0$  is small.



**Fig 14:** T-distribution

Since the significance (0.1810) is more than 0.05, the alternative hypothesis [ $H_1$ ] must be accepted and the null hypothesis [ $H_0$ ] must be rejected. Hence the Oracle ERP systems in organization improve fulfillment of business operations.

## 5. Recommendation & Conclusion

### Recommendation

The government should encourage cooperatives since they have a positive impact on the economy by producing jobs and other things. Cooperatives will receive funds from government business funding organizations in order to deploy the ERP system in their enterprises. ERP professionals teach classes so that cooperatives can get the skills and knowledge they need to keep the ERP system running. The backing of top management is critical to the implementation's success; it will give strategic direction for all stakeholders' active participation. The ERP system converts the firm to higher performance through a streamlined business process, rather than replacing every component (hardware and software).

**Cooperatives can use the Study's Findings to Better Understand and Plan for the Installation of an ERP System. The Following are Some Strategies to Consider**

- Project definition: to ensure that all users have a clear knowledge of the project they will be working on. It assists students in gaining practical knowledge. There should be a schedule in place for various activities to be completed, allowing for team participation

- b) Project management structure: the project should have a formal method in place. For all deviations, the method should be followed. Team members should attend regular meetings, write regular reports, and learn new things.
- c) ERP expertise: the utilization of professionals to assist teams in becoming informed and experienced in their task. Once everyone understands how things function, it will emphasize clear decision-making. Training will be offered through specially prepared materials and courses.
- d) Performance measurement: performance measurement to keep track of progress and make modifications as needed to reduce the cost of having to go back, which will be more expensive.

## **Conclusion**

- The major purpose of the paper is to propose the ERP system into cooperatives by identifying various keys that could assist them in implementing the system
- An ERP system is more than simply a piece of software. It's a way of life for them. All management activities are supported by an ERP system once it has been successfully established. As a result, it's critical to ensure that the system is effectively installed and that all organizational departments and people use it to communicate.
- There are areas of innovation and creativity around qualitative studies in this form of a topic.
- There are many gaps found in the research and they have been discussed.
- The importance of ERP systems in major organizations adopting systems from significant vendors such as oracle is well understood since much has been written about ERP system selection, adoption, and implementation. The impact of ERP systems on the SME sector, as well as developing types of ERP systems like COSES, is less well understood. This study contributes to the theory of both IT assimilation and the resource-based view of the firm by examining the implementation stage of ERP systems.

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# Chapter - 4

## Investigation of Effect of Internet of Things on Servitisation

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### Abstract

To understand the IOT and Servitisation in the healthcare sector and developing complementary relationship between them. The scope of the study would be limited to the equipment manufacturer of the industry. The research would be qualitative in nature which would be done via interviews and observations.

### Introduction

More and more devices are becoming interconnected, incorporated with sensors, and gaining the ability to communicate. While there is a plethora of terms used to describe this emerging technological shift (e.g., M2M, ubiquitous computing, smart objects), they are all characterized by the advent of things becoming equipped with computing logic, sensors and networking capabilities, forming the so-called Internet of Things (IoT hereafter) (Andreev, Balandin, and Koucheryavy 2012).

One of the most radical and disruptive trends in recent years will be, and has already begun to be, the rising digitalization and interconnectedness of virtual and physical objects. In industrial applications, IoT and its value propositions of machine learning, data analytics, monitoring, and remote control present huge opportunities for manufacturers looking to expand their product portfolios with customized analytics and remote/predictive maintenance services.

The seamless flow of data between a network of ubiquitous things, enabling such services can be bundled into complex product-service solutions (Baines, Lightfoot, Peppard, *et al.* 2009; Baines, Lightfoot, Benedettini, *et al.* 2009; Lightfoot, Baines, and Smart 2013), shifting manufacturers towards

becoming service providers. This transformation, also known as ‘servitisation’ (or ‘servitisation’), is not a new phenomenon and scholars are suggesting that the IoT may have a ‘boosting’ or accelerating effect on it. Servitisation is defined as “the transformational processes whereby a company shifts from a product-centric to a service centric business model and logic” (Kowalkowski, Gebauer, Kamp, & Parry, 2017, p.8).

Servitisation involves moving from the production and sale of products to the provision and sale of services, or combinations of products, services, and sometimes consumables. In the past, selling equipment has always been the main source of income for manufacturing companies. However, in many industries, including automotive, handling and entertainment, the situation has changed, with increasing revenue derived from services. For example, Konecranes Oyj's services business revenue exceeded that of its lifting and crane business by about 6%, while its air compressor business of Atlas Copco AB generates almost half of its revenue from services. Servicing is popular because it addresses the needs of changing from ownership of the device to immediate access to it when needed. Overall, the number of people buying conventional products and services is decreasing; instead, more people are searching for the results these products deliver. In other words, instead of “buying a car”, commuters want “portability”. And instead of buying “insurance”, the owner wants to buy “Peace of mind”. People increasingly want access to equipment without the burden of ownership.

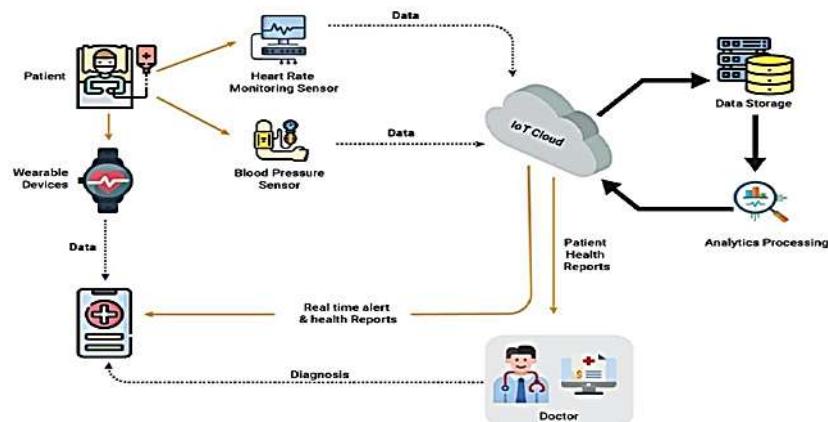
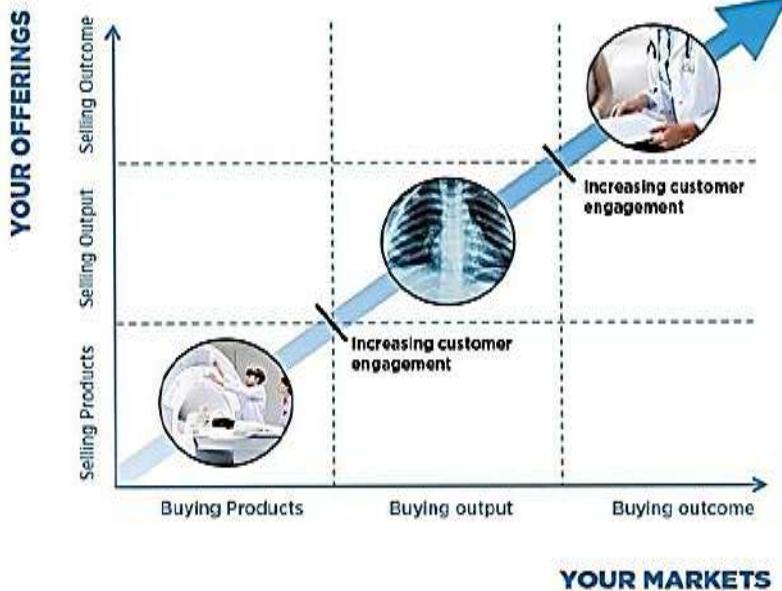


Fig 1: IoT in Healthcare Sector



**Fig 2:** Servitisation in Healthcare Sector

### Scope

The focal point of the study is to further understand the emergence of IoT in healthcare sector and how it will impact and enhance the Servitisation of the same. There has been much ongoing research on the topic and the study is primarily focused on various models of Servitisation that can be implemented by the primary Stakeholders (i.e., Hospitals and Equipment Manufacturers) in the future to come, what are the factors that will inhibit the progress and What are the benefits of such implementations.

### Research and Methodology

In this dissertation an extensive amount of previous literature would be examined to create a framework, which would then be utilized in the analysis of the case company (probably GE and Chemical plant). Thus, the idea is to present a theory-initiated case study. To understand the current Indian Healthcare Industry scenario a series of questions from a small group of Industry leaders, company employees in healthcare manufacturing is to be asked through social media sites like LinkedIn. The study can also take help of multiple webinars regarding healthcare and Servitisation topic by Industry leaders to answer the below questions.

## **Following Questions are being in Consideration**

- a) What are the various types of IoT used in Healthcare Industry/Company and What kind of Business models do they operate?
- b) What are various the benefits of the IoT-enabled Servitized business models in India?
- c) Which companies are currently using any IOT technology in their devices? What is the future plan to incorporate IoT?
- d) What factors are preventing firms from implementing IoT-enabled Servitized business models?

Thus, the project would be organized as follows: First, the literature review will concentrate on the reasons for Servitisation and IOT implementations and possible benefits gained from it.

After this a theoretical framework of various models of IoT enabled Servitised business model would be created based on Literature review. Thereafter the current and future implementation of such model in the market would be examined.

### **Servitisation in the Healthcare Sector**

By its very nature, the healthcare industry differs from other industries, and these variations may have an impact on the amount of success with which Servitisation is implemented. Both on a worldwide scale and within the India, healthcare costs are rising and there are limited resources available. With growing population it's difficult to regulate growing healthcare costs. Furthermore, expectations of the services and therefore the requirements for market acceptance and reimbursement are increasing. To extend the efficiency of operations and reduce the value per treatment, hospitals are beginning to involve their suppliers more closely in their operations. One example of this sort of supplier involvement is that the purchasing of services through which equipment suppliers assist hospital staff in optimizing the utilization of their equipment.

A number of hospitals the across the world have already implemented servitized solutions for their hospitals. One of the major regional hospitals in the Netherlands, for example, is now using limited Servitised solutions to acquire copiers and printers. In 2016, the hospital started a project in collaboration with DLL and evaluated the advantages of servitized solutions within radiology. This collaboration provided insights into the various sorts of equipment, devices utilized in radiology, their usage, total cost of ownership

of the equipment, and program requirements for establishing a servitization model.

In many clinical hospitals of highest grade across the globe, servers and data are outsourced and therefore the manufacturers manage the information storage and software whereas medical and imaging equipment is provided as a service. Although there's greater satisfaction with the contract because the supplier is far more involved in how healthcare services are being provided by the hospital, but further development has stalled due to challenges from both suppliers and hospitals. These may include:

### **For Manufacturers**

- Difficulties in determining which sorts of services to supply in specific global markets as different country and region may require different services.
- Limited internal alignment within suppliers or lack of seamless business integration may suggests that certain business functions could also be missed in critical stages
- Risks related to responsibilities not being clearly defined between suppliers and hospitals which may lead to conflict between the entities.

### **For Hospitals**

- Commitment to long-term service contracts limiting the likelihood to modify and diversify supplier base.
- Medical personnel not having the ability to use the equipment that they like because of lack of understanding of this cutting-edge equipment.
- Limited internal alignment within hospitals, which ends up in doctors' expectations that aren't aligned with the contract may lead to conflict
- Conflicting interests between doctors and suppliers' sales personnel may lead to conflict

Because servitization contracts are typically long-term, the decision to adopt servitized solutions for a hospital is largely based on strategy & forecasts and on long term vision of the Hospital administration as many a times the equipment's to be used by the hospitals may not have been developed and are usually in development when the contracts are being signed.

## Data Sources

Existing secondary research on the relevant topics by doing literature review published in research papers in journals on sites like Computer Network and JMIR Publications. Taylor & Francis Online, Elsevier, International Frequency Sensor Association (IFSA) Publishing.

Apart from that various webinars of Harbinger Systems, Wonder Rx, GAVS, Schneider Electric India was watched to understand the current state of affairs of IoT and Servitisation in India.

Various reports from McKinsey and Accenture to understand the current state and future of Servitisation and IoT in Healthcare.

## Analysis and Results

Devices	Usage	Servitised Model that can be Followed
Remote patient monitoring including Glucose monitoring, Heart-rate monitoring, Depression and mood monitoring	IoT devices can collect health indicators such as heart rate, blood pressure, temperature, and more from patients who are not physically present in a healthcare facility, removing the need for patients to travel to providers or collect data themselves.	Leverage customer data business model (One of the four models of Add On Business Model) can be implemented by Hospitals wherein data obtained from the patients during the use of the product is utilized by Hospitals to offer customized service to the patients
Hand hygiene monitoring	Remind people to sanitize their hands when they enter hospital rooms	The Sharing business model could be used wherein the device remains with the supplier (ie Hospitals) with changing users ie patients
Medical Imaging IT	Ultrasonography, x-rays, mammography, computed tomography (CT scans), and nuclear medicine are all examples of medical imaging.	Agfa HealthCare, for example, is a healthcare provider that uses IoT to remotely monitor imaging hardware and software to respond to issues more quickly.

Apart from the above various devices which can follow the above IoT-enabled Servitised business models there are various collaborations happening among various stakeholders to bring new types of service models for their customers.

There is already Medical Devices as A Service (MDaaS) transforming healthcare landscape in Nigeria. For example, mdaasglobal, an African based

start-up provides hospitals with a range of device acquisition options and offer world-class service support. They provide Direct Sales of new or refurbished medical devices from leading brands, Renting and Leasing of medical devices as well as Partnership with Hospitals.

Thus, they are implementing Add-On, Sharing Business models. The same can be done with IoT-enabled devices to be sold/leased/partnered to Hospitals by either direct manufacturer like GE, Philips, Siemens or by a third party (Start-up) which will aggregate the devices and provide Device as a service (DAAS). Hence the ecosystem of IoT enabled Servitisation could be formed.

**Iot Enabled Servitisation Model Is a New Concept That Has Been Gradually Evolving and Is a Subject of Ongoing Research. While There Are Many Benefits, the Iot cum Servitisation in Healthcare Faces Few Headwinds Including**

1. Cost of the devices
2. Usability of the data that the customer collects? Will doctor trust such data?
3. Consumer motivation-While more and more people are getting health conscious, still most of the IoT wearables are owned by athletes, fitness enthusiast and mass usage by common people is still far away
4. Doctors' interest and ability to use the data as well as liability concerns. Doctors may not be digitally literate to understand various data that they receive from customers.
5. Reimbursement models
6. Healthcare task flows that are how the devices, data collected from patients and various insights obtained after analytics would be integrated into the existing process.
7. Accessibility? Will the neediest get the devices easily? Who needs the most (i.e., can those most in need use the devices easily?)

**Similarly, for the Iot Cum Servitisation Model to Succeed There are Many Critical Success Factors That Needs to be identified. For Example, There Must Be**

1. A longstanding relationship between the hospital and the supplier which will be based on trust and ability to both stakeholders to keep track of the performance.
2. A unified vision of future developments (from the manufacturer, the

hospital, and the clinicians).

3. Innovation and digitalization: High technology capabilities.
4. Increased flexibility, permitting the supplier switching and taking advantage of innovative solutions available (applicable to end-users).
5. Strategic sourcing expertise: A high-level servitization strategy is required. Instead of procurement, the board should make final choices on insourcing or outsourcing activities and how to manage the supply chain.
6. Customer centricity: understanding the customer's business and service requirements.

## **Managerial Implications**

The study has shown that future of healthcare is going to change radically. Be it the manufacturers of equipment's of its users like Hospitals, IoT enabled Servitisation is the way to go. There is a shifting focus towards service business, where knowledge, information, analysis are the main intangibles input and outputs as opposed to the tangible equipment's itself. These new radical changes will drive how the data, knowledge is managed and looked after by the industry and how they incorporate the organizational process to achieve technological transformation and competitive advantage. The distinct disparities between products and services are mostly determined by the organization's human capital, which is the primary focus.

To help drive strategic decisions and promote competitiveness within the newly emerging components of IoT enabled Servitisation, the process of knowledge sharing must become an efficient driver for organization, individual, and customer behaviors.

Many of the organizations consider culture as the key ingredient for Knowledge management which has a direct link to creation and sharing of information. Agility and transparency thus become a key ingredient to develop such culture wherein information and knowledge is easily created and shared.

Beyond culture, strategic initiatives around human resources and information technology, digital transformation is also equally important to become leader in IoT enabled Servitisation, thus positioning oneself as a differentiator and eventually becoming a market leader

## **Conclusion**

In this Covid infected world, personal care, healthcare has gained substantial transaction and has positioned itself as one of the most important

aspects of life. Be it work life balance or the need to be physically and mentally fit has gained central position in one's life more than ever while at the same time consumer habits are radically transforming covid the personalized service was a trend and post covid it will firmly settle itself as a norm.

But at the same time the ballooning cost of healthcare has limited the affordability to less and lesser people. Cutting edge IoT devices coupled with Servitisation can not only provide healthcare at affordable cost but also make it more agile, lean, portable, and accessible at any place, any time.

In fact, in the fight against the second wave of coronavirus outbreak, hospitals across the country are already implementing remote patient monitoring to address bed shortages and effectively treat patients who require continuous monitoring and treatment. Similarly, Medtronic India, a subsidiary of the Irish medical technology giant Medtronic, has formed a strategic partnership with Statis Health to promote the latter's bedside patient monitoring system in India.

While these are mostly the use of IoT in healthcare, they will become the steppingstone for IoT enabled Servitisation which will radically change the entire ecosystem of healthcare in the coming future. While true IoT enabled Servitisation has only started in few pockets across the globe, its cost effectiveness, ease of access and changing customer needs will eventually cement its place in the Healthcare sector as the default ecosystem.

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# **Chapter - 5**

## **Operations Strategy on Revenue Management at Royaloak Incorporation Pvt. Ltd.**

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### **Introduction**

Are Consumers in India like other developed countries when it comes to purchasing furniture which are costlier or will prefer budget or pocket friendly furniture's. This question demands a thorough research analysis before it can be answered. Thus, a brand which offers international furniture at unbeatable price and its presence transforms living standards of people through a wide range of collections from 7 countries and 7 categories to enable the customers to access furniture across India the way they want.

With levels of furniture from lowest prices to the highest among major furniture retail, relationship building has assumed significance. However, Relationship building is not a new thing, especially in India. Most successful managers at store level and back-end corporate level have thrived on the close liaison they had with their clients. A Trusted Manager or a salesperson was almost a family member. However, the days of customer dependence on one brand for his needs have undergone a sea change. Most Customers would prefer to choose and pick the best available alternative. The days of a committed customer are declining. Moreover, the customers are now well educated and aware of the alternatives in the market. The job of retail personnel becomes more challenging in today's competitive scenario.

To reap the benefits of having retained customers and gaining competitive advantage online and offline, retail needs to develop a thorough understanding of the antecedents of retaining customers on internet and stores through good relationships and service. To investigate the importance of business operations to improve the business and processes, the identification of variables

influencing repeat purchasing behavior and word-of-mouth recommendation is a crucial area of research.

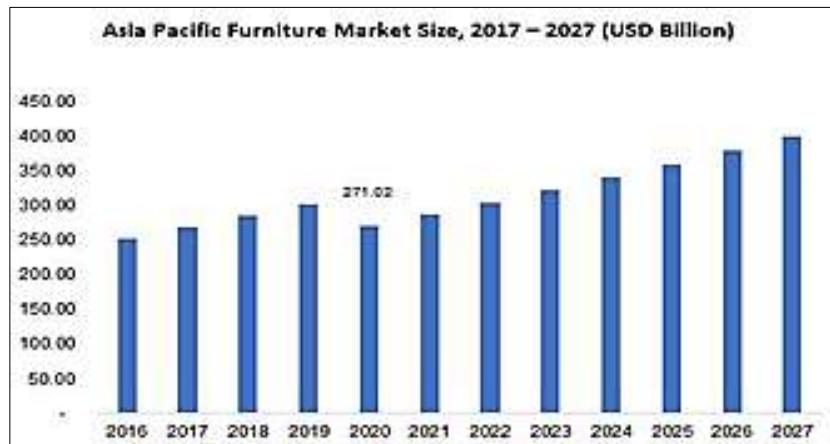
This will help retail brands in the areas in which they can improve. Hindrances, such as waiting for information, customer service, having to visit stores very often, can prompt people to switch brands and demand attention to provide an insight into customer satisfaction and retention of customers. Customers expect brands to provide great quality and service at cheaper price. More and more brands are now offering online services to reach every corner of India or globe for facilities, to target prospective customers. Based on the above discussion, it can be said that retail industry is booming in India after the pandemic, and it was the most hit because of ne way functioning so new business operations and processes is the need of the hour. So, this study will have practical value, as the findings will be used by retail brands to improve revenue.

## Industry Profile

### Global Furniture Industry

The global furniture market can be broadly categorized into four categories - domestic furniture, office/corporate furniture, hotel furniture and furniture parts. Globally, domestic furniture accounts for 65 per cent of the production value, whilst corporate/office furniture represents 15 per cent, hotel furniture 15 per cent and furniture parts 5 per cent. According to a World Bank study, the organized furniture industry is expected to grow by 20 per cent every year. A large part of this growth is expected to come from the rapidly growing consumer markets of Asia, implying significant potential for growth in the Indian furniture.





The furniture industry is one of the fastest-growing industries in the world. The global furniture market was valued at USD 609.7 billion in 2019, with an expected growth rate of 5.4% from 2020 to 2026. However, like all other industries, the furniture industry took a massive hit in the year 2020-21 due to the ever-rising Covid-19 pandemic.

The Living Room and Dining Room Furniture categories are the largest and most popular furniture market. The segment is driven by consumers' need for comfort in their homes.

China is the leading Furniture exporter and has a market share of about 37.5%, followed by Germany, Poland, Italy and the USA. As of 2018, India ranked 28th in the world exports with top export destinations including the US (39.2%), Germany (7.4%), France (6.6%), UK (6.3%), Netherland (6%), and Australia (2.8%) with USD 1.65 Billion and hold up 0.6% share in the world exports.

The Asian region is rapidly expanding due to its large population and rising residential construction. Customers have begun to invest in home décor and furniture as the standard of living in countries such as India and China continue to increase.

With an estimated USD 271 billion in 2020, Asia Pacific Furniture Market exceeded its market size and is expected to grow 5.1% from 2021 to 2027. The growth of the furniture market in the region has also been fueled by rising consumer spending power. As a result, there is an increasing demand for affordable yet stylish furniture. This contributes a significant amount to the growth of the sector in this region.

## Furniture Industry in India

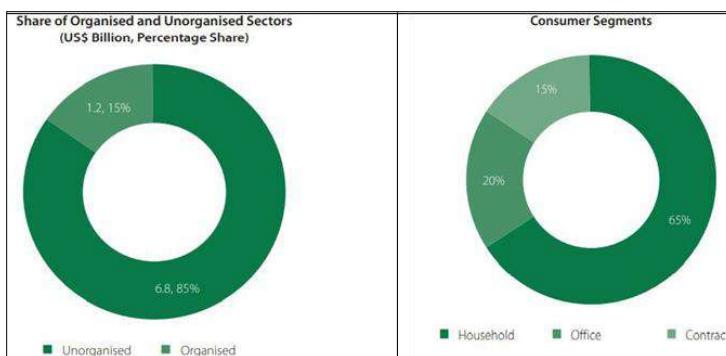
- India is known for its unique and exceptional furniture design. Because of its rich handcraft and appealing traditional art and style, the Indian furniture business is well-known both in India and beyond. Over time, the Indian furniture market has changed. Its market has expanded beyond chairs and tables to include designed interiors, such as wardrobes and sofas. For generations, furniture has been an important element of Indian households.
- The growing middle-class population, rising disposable income, and the growing number of urban homes all contribute to the expansion of the Indian furniture market. The furniture market in India is dominated by small unorganized local firms. However, organized players have increased their contribution to the Indian furniture sector during the previous decade. With the advent of multinational furniture companies, like IKEA, into India, the organized players' market share would expand even more.
- The rising desire for modular and state-of-the-art furniture among the people living in urban areas, growing urbanization in Indian states, and rising need for durable and hybrid seating furniture are all driving the growth of the Indian furniture industry. Furthermore, the Indian expanding wood sector helps to offset the cost of furniture. The furniture industry in India is predicted to grow as a result of these causes. Furthermore, India's growing trend of online and mobile shopping is expected to boost demand for furniture via online channels.
- The growth of the Indian furniture market is also driven by the tourism and hospitality industry and the corporate sector. The increasing number of hotels and business offices further spur the demand for furniture in the country.
- When it comes to home furnishings, the country's industry is increasingly catering to the needs of the urban middle class for elegant homes in small spaces. Additionally, affluent urban households are driving the import of furniture from countries, such as China, Malaysia, Indonesia, and Bangladesh.
- In terms of age bracket, furniture sellers in India have identified the 25–35-year-old as their primary target market. Most of the demand for furniture products from organized firms has come from tier-1 cities, according to cities. Imports account for a major share of the

products marketed to the Indian society's uppermiddle and higher-income classes. India has been identified as the world's largest importer of furniture, with beds accounting for most of the country's imports.

- In terms of import destination, China is a leading importing country for furniture products in India for almost every product category.
- Customers may now browse a huge variety of furniture products from anywhere and at any time, thanks to the introduction of online furniture merchants. Local carpenters, offline branded players, and furniture e-commerce enterprises have all become more competitive because of this.
- International players can now bet big on the Indian growing home furnishings market thanks to the introduction of 51% FDI in multi-brand retail.
- International corporations are also likely to enter the market in greater numbers. Godrej Interio, Nilkamal, Royaloak and Durian are some of India's major furniture producers. Wooden furniture is the most popular type of furniture in both the home and workplace markets.
- The popularity of traditional furniture has boosted the demand for wood in furniture manufacture in India. People have begun to use wood for furnishing cupboards, decorating, and other uses in the home over the last few years, which has boosted the use of wooden goods in the home. Aside from that, demand for engineered wood furniture is increasing in major cities, such as Delhi, Mumbai, and Bangalore. The reason for this is that ready-to- assemble house furniture is becoming increasingly popular in these cities.
- Furthermore, expanding urbanization in Indian states, like Gujarat, Maharashtra, and Tamil Nadu, is bolstering the housing society culture. Furthermore, the Indian corporate sector is growing as a result of the government's efforts to make it easier to do business. These characteristics are thought to help the Indian furniture market flourish.
- In India, a wide range of raw materials, such as wood, plastic, cane, bamboo, and metal, are used to make furniture. Because of the different variations of local and imported wood, wood furniture provides the greatest parts globally. Bamboo woods are becoming increasingly popular as a substitute for plywood. Indian wood is

renowned for its beauty and traditional craftsmanship. States, like Kerala, Gujarat, Uttar Pradesh, Kashmir, and Punjab, are known for their excellent decorating, turning, and finishing skills.

- Although the rise of nuclear families and the influence of western culture has influenced the demand for wood furniture, changing tastes and preferences for various types of furniture is driving market growth, and customers' interest is shifting toward using different materials, such as leather and glass, making them a lucrative segment in the future.
- The demand for furniture products in the country has varied across different income levels.
- For instance, the high-income class prefers branded furniture with high-quality wood, such as teak, sheesham, or mango, as an alternate wood. They generally prefer products with fine finishing, such as veneer coating, which makes furniture more attractive. The high-income group prefers quality and durability, and price is not the major criteria for this income class.
- On the other hand, the medium-income class prefers medium durability and attractive looks, such as rubber, wood, and plywood. The low-income class in India does not prefer purchasing branded furniture due to its low budget and generally contacts local carpenters to make furniture.
- The furniture market has witnessed tremendous growth in online order due to the pandemic and lockdown. The COVID-19 pandemic has happened during the initial days of 2020 has changed the furniture industry on a huge scale. The supply chain disruption and the temporary ban on global trade have highly affected the countries with high dependencies on imports for their furniture needs.



The furniture sector in India makes a marginal contribution to the Gross Domestic Product (GDP), representing about 0.5 per cent of the total GDP. A major part of this industry, approximately 85 per cent is in the unorganized sector. The remaining 15 per cent comprises of large manufacturers, such as, Godrej & Boyce Manufacturing Co. Ltd., BP Ergo, Featherlite, Haworth, Style Spa, Yantra, Renaissance, Millennium Lifestyles, Durian, Kian, Tangent, Furniture Concepts, Furniture Wala, Zuari, Truzo, N R Jasani & Company, V3 Engineers, PSL Modular Furniture, etc. The range of indigenous furniture available in India, includes both residential and contract system furniture. Manufacturers in India usually use a three-tier selling and distribution structure, comprising of the distributor, wholesaler and retailer. The market is mainly concentrated in A, B and C category cities (the top 589 cities). A and B type cities together constitute 33 per cent of the total market. With a healthy economy and increased household and institutional spending, the market is growing steadily.

### **Furniture Industry Composition**

As with the global market, home furniture is the largest segment in the Indian furniture market, accounting for about 65 per cent of furniture sales. This is followed by the office furniture segment with a 20 per cent share and the contract segment, accounting for the remaining 15 per cent.

#### **Home furniture**

Home furniture in India is available in a wide range, to cater to different customer needs. A typical middle class urban Indian home has five rooms (including kitchen and bathroom). About 25 per cent of the urban population live in homes with five rooms or more, while 45 per cent live in houses with three rooms or less. About 16 per cent is estimated to live in single-room homes. The type of furniture used depends on the customer's affluence and taste. The rich and upper middle class is typically very attentive to design and quality, so price is rarely a determining factor. In general, European style furniture is only found in homes of the urban upper class. Demand for furniture of international standards is limited to the larger cities. It is also estimated that the wealthier classes do not change furniture very frequently; the average life of a piece of furniture is about 20 years and some craftsmen's pieces are used for as long as 50-70 years. Colonial furniture is still very common in India, but the trend seems to be declining slowly.

#### **Office Furniture**

The office furniture segment caters to the commercial and office space. This segment has witnessed rapid growth in recent years, in line with the

growth in the Indian economy and subsequent demand for office space. The thrust on real estate and office construction is expected to sustain in the near future, indicating continued growth for the furniture industry.

### **Contract segment**

The contract segment caters primarily to hotels and its growth is consequently linked to growth in tourism and development of new hotels. There are around 1,200 hotels in India in the organized sector. More than 10 per cent of these are in the 5-star and above categories (please refer to table below for details).

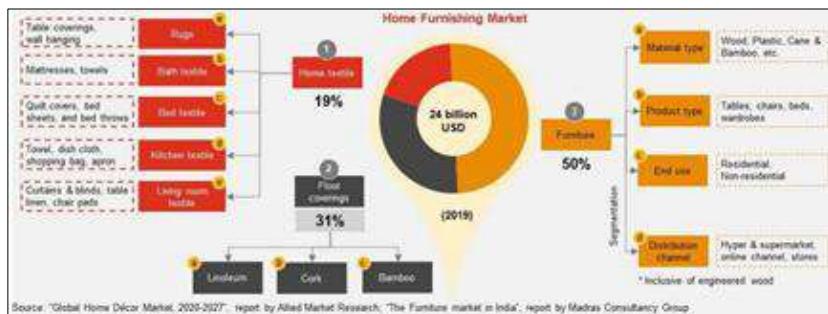
### **Growth potential of furniture market of India**

India is one of the largest developing economies in the world. Rapidly increasing urbanization, large share of younger population and rising aspirations of middle-class society has contributed to a vibrant home furnishing market in India. The home furnishing industry consists of businesses that manufacture and sell furniture, textile, and home furnishing accessories for residences, offices, hotels and others in the commercial space.

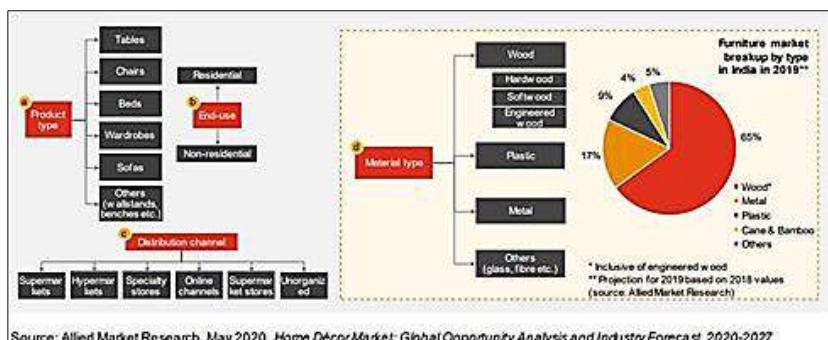
Currently Indian home furnishing market holds a small share of about 4% globally. It was valued at \$24.4 billion in FY2019 and grew at CAGR of 3.5% from FY2014 to FY2019.<sup>6</sup> However, various estimates have suggested that this growth will continue in future. The pattern of this growth might be different in the short term as COVID-19 pandemic is expected to increase the demand for affordable furniture within segments like ergonomic furniture, office furniture, living room seating and bedroom furniture.

While the economic revival is underway, rapid growth is expected in medium and long term in three key factors driving increase in demand for home furnishing products – 1) urbanization, 2) change in consumer demographics and 3) tourism & hospitality industry.<sup>8</sup> Urban population is expected to witness a two-fold increase to 701 million in 2035 from 2019 levels. By 2035, the personal disposable income is also expected to increase to USD 4.75 million from USD 2.9 million in 2019.<sup>9</sup> Tourist inflow in India is also estimated to increase to 17.2 million in 2035 at a CAGR of 8% from 2019 levels.<sup>10</sup> By 2040, the real estate market of India is estimated to grow to \$9.30 billion and contribute 13% to the country's economy.

## Sub-Segmentation of Home Furnishings Market



## Sub-segmentation of furniture sector and market breakup by material type



## Royal Oak-Nature of Business

RoyalOak is a leading furniture brand adding international style furniture that brings alive the aesthetics to your home. Their furniture designs add a premium & stylish look to your home & office environment in uniqueness of design and that it should be exclusive, comfortable and user friendly with pleasant aesthetics. International design country collections are extraordinary and unique in the industry. They understand and create enhanced furniture shopping experience across their physical stores & online portal. Their founding team has experience of more than 40+ years and have been recognized as pioneers in the industry across the globe. What started as a single store brand has grown to become the leading Omni channel furniture brand with largest physical store footprint spread across India.

## RoyalOak Has 3 Verticals

### 1. RMS (Retail Management System)

RMS has 44 stores across India all these stores are completely operated

by Royaloak from front end to back end. More Prevalent in the Tier-1 Cities/Metro/District HQ. There are company owned Company operated stores

## **2. FMS (Franchise Management System)**

FMS has 49 stores across India. The FMS stores are operated by the franchise owners and both company and franchise owners make profit from the sales. More Prevalent in the Tier-2 & 3 cities.

## **3. EMS (E-commerce Management System)**

The EMS handles the online website and e-commerce platform of Royaloak to generate sales through online platform.

### **Problem Identification**

All the brands want to attract customers in different ways and retain their customers to improve sales and generate good revenue to become market leaders. To be more efficient in all the above aspects it is very important to have smooth process and thorough understanding of market and trends. Lack of understanding the market without data analysis and following up the traditional techniques can soon saturate the business and can start declining. Royaloak has good presence across India but their business operations is yet to be well organized in order to make the business functioning smooth and efficient. With the help of different types of analysis, we can target certain market areas from the customers are purchasing the most. Alongside there needs to be more process improvement at both front end and back end of the business. This study will address the following questions.

1. What is the Operations strategy to improve marketing activity, attract new customers and to open new stores within or outside geography?

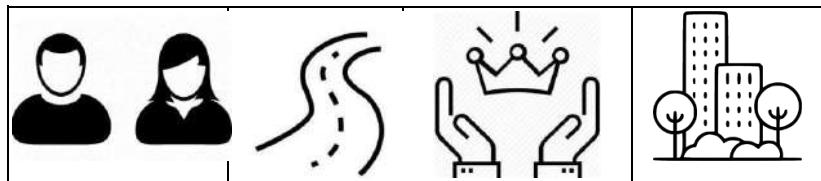
### **Catchment Analysis**

Catchment is important for retailers and venues, it's 'the defined area around a store, site or venue that has a sphere of influence to draw in customers. Your catchment size will be dependent on the nature of the business, the offering provided and availability from competitors in the local area.

Any business whether a large retailer or SME needs to understand their catchment area and underlying consumer demographics to align their product/service offering and improve targeting.

Catchment analysis provides key information about who lives within the local catchment, how far they are prepared to travel and what ranging, pricing and promotions will help to drive footfall and increase sales. For new

businesses it can confirm viability whereas for existing stores or venues, it can highlight if the strategy needs to be redefined or tweaked in line with the target audience.



**Socio-demographics:** Analysing consumer by age, life stage, education and income to help identify what customers look like, what they might be interested in, their disposable income and buying power.

**Infrastructure:** The surrounding transport network of roads, rail and public transport will indicate how accessible a location is. This accessibility will influence how far away your target audience might live and can impact how far they are prepared to travel for your offering.

**Competitor Analysis:** Looks at the local businesses within your local area, the quantity, products and services offered and price point. These factors identify the potential level of demand for your products or services and can highlight or inform your own pricing or category ranging strategy.

**Residential & Workforce Population:** Your catchment will contain both residential and workforce populations. Your daytime footfall will therefore vary to that of night-time, based on the transient population either working or shopping within your catchment. The workforce population is important to consider as the number of businesses, size and industry type will also be influential on sales volumes and potential footfall.

### Catchment Analysis for Bangalore

#### One Month - Google Insights

Pin-Code	Direction Visits	Pin-Code Name
560043	284	Banaswadi S.O
560007	63	Agram S.O
560016	60	Doorvaninagar S.O
560103	35	Bellandur S.O
560077	28	Doddagubbi B.O
560038	24	Indiranagar S.O (Bangalore)
560048	24	Hoodi B.O
560032	22	P&T Col. Kavalbyrasandra S.O
560068	21	Begur B.O

560094	17	ISRO Antharaksha Bhavan S.O
560024	15	Anandnagar S.O (Bangalore)
560078	15	J P Nagar S.O
560097	15	Vidyaranyapura S.O
560092	14	Amruthahalli B.O
560093	14	C.V.Raman Nagar S.O
560076	13	Bannerghatta Road S.O
560001	12	Bangalore Bazaar S.O
560033	12	Maruthi Sevanagar S.O
560036	12	Devasandra S.O
560045	12	Arabic College S.O
560064	12	Attur B.O
560067	12	Devanagundi B.O
560100	12	Electronics City S.O
562129	12	Bendiganahalli B.O
560049	10	Bhattarahalli S.O
560005	<10	Fraser Town S.O
560006	<10	J.C.Nagar S.O
560008	<10	H.A.L II Stage H.O
560015	<10	Jalahalli West S.O
560017	<10	NAL S.O
560022	<10	Yeshwanthpur Bazar S.O
560023	<10	Magadi Road S.O
560025	<10	Bangalore Sub Foreign Post S.O
560026	<10	Deepanjalinagar S.O
560027	<10	Sampangiragramnagar S.O
560029	<10	Dharmaram College S.O
560034	<10	Agara B.O
560035	<10	Carmelram S.O
560037	<10	Doddanekkundi B.O
560039	<10	Nayandahalli S.O
560040	<10	Chandra Lay Out S.O
560047	<10	Austin Town S.O
560058	<10	Laggere S.O
560061	<10	Chikkalasandra S.O
560062	<10	Doddakallasandra S.O
560063	<10	A F Station Yelahanka S.O
560066	<10	EPIP S.O
560072	<10	Nagarbhavi S.O
560073	<10	Bagalgunte B.O
560075	<10	Jeevanbhimanagar S.O

560079	<10	Basaveshwaranagar S.O
560090	<10	Chikkabanavara S.O
560091	<10	Bapagrama B.O
560095	<10	Koramangala VI Bk S.O
560099	<10	Bommasandra Industrial Estate S.O
560102	<10	HSR Layout S.O
560109	<10	Thalaghattapura S.O
562149	<10	Bagalur S.O (Bangalore)
562157	<10	Bettahalsur S.O
59		59

### Interpretation

- The above catchment analysis google insights are from the Banaswadi store of Royaloak.
- The Google insights are extracted from google analytics which is accessible by Royaloak and shows us the data of people who have put direction requests to Royaloak Banaswadi from different locations. The pin-codes are such locations from where people have put direction requests.
- The second column tells us the number of requests for each pin-code.
- The third column is the name of each area pin-code.
- These locations are matched against the revenue generated at Banaswadi store from each pin- code.
- This gives us the insights to understand which area is contributing how much to the store.
- Based upon this insight we can plan which areas are contributing less and we can focus on such areas to improve marketing activities or focus to open new stores.

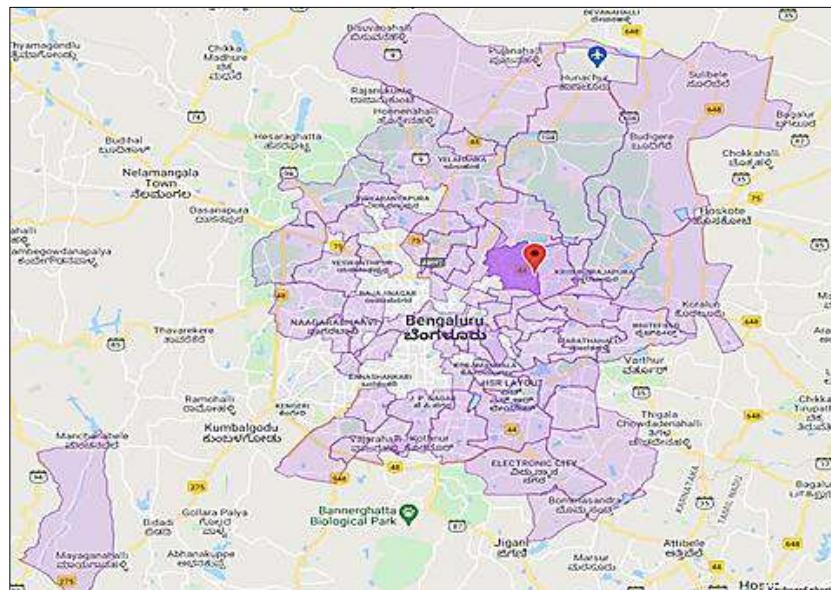
Store Visits - Feb 03 to	Week 1	Week 2	Week 3	Week 4
<b>Monday</b>		98	76	
<b>Tuesday</b>		115	58	
<b>Wednesday</b>		105	60	
<b>Thursday</b>	0	106	64	
<b>Friday</b>	16	103	34	
<b>Saturday</b>	141	101	62	
<b>Sunday</b>	185	66		



## Interpretation

- The above table shows the number of people visited the stores each day on respective dates.
- This data will be compared with the google insights for each pin code to check the correlation between the revenue generated and the number of people visited.
- This comparison tells us that whether the marketing activity or the footfalls or the brand awareness is strong to match the conversion rate.

## Heat Map



## Interpretation

- The above picture is the heat map for the part of catchment analysis.
- The heat map shows the detailed picture of locations for the pin code mentioned in the table.
- With the help of this heat map we can understand which are the nearby locations which needs to be focused on and also to understand which area people are more interested in our brand, so it also helps in opening a new store in the geography.



## Interpretation

- The above chart is the representation of Direction requests v/s the revenue generated.
- This shows what the contribution between the numbers of requests made was and the number of sales happened in real.

	10 to 11	11 to 12	12 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6	6 to 7	7 to 8	8 to 9
Monday											
Tuesday											
Wednesday											
Thursday											
Friday											
Saturday											1
Sunday											

Correlation - Direction Visits V/S Revenue  
0.869467284

- This is the correlation between the two variables. The Revenue is a

dependent variable on Direction Requests which is independent variable.

- Banaswadi store has the strong correlation. Which means that the store is in good location and all the back-end activities are adding to the revenue generated by the store.

### Customer Visits to Store Interpretation

- The above table is the number of store visits by the people i.e. The peak hours.
- The cell in green is the time when the customers have visited the store in big numbers.
- The cell in orange is the time when the number of customers visited the store in less numbers.
- The above analysis helps us to deploy staff during peak hours and manage crowd wisely during the peak hours. This is the operations strategy which will help at store level.

CATCHMENT ANALYSIS SUMMARY				
STORE	REV GOOGLE INSIGHT	REV WITHOUT GOOGLE INSIGHT	TOTAL	CORRELATION
ETC	₹ 49.64	₹ 14.37	₹ 64.02	0.99999
YLK	₹ 47.93	₹ 19.20	₹ 67.12	0.99401
MRH	₹ 86.30	₹ 9.78	₹ 96.08	0.91138
BNS	₹ 132.15	₹ 22.77	₹ 154.91	0.86947
MSR	₹ 102.64	₹ 50.45	₹ 153.09	0.82002
MRR	₹ 19.50	₹ 7.97	₹ 27.47	0.76978
WFD	₹ 38.62	₹ 3.52	₹ 42.14	0.67159
BNG	₹ 66.60	₹ 6.67	₹ 73.27	0.65576
OMR	₹ 76.72	₹ 22.39	₹ 99.10	0.63935
KKR	₹ 57.56	₹ 5.89	₹ 63.45	0.61971
KRM	₹ 34.09	₹ 17.91	₹ 52.00	0.58234
SJR	₹ 48.63	₹ 4.68	₹ 53.31	0.55220
APR	₹ 61.58	₹ 38.16	₹ 99.74	0.39759
TMR	₹ 49.72	₹ 21.11	₹ 70.83	0.31985
			₹ 1,116.53	



## Interpretation

- The above summary is of the catchment analysis for all the Retail stores of Royaloak in Bangalore.
- The summary is the correlation between the revenue of google insights and without insights to get the correlation for each store.
- We can see that Electronic city store is the top performing with the strong correlation whereas the Tumkur Road store is the least performing.
- With the help of correlation we can identify the problem and improve the sales of that geography.

## Competitive Analysis

- The offline competitive analysis is done for the subsidiary brand of Royaloak which is called as “Berlynoak”.
- Berlynoak focuses on the unorganized sector in Furniture industry.
- They mainly operate in Tier 2 cities.
- They have low cost sofas which fits the budget of a student to an individual who has just started earning.
- The competitive analysis will be done for both Online and Offline market for Berlynoak.
- It focuses on 4 main categories like Living, Bedding, Dining and Mattress. The main focus is to get the starting point of the products in each category and compare them with Berlynoak.
- In latter phase it helps to make decision on pricing strategy which can beat the competitors. ONLINE: Competitor analysis is a technique that organizations or brands use to compare against other players in the industry on key components like websites, pricing, service offerings, marketing strategies, social media, etc.
- Online competitors to Berlynoak are Pepperfry, Amazon, Flipkart.

**Offline:** Competitive analysis is the process of analyzing your competitors' brand and marketing efforts. It also includes evaluating the competitors' products.

Offline competitors to Berlynoak are the Unorganised sector which is the local market.

ONLINE										OFFLINE									
		Configuration		BERLYNOAK		AMAZON		FLIPKART		PEPPERY		OFFLINE BAN		NASWAD		MARATHALLI		SHIVAN NAGAR	
I V I N G	S O F A	Fabric	BERLYNOAK	3x3	22,000	18,149	8,198	11,659					3+2	25,000	18,000	28,000	40,000		
			2x	18,000	14,549	11,169	9,379												
			1x		10,899	8,459	6,614												
		Leather	5x	50,000	44,330	10,050	7,024												
			2x	35,000	31,002	13,959	10,450												
	I V I N G	Leatherette	5x	50,000	42,295	12,999	10,239												
			2x	31,000	16,013	8,939	7,654												
			1x	16,500	11,779	8,150	14,231						3+2	30,000	25,000	35,000	30,000		
		Wooden	5x	30,800	15,899	16,259	15,499												
			2x	24,200	10,259	9,199	11,049						3+2	18,000	32,000	25,000	45,000		
			1x	12,600	7,849	6,499	8,249												
D I N I N G	R E V I N G	Sofa cum Bed	3x	24,000	14,879	10,849	10,926						3+2		38,000	34,000			
			2x	24,000	14,879	10,849	10,926												
			1x	44,000	35,039	42,000	45,020												
		Fabric	3x	35,000	34,830	40,375	35,149						3+2 (Fabric)				99,000	79,000	
			2x	19,800	8,500	13,200	13,269												
	I V I N G	Leather	3x	70,899	61,449	71,200	141,014												
			2x	29,000	24,000	27,000	27,000												
			1x	31,000	16,858	22,000	25,640												
		Leatherette	3x	24,000	16,509	21,000	24,330												
			2x	42,500	28,099	30,399	42,330												
		1x	14,339	12,339	12,339	16,119													
B R D I N G	S O F A	Configuration	BERLYNOAK	4x4	12,700	FLIPKART	PEPPERY	Configuration	BAN	SWADI	MARATHALLI	SHIVAN NAGAR	BERLYNOAK						
			QUEEN	14,000	12,299	12,110	12,299	4x	14,000	11,000	13,000	14,000							
			QUEEN	35,000	22,499	22,469	22,469	6x	15,000	20,000	18,000	35,000							
		Screentime (N/S)	5x	28,000	16,301	15,049	23,900	4x	28,000	28,000	28,000	28,000							
			6x	33,200	27,394	20,951	39,900	6x	37,200	38,000	38,000	38,000							
	I V I N G	Glass	4x	16,000	14,399	14,990	15,105	4x				18,000	18,000						
			5x	28,000	19,430	19,430	26,900	6x				14,000	18,000						
			6x	40,000	39,999	94,000													
		Almirah	5x	50,000	92,143	1,61,000	132,520												
			6x	50,000	49,999	92,143	132,520												
A T R E S	S O F A	Ritz Gloss (STORAGE)	BERLYNOAK	4x4	12,700	FLIPKART	PEPPERY	Configuration	BAN	SWADI	MARATHALLI	SHIVAN NAGAR	BERLYNOAK						
			QUEEN	41,000	39,939	34,375	41,112	4x	41,000	18,000	18,000	41,000							
			QUEEN	41,000	39,939	34,375	41,112	6x	41,000	18,000	18,000	41,000							
		Malm zinc (STORAGE)	KING	12,000	2,122	1,632	3,222	KING	12,000	12,000	12,000	12,000							
			KING	12,000	11,722	10,104	6,599	KING	12,000	12,000	12,000	12,000							
	I V I N G	Wooden	QUEEN	22,000	19,550	26,899	35,873	QUEEN	14,000	12,000	11,000	13,000							
			KING	24,399	21,899	21,899	38,439	KING	18,000	18,000	14,000	14,000							
			QUEEN	22,000	22,000	45,000	44,214	QUEEN	14,000	14,000	14,000	14,000							
		Wardrobe (L+R)	KING	22,000	20,994	19,500	22,222	KING	14,000	14,000	14,000	14,000							
			QUEEN	22,000	20,994	19,500	22,222	QUEEN	14,000	14,000	14,000	14,000							
A T R E S	S O F A	Configuration	BERLYNOAK	AMAZON	FLIPKART	PEPPERY	Configuration	BAN	SWADI	MARATHALLI	SHIVAN NAGAR	BERLYNOAK							
			SINGL	14,331	9,321	7,015	4,035	SINGL	14,331	14,331	14,331	14,331							
			QUEEN	14,331	9,331	6,693	6,693	QUEEN	14,331	14,331	14,331	14,331							
		Bonnell	KING	16,000	11,722	10,104	6,599	KING	16,000	16,000	16,000	16,000							
			SINGL	9,033	11,048	4,859	12,105	SINGL	9,033	14,701	14,701	14,701							
	I V I N G	Bonnell	QUEEN	15,000	11,693	14,938	14,972	QUEEN	7,500	11,000	11,000	11,000							
			KING	18,000	12,388	15,140	16,454	KING	18,000	18,000	18,000	18,000							
			QUEEN	20,000	15,548	12,219	9,300	QUEEN	18,000	18,000	18,000	18,000							
		Pocket Spring	KING	24,000	19,872	15,999	11,417												

# Chapter - 6

## A Study on Impact of Organization Culture on Succession Planning

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### Abstract

Succession planning is perhaps one of the hottest topics today as a result of ethical issues, compensation, development, and implementation. Organizations faced with fast-paced change can no longer afford long lengthy internal development of the apparent. However the organizations who seek faster external executive hires have found it as organizational culture often trumps talent and experience. The organization's capacity for learning is the key to long-term success as recent research points to those who do internal succession well with little disruption and ready change depend on the ability to execute plans. In this study increasing questions about the value of Human Resources and furthermore, Human Resource Development, there has never been a better time to prove a strategic worth.

Many organizations are replacing Human Resource executives with legal professionals or those with legal backgrounds as a safety net to preclude unethical and illegal behaviour in an effort to treat the symptom rather than the root cause. Cultural alignment of organizational processes development the succession planning ensures an effect on the root cause in that it serves as a contingency between values, beliefs and organizational results. This is where Human Resource Development practitioners should spend their most effort. This study has proven that traditional practices of large organizations which are seen as institutions in this study finding themselves challenged and more demanding workforce. The key to an organization's survival lies in its ability to retain, groom and development talent which can strategically and ethically lead the organization successfully into the future.

**Keywords:** Organizational Culture, Succession Planning, Employees development

## 1. Introduction

How the organizational culture influences the implementation of succession planning, a critical requirement of organizational longevity. Organizational culture as a contextual factor in succession planning has not been rigorously researched. It is, however, an important area for study and theory generation. An understanding of the cultural context within which a succession planning system operates may serve to enhance the implementation, utilization, and change of succession planning systems in organizations. The goal of the proposed research is to develop an understanding of the role organizational culture plays in how executives and managers influence the implementation of succession planning programs resulting in an executive level succession.

## Theoretical Background of the Study

Succession planning is perhaps one of the hottest topics today as a result of ethical issues, compensation, development and implementation. Global organizations faced with fast-paced change can no longer afford long, lengthy internal development of an heir apparent. However, those organizations who seek faster, external executive hires have found it no panacea as organizational culture often trumps talent and industry experience. Recent research points to those who do internal succession well, with little disruption and ready change depend on their ability to execute plan.

Succession planning is a critical process for the long-term viability of an organization. Lack of proper succession planning in an organization can have a direct effect of causing business to collapse upon departure of key players. Many organizations are experiencing a shortage of skilled employees owing to retirements; deaths, talent poaching and changing of jobs (Human Resource Development Council HRDC. According to succession planning is a deliberate and systematic effort by an organization to ensure leadership continuity in key positions, retention and development of intellectual and knowledge capital for the future, and encouragement of individual advancement.

Succession planning is vital to impart stability in an organization since a need for succession can threaten any development at any time irrespective of their greatness or size. Succession is typically done for upper management because the loss of a key leader can be detrimental to the social well-being and productivity of an organization. However, succession planning can also be

beneficial to other positions within a company. Regardless of the position's level, a solid succession plan for organization is critical for good performance as indicated.

In this study, the concept of succession planning is considered from two perspectives: 1) the process itself; and, 2) the way the process is implemented. The literature suggests that the definition of the succession planning process is unique within each organization and therefore questions remain as to the impetus, stages, length of time, participants, support, outcomes and measurement of the success of this process. Driven by the desire to unveil the truth behind the mysticism, previously known to only those in power, succession researchers have been creative in their approach to approximating how the process unfolds.

Succession research to date circumvents the problem of access to covert, informal or secretive processes by simply defining the process from an event perspective, usually at the point in which the selection of the successor has been made. This information is readily found in archival data such as public records of corporate activity, newspapers and business journals. The selection event as described begins with the selection there seems to be a more recent trend which describes the succession planning process as succession management in an attempt to broaden the focus beyond the selection itself. This trend is more promising as it suggests that the succession process begins early on, perhaps even with the hiring of an employee, and may end when the succession event can be adequately measured via organizational results.

## **2. Review of Literature**

Deal & Kennedy (1982) organizational culture here can be defined by its variables which can be manipulated and changed by an organization's leadership. Smircich (1983) states that organizational culture is viewed through these various perspectives or paradigms, as either comprised of variables or root metaphors. The former views organizational culture as something an organization has and the latter as something an organization is. A Behaviourist Perspective When employing a behaviourist perspective, culture is evident in the way people in the organization behave as they go about their work. Trice and Beyer (1993) present the common characteristics of these definitions as: collective; historically based; inherently symbolic; dynamic and inherently elaborates using factors which reflect culture in organizations. Organizational culture is relatively stable and resistant to change it is taken for granted and less consciously held it derives its meaning from the organization's members and it incorporates sets of shared

understandings. There have been many attempts to understand the construct of culture using various theoretical perspectives.

Kenser and Sebora (1994) the most comprehensive literature reviews of succession planning to date. What we currently know about succession research does not differ significantly from their findings. Succession research is primarily driven by quantitative methods using archival despite calls for innovative, qualitative approaches. Friedman and Olk (1995) suggest that succession begins when candidates and selection criteria are considered and ends with a new CEO in office. He state that the process has only two steps: 1) identification of candidates and 2) development although there is much discrepancy in the literature as to the definition of the succession process-its start, the events, and when it ends, most agree that the process is systematic and includes the development of high-potential individuals.

Sharma *et al.* (2003) defined the succession process as one that takes place over a long period of time and includes many activities and suggest that there is an overlap in the definition of succession planning and succession process. The succession process includes not only the identification of a pool of potentials, the designation of successor, the notification of that successor and others of the choice made; but also, the selection and training of the successor, the development of a vision or strategic plan for the firm following the succession; the definition of the role of the incumbent and the communication of the decision to key stakeholders. In Sharma *et al.* (2003), another study

This literature provided an overview of the gap in research and theory relative to how organizational culture impacts the implementation of succession planning in organizations. The succession planning as a fundamental human resource management and development practice in organizations supports the notion that human resource professionals and organizational could benefit from an understanding of organizational culture as a likely contextual factor in developing, implementing, and changing succession planning processes. This chapter also summarized the focus questions and overall approach to a qualitative study on this literature.

## **The Objective of the Study**

### **The Objective of the Study Sought**

1. What cultural knowledge of succession planning, if any, does the data suggest that organizations.
2. What is the perceived influence of organizational culture on the way succession planning is implemented in an organizations.

3. Does the succession planning process perpetuate or challenge the apparent organizational culture.
4. Influences the implementation of succession planning in an organization.

### **3. Research Methodology**

This study explored the apparent influence of organizational culture on the implementation of succession planning in an organization. The proposed study is to research is to develop an understanding of the role organizational culture plays in how executives and managers influence the implementation of succession planning programs resulting in an executive level succession.

The study sample of 100 employees was obtained using simple random sampling and purposive sampling. Simple random sampling was used to selective organization culture. Purposive sampling was used to select the organization of the succession planning to ensure that they were part of the study. This study assumed that they may have had some key information which might have otherwise been left out if they are excluded. The unit of inquiry will be individual the culture from and unit of analysis will be as an organization.

Primary data was obtained from self-administered questionnaires which were delivered to the respondents. Secondary data is collected from previous research and literature to fill in the respective project.

### **Analysis and Interpretation of the Data Collected**

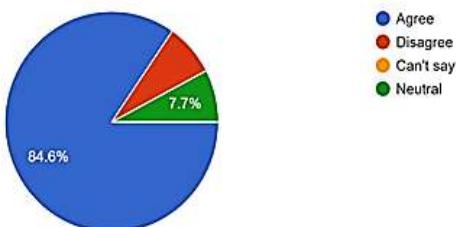
#### **Profile of the Respondents**

**Table 1: Basic Detail of the Respondents**

<b>Particulars</b>	<b>Category</b>	<b>No. of Respondents</b>	<b>Percentage</b>
Age	21-30	57	57%
	31-40	32	32%
	41-50	8	8%
	51 and above	1	1%
	Total	100	100%
Gender	No. of male respondents	58	58%
	No. of female respondents	42	42%
Annual Income	Up to 5 lakhs	85	79.4%
	5 lakhs- 10 lakhs	18	16.8%
	Above 10 lakhs	4	4%

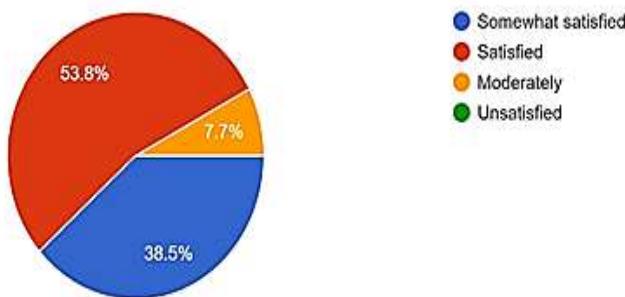
## Part-II: Organisation culture on Succession Planning

As the organization culture on succession planning implementing in progression development in the organization?\*

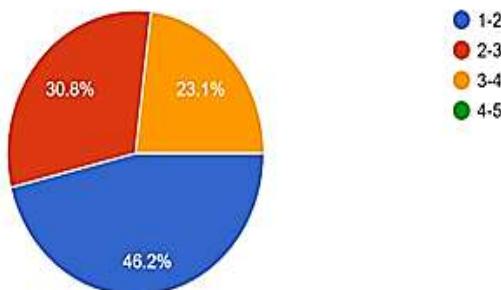


84.6% of the respondents are agree with this fact of the organization, 7.7% of the respondents are disagree with this fact and remaining 7.7 % are neutral with this of the respondents in this analysis of interpretation.

How would you satisfied the succession planning in organization culture?\*

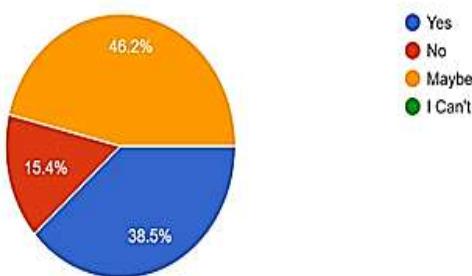


What are the tasks of your current succession planning in the organization?\*



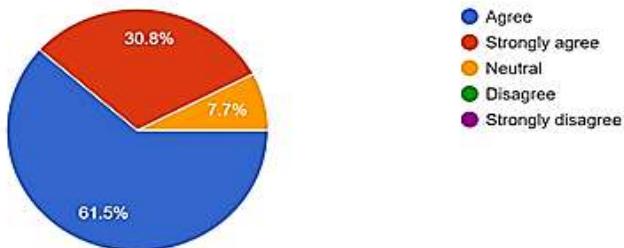
38.5% of the respondents are somewhat satisfied with is organization of the culture 53.8% are satisfied with this and 7.7 % of the respondents are neutral with this of the analysis of this table. 46.2% of the respondents have 1-2 of the organization fact of this and effective 30.8% of the respondents are 2-3 and remaining 23.1% of the respondents are 3-4 Of the organization of the respondents of this analysis.

**The organization has included succession planning in the strategic or other planning**



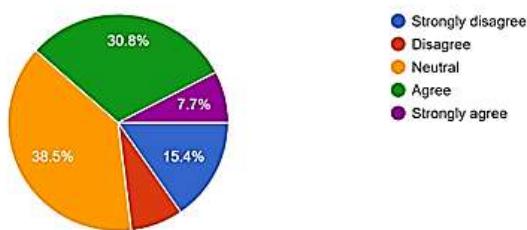
38.5% of the respondents are yes with this organization with this 15.4% of the respondents are no with this of the respondents and 46.2% of the respondents are says may be with this of the culture of respondents of this analysis.

**Is the organization has clearly defined the goals of future implementation**



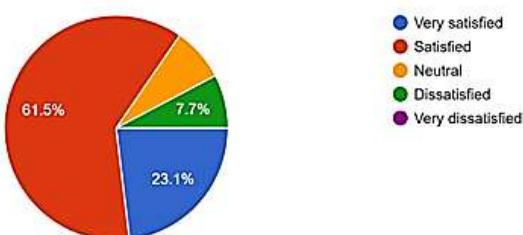
61.5% of the respondents are agree with this fact of the organization 30.8% of the respondents are strongly agree with of the respondents and remaining 7.7 % of the respondents are neutral with this analysis with this table.

Managing the concepts individuals into the organization is a part of succession planning in organization resources and requires a culture that understands the value of pools?\*



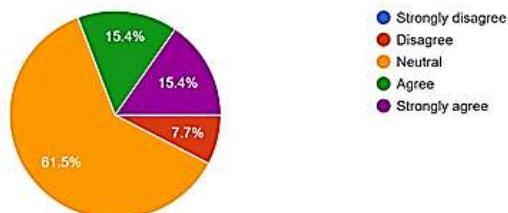
15.4% of the respondents are strongly agree with this organization of this culture, 7.6% of the respondents are disagree with this 30.8% of the respondents are agree for this organization 7.7% of the respondents are strongly agree and remaining 38.5% of the respondents are neutral of this organization.

How satisfied are you with face to face communication with supervisor in the organization culture?\*



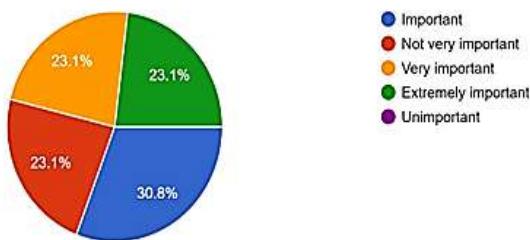
23.1% of the respondents are very satisfied with this organization culture 61.5 % of the respondents are satisfied with this culture 7.7 % of the respondents are dissatisfied with this and lastly 7.7% of the respondents are neutral with this analysis of this table.

As organization has a timeline for succession both for organization need for individual readiness?\*



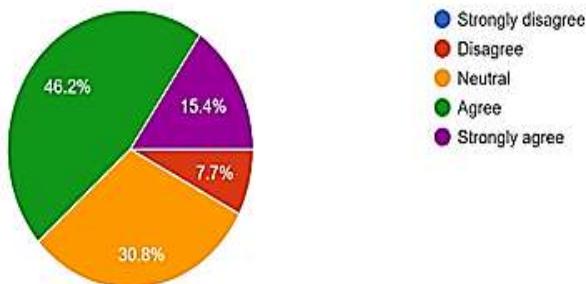
15.4% of the respondents are agree to this organization effective of this individual readiness to this organization timeline succession 15.4% of the respondents are strongly agree to this individual readiness 7.7% of the respondents are disagree to this organization and 61.5% of the respondents are neutral to this organization of this analysis of this table.

Identify replacement needs as means of organization culture necessary for training employee education and employee development



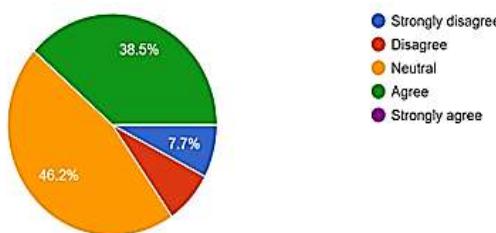
30.8% of the respondents are important for the organization culture necessary for training employee education 23.1% of the respondents says it is extremely important for the educating employee development 23.1% of the respondents says it is very important to educate the employee development for the training necessary for it and remaining 23.1% of the respondents are it is not very important for them.

Succession planning is very important for better survival of the any organization?\*



46.2% of the respondents are agree for the succession planning is very important for any organization 15.4% of the respondents are says that they are strongly agree to this fact of the organization 7.7% of the respondent feels that they are disagree to this and remaining 300.8% of the respondents are feels that neutral for this succession planning in organization in this analysis.

Organization culture influences the implementation of succession planning in an organization have taken this approach to examine organization culture...or in the implementation of succession planning?\*



38.5% of the respondents feels that it was agree to the organization culture influence the implementation of succession planning 7.7% of the respondents says that strongly disagree to this implementation 7.6 % of the respondents says that disagree to this implementation of this organization and remaining 46.2% of the respondents feels that it was neutral to this organization implementation of succession planning in this table.

#### 4. Findings

The study revealed that most of the practiced mentoring and coaching. The findings suggest that organizational culture was an important contextual factor in the implementation of succession planning. However, the culture of this organization presents itself as adverse to the publicity associated with the implementation of succession planning. Although there may be considerable pressure for consistency in HR practices related to promotion and succession, the organizational culture appears to prohibit the formalization of one.

The current formal succession process can perhaps only be useful in terms of serving as a concerns assessment tool. Perhaps long-lasting change will result in the struggle for HR control of the entire process. Succession planning as an organizational practice remains as the bridge between the organization past and its inherent future. In theory it was to be utilized to encourage the behaviour change which supports the organization's intended strategy of ensuring a successor capable of meeting the demands of a larger, less traditional, more diversified. The significant change in successors would be one mechanism to effect organizational culture change however the process and its outcome must be supported by peers and those in middle management for it to be long-lasting and successful. It is therefore unlikely that the imposed formal corporate approach to succession planning will in its current state achieve these results.

## 5. Suggestions

- This research supports theory development in that organizational culture has been found to be a significant contextual factor in not only the implementation of succession planning but in its definition, purpose, timing and communication.
- This study tapped into the process of succession planning from an emic perspective utilizing the language and explanation of its use by those participants critical to the process the middle and upper management of the organization.
- Although these participants experienced difficulty in defining succession planning, they were intimately familiar with the process which has been in place and relatively unchanged.
- This research contributes to the following way: First this study overwhelmingly confirms the influence of the organization culture in the creation and perception of the organizational culture.
- Secondly the support of the importance of organizational culture as a necessary context with which to study succession planning.
- Third the study suggests that organizational trust is a key determinant in the retention of talent necessary for the perception of an internal succession planning process.
- Fourth the study suggest that the need for psychological ownership plays a role in the implementation and evaluation of a succession planning process.

## 6. Conclusion

Succession planning is perhaps one of the hottest topics today as a result of ethical issues, compensation, development and implementation. Organizations faced with fast-paced change can no longer afford long lengthy internal development of the apparent. However the organizations who seek faster external executive hires have found it as organizational culture often trumps talent and experience. The organization's capacity for learning is the key to long-term success as recent research points to those who do internal succession well with little disruption and ready change depend on the ability to execute plans. In this study increasing questions about the value of Human Resources and furthermore, Human Resource Development, there has never been a better time to prove a strategic worth.

Many organizations are replacing Human Resource executives with legal professionals or those with legal backgrounds as a safety net to preclude

unethical and illegal behaviour in an effort to treat the symptom rather than the root cause. Cultural alignment of organizational processes development the succession planning ensures an effect on the root cause in that it serves as a contingency between values, beliefs and organizational results. This is where Human Resource Development practitioners should spend their most effort. This study has proven that traditional practices of large organizations which are seen as institutions in this study finding themselves challenged and more demanding workforce. The key to an organization's survival lies in its ability to retain, groom and development talent which can strategically and ethically lead the organization successfully into the future.

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# Chapter - 7

## A Study on an Integration of Green Marketing within Automobile Industry of Bangalore Urban District

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### **Abstract**

In the present scenario, challenge is to keep the customers as well as consumers in fold and even keep our natural environment safe—which is the biggest need of the time. Companies may lose many loyal and profitable customers and consumers due to absence of green management. In India the greater part of the organizations is wandering into green advertising as a result of the accompanying reasons. In India, around 25% of the customer's lean toward ecological well-disposed items, and around 28% might be thought of as sound cognizant. Along these lines, green advertisers have assorted and genuinely sizeable portions to cater to. Many organizations have begun understanding that they should act in a climate cordial style and accept both in accomplishing natural targets as well as benefit related goals. Different guidelines as of late outlined by the public authority to safeguard purchasers and the general public at large led to the adoption of Green marketing as a compulsion rather than a choice. For example, the ban of plastic bags in many parts of the country, and forbiddance of smoking in open regions, and so forth various regulations recently framed by the government to protect consumers and the society at large led to the adoption of Green marketing as a compulsion rather than a choice. Many organizations take up green advertising to keep up with their strategic advantage.

**Keywords:** Green Marketing, Automobile industry, Bangalore

### **Introducción**

Green marketing and its measures towards protecting environment from the hazards and the study covers its theoretical background of the concept and then moving forward we will come to observe and notice important changes

that are taking place in the market in the recent past. Green marketing has become one of the important operational strategies of the corporate through which they want to attract market and they want to increase their market share. Green marketing plays a vital role in increasing goodwill of the company hence it reflects on the profits of the same. Green marketing is now has become an important segment in every company's operations where they focus more on satisfying customer needs, demands and wants. Now a days even a normal customer is thinking of protecting the environment from the hazards and even normal customers are also contributing towards protecting now it has become an important segment where they will start identifying the areas especially in which they can focus and implement measures towards green marketing and its techniques. Green marketing now it has become an important segment where they will start identifying the areas especially in which they can focus and implement measures towards green marketing and its techniques.

## **Literature Review**

### **About Green Marketing**

The essential place of this study is to contextualize sensibility and require its idea in firms' organization, to be explicit through green advancing and green brand. Though the possibility of achievable progression appeared during the 1970s, actually has it been joined by firms. Improvement, to be viable, requirements to satisfy the necessities of current ages, without compromising the limit of individuals in the future to satisfy theirs. This requires a harmony in regulating social, monetary and natural focuses, both current and future. Given the rising confirmation of environmental issues, the regard for the necessity for reasonability has been stretching out, at the individual and at the corporate level. Naturally reliable firms secure various benefits, for instance, cost decline (due to the lower resource use, similar to water or energy), and benefit increase (from reusing and residuals reuse), creation process improvement (given the cleaner and more useful progressions), corporate picture redesigning, improvement of brand care and worth as well as execution. Oppositely, firms connected with non-reasonable exercises are hindered in those areas. In the degree of a green system, a green brand gains properties and benefits associated with the lessening of the brand's environmental impact. Likewise, it should propel the impression of an earth sound brand and disclose such benefits to the more earth careful buyers. We present the occasion of Toyota, a brand with patent and perceived attempts in what regards viability. It is a general reference of corporate commitment and of a powerful use of green publicizing. The brand's test to show up at critical

regular goals until 2050, displays its liability additionally, attempt in different dire pieces of reasonability the chiefs. As such, Toyota is experiencing the same thing as a "overall green brand".

For meeting hardships in the present globalized world, affiliations have endeavoured to green their stock chains to meet with troubles like energy protection and pollution decrease. 'Rehearsing natural mindfulness' has presently transformed into a requirement for relationship to conciliate buyers' biological concerns as well as to grow benefits. The guideline inspiration driving this paper is to present the Green Supply Chain Management practices in the significantly ferocious Automobile Industry. The paper fundamentally deals with the practices Automobile associations follow concerning GSCM, for instance Green Design and Green Operations, and the checks that they face as for its execution. This greening of supply fastens means to counterbalance advancing execution with environmental issues.

Clearly, there are various outlines to be sorted out some way to avoid green advancing myopia (see the carton on this page)- the shortened type of this is that convincing green exhibiting requires applying incredible imperfection keying principles to make green things charming for clients. The request that leftover parts, regardless, is, what is green advancing's future? Taking everything into account, green advancing has been a misjudged concept. Business specialists have considered it to be a "outskirts" topic, taking into account that environmental ism's affirmation of limits and conservation doesn't function admirably with publicizing standard maxims of "give clients what they need" and "sell whatever amount of you can." all things being equal, green exhibiting myopia has provoked lacking things and client reluctance. Practicality, in any case, will undoubtedly overpower twenty-first century exchange. Rising energy costs.

"Viability" doesn't have a settled upon single definition. There are a huge number definition for viability. According to Ehrenfeld (2008), reasonability is the opportunity of the human and other life will flourish with the earth forever". USA public normal game plan act (1969) portrayed sensibility as: "Create and stay aware of conditions under which [humans] and nature can exist in valuable friendliness, and fulfil the social, monetary and various necessities of present and future times of Americans." Sustainable improvement as per the "Report of the World Commission on Climate and Development (United Nations, 1987)" can be viewed to act as an illustration of resource utilize that means to resolve human issues while shielding the environment so these prerequisites can be met not simply in the present, yet at the equivalent in the interminable future. Achievable headway is the sort of

progress which centres around reasonable usage and down to earth money related advancement and endeavours to shield the environment. Legitimacy is involved on three viewpoints: the environment, the economy, and the general public. In this way the field of sensible headway can be mindfully broken into three constituent parts: biological sensibility, money related practicality and socio-political acceptability. Because of challenges of an unnatural weather conditions change, nations and people nowadays have record-breaking high concern for environmental security and one more association of business has emerged as Green Business. The organizations who ensure that they are environment friendly and have stress for society are known as green undertakings, their publicizing hypothesis is named as green advancing and their present situation cheerful things are called as green things. In like manner acknowledged by the associations expecting they will offer green things it will give them a high ground over their adversaries as people nowadays have a positive attitude for green things. They acknowledge that green advancing can be an advantageous endeavour for sustainable turn of events. Numerous assessments on these topics have been acted in advanced countries, but there actually is a need to perform such examinations concerning rural countries. This investigation is an undertaking by the makers to get the disposition of Industries in India towards green advancing. Could it be said that they are stressed over the biological affirmation as the endeavours in made countries are? Do they in like manner feel that by practicing green perspective they will procure advantage and will ensure common sense development? Preceding social event, the fundamental data from endeavours, experts did an exhaustive composing review and considering this they set four hypotheses, which were attempted by using parametric tests (one-way ANOVA). Key disclosures of the survey reflect that Industries nowadays have high concern for normal protection and have profoundly felt feeling that green advancing can be used as a gadget for procuring genuine and reasonable turn of events.

This study hopes to propose a dynamic arrangement of effects model to focus on three trailblazers of green faithfulness: green trust, green satisfaction and green for the most part picture, and to check out at the associations between these variables. At this point, biological issues attract the thought of scholastics and specialists all over the planet. In the amiability business, this interest is considerably more noticeable because of the huge measures of water and energy finished by housing associations and because of the regular degradation that this industry can cause with unmanaged advancement and improvement. Along these lines, a couple of makers have proposed merging the green relentless create as a key variable in the movement business theory and practice.

## **Analysis of Green Marketing Trend in Passenger Car Segment of Indian Automobile Industry**

With the rising number of arrangements in all of the segments during latest two or three years, the automobile business of India has risen up out of the overall slump with a solid obligation. The voyager vehicle (PC) industry of India has been reliably becoming on both local and exchange front by becoming greener. There are a couple of hard crushing elements that lead the auto business of India into green. In this paper an undertaking has been made to get the components obligated for the adjustment of components of the Indian vehicle industry.

This audit intends to assess the effect of accomplices on green advancing strategy (GMS). Displaying composing sees that accomplices accept a basic part in influencing affiliations and markets, yet has not assigned a lone facilitated method for managing examine the association between accomplice the board and GMS.

The auto region is rapidly extending its part of the general business worldwide lately. It is an after effect of various business procedures through vehicle creator like more focus on little vehicles and eco-friendly vehicles having a low market esteem that are centred around to get the most outrageous market. Regardless, due to growing part of the general business of the vehicle region there are a couple of natural issues are similarly arising like non-renewable energy source result, an overall temperature modification, etc. Experiencing the same thing, vehicle makers are going up against twofold strain one, to save the environment and another is to stay aware of the introduction of the firm over the long haul. The introduction of the firm can be chosen in view of money related, useful and promoting limit of the firm. This paper encourages an approach towards the gathering of the green drives at the firm, and besides endeavours to collect an association between the introduction of the firm and practical improvement through the gathering of green drives. The paper would look at changed green drives for instance, green displaying, green creation network the board, green progression, thus forward which firms are embracing. The survey would focus in on current real factors and chances of green drives for the advancement of the firm as well as sensible development.

In this work we focused in on summarizing the norms of green advancing and the thoughts associated with it. The mark of this responsibility was to exhibit the association between the execution of green promoting guidelines and sensible genuine association position accessible. To show the association

between the execution of green publicizing principles and the genuine market position of associations, we used an alternate backslide method to reveal the relationship, despite various variables. This was gone before by a part assessment that helped us with picking the key components of effect. To meet this goal, we have drawn from the outlines coordinated by PwC (Bratislava, Slovakia), the Automobile Industry Association and the Slovak Automobile Institute to perceive key components and future expected improvement in the vehicle business supplier segment and our advancing exploration drove from December 2015 to February 2016. Considering the delayed consequences of publicizing outlines, research responses and the examination of open resources, we contemplated that there is no extensive green displaying execution model associating natural buyer direct with an association with the association's advancing methodology. The responsibility could help the Automotive Industry Union to acquaint necessities with the public power and help with making inspirations for the elective vehicle market, and our revelations could be joined into the creation of associations' strategy.

## **Research Gap**

The vehicles are capable of 10% of the CO2 delivered in the air. For sure, the depletes address 80% of the aggregate sum of contamination made by a vehicle (FEBIAC, 2019). So here I needed to concentrate on Advantages in the wake of carrying out the green idea and the client mindfulness toward green showcasing.

## **Research Methodology**

### **Statement of the Problem**

The vehicles are equipped for 10% of the CO2 conveyed in the climate. Undoubtedly, the in capacitates address 80% of the total amount of tainting made by a vehicle (FEBIAC, 2019). So here I expected to focus on Advantages ensuing to completing the green thought and the client care toward green exhibiting.

### **Objectives of the Study**

- To study the awareness about green marketing concept among people.
- To study the perception of people towards green concept
- To study the Automobile companies which has implemented green concept
- To study the impact of green Cars on Company Sales

## Sampling Design and Data Collection

- **Research Design:** Explorative & Descriptive
- **Sample Size:** 45 customers and Car Manufacturing Companies like Renault, Toyota, Motors, Mahindra Reva
- **Sampling Method:** Probability Sampling
- **Data Collection Through:** Interviews, Questionnaires

## Limitations of the Study

- This study will be carried out in Bangalore Urban District
- Samples collected for the study are fewer in number
- May get biased information
- Time constraint

## Data Analysis and Interpretation

Data analysis is considered to be important step and heart of the research in the research work. Data analysis & interpretation is a process of applying statistical practices to organize, represent, describe, evaluate & interpret the data. In this chapter, the data collected through questionnaire has been tabulated and analyzed with tools of analysis like percentage. The analyzed data has been presented in the form of graphs & charts. The data has been interpreted on the basis of analysis. In research, personnel characteristics of respondents have very significant role to play in expressing & giving the responses about the problem, keeping this in mind, in this analysis a set of personal characteristics namely age, gender, education, occupation, income etc of 180 respondents have been examined & presented in this chapter of the research project entitled. The number of male are 28 (62.2%) and Female are 17 (37.8%). With regard to the age majority of the respondents belong to the age of 21-25 (64.44%). Coming with the income of the respondents most of the respondents are earning (33.33%) 3 lakhs per annum.

**Table 1:** People Ever Heard Of Green Marketing Table

<b>Ever Heard of Green Marketing</b>	<b>No of Respondents</b>	<b>Percentage (%)</b>
Yes	30	66.7 %
No	09	20 %
Maybe	06	13.3 %
Total	45	100%

From the above Table 1, it can be analysed that 67% i.e. 30 people out of 45 response are aware of green marketing and are also adapting to use the

green vehicles. And 13% i.e. 06 people are not sure of green marketing and about 20% i.e. 09 people are not aware of green marketing.

**Table 2:** Responses to What Makes Green Marketing

What makes Green Marketing	No of Respondents	Percentage (%)
Protecting Environment From Hazards	11	24.4 %
Making more usage of environmental friendly products	26	57.8 %
Reduction of Air pollution	08	17.8%
Total	45	100%

From the above table we can observe that 11 people i.e. 24.4 % responded that what makes green marketing is protecting environment from Hazards. 26 people that is 57.8 % the majority knows that green marketing helps in making more usage of environmental friendly products and save the nature.

08 responded that is 17.8 % it reduces the air pollution. Hence we can observe that promoting green marketing in automobiles sectors helps in the saving of the nature.

**Table 3:** Responses for Techniques of Green Marketing

Techniques of Green Marketing	No of Respondents	Percentage (%)
Promoting electric vehicles	08	17.8%
Promotion of trees	12	26.7%
Avoiding usage of plastics	03	6.7%
Making less Air Pollution by using nature friendly Production methods	22	48.9%
Total	45	100%

Promoting electric vehicles 08 of 45 responded that is 17.8%, Promotion of trees 12 of 45 responded that is 26.7%, Making less Air Pollution by using nature friendly Production methods 22 of 45 responded that is 48.9%, and Avoiding usage of plastics 03 of 45 responded that is 6.7%. Majority is Making less Air Pollution by using nature friendly Production methods 22 of 45 responded that is 48.9%.

**Table 4:** Responses For Is Automobile Industry Contributing Positively To Green Marketing.

For Is Automobile Industry Contributing Positively To Green Marketing	No of Respondents	Percentage (%)
Strongly disagree	07	15.6%
Disagree	10	22.2%
Neutral	14	31.1%
Agree	11	24.4%

Strongly agree	03	6.7%
Total	45	100%

From the above table we can observe that 07 of 45 that is 15.6% responded as strongly disagree for is automobile industry contributing positively to green marketing,10 of 45 that is 22.2% responded as disagree for is automobile industry contributing positively to green marketing,14 of 45 that is 31.1% responded as Agree for is automobile industry contributing positively to green marketing,11 of 45 that is 24.4% responded as strongly agree for is automobile industry contributing positively to green marketing.

**Table 5:** Responses for Air Pollution and Green Marketing Do They Influence.

Air Pollution and Green Marketing do They Influence.	No of Respondents	Percentage (%)
Yes	27	60 %
No	08	17.8 %
Maybe	10	22.2 %
Total	45	100%

From the above table we can observe that how much the Green marketing influence in Air pollution.

From the above table we can observe that 27 of 45 that is 60 % responded as Yes, 08 of 45 that is 17.8 % responded as No, 10 of 45 that is 22.2 % responded as Maybe.

## Findings and Suggestions

### I) Company Name: Mahindra Reva

1. Plans and activity to execute green Car: The actual Company is known for Green vehicle (Electric vehicle). To fabricate eco well-disposed climate was the primary reason for making the green vehicle. They utilized the innovation which can support to construct a green vehicle.
2. Sales Performance after execution: The Company at the underlying stage began selling the electric vehicle which is called as green vehicle was not all that compelling however as of late it is improving, individuals have begun tolerating these sorts of vehicles.

### II) Company Name: Renault

1. Plans and activity to carry out green Car: They fostered the idea of the existence cycle the executives through which plan, creation, appropriation, administration life, reusing should be possible.

2. Sales Performance before implementation: Sales performance was good as Renault duster car selling speedily.
3. Sales Performance after implementation: Renault Twingo the green car got award named as 'car of future'

### **III) Company Name: Tata Motors**

1. Plans & action to Implement green Car: Develop a kind of Hybrid car so that the fuel emission could be avoided
2. Sales Performance after implementation They just entered into this concept; the green car will be launched within the end of October 2014

### **IV) Company Name: Volkswagen India**

1. Plans & action to Implement green Car: Company has already launched 3 green cars namely Polo, Pass at, Golf. Now they are studying possibility to use a fuel from biogas called sun fuel with this 90% emission could be avoided
2. Sales Performance before implementation: All cars are in demand & performing well also
3. Sales Performance after implementation: After implementation of this technology they got good response & company got the award named as 'World car of the year' in the year 2010

### **V) Company Name: Toyota**

1. Plans & action to implement green Car: Developing model based on fuel efficiency, emission noise, disposal recovery rate, synthetic organic compounds.
2. Sales Performance before implementation: Cars were at demand
3. Sales Performance after implementation: The Company got 'Best green car' award since from 2009-2013 for Toyota Prius.

### **Suggestions and Implications**

- Organizations ought to begin to direct unique showcasing efforts, for example, cultural government assistance programs, so the mindfulness will be made among individuals.
- Organizations need to begin showing more T.V promotion about the green items, which makes mindfulness, as well as instruct individuals about the advantages and significance of green items.
- The respondents feel that the green items are a trick by the

organizations to create gains, so the organizations need to invest amounts of energy to instructing the clients by giving appropriate contributions to news channels and through media.

- The organizations ought to direct preparation programs for teaching and spurring the representatives for taking on green idea.
- Organizations ought to lean toward other Medias like Facebook, twitter, WhatsApp, LinkedIn to make mindfulness as these web-based entertainments are exceptionally compelling with direct reach.
- The organizations ought to work together with government to make the green advertising idea more powerful.
- Organizations need to guarantee that green items are accessible at the cost of typical items.

## Conclusion

The point of this review, by examining the effect of ecological mindfulness, green item insight among individuals. The consequence of our review shows that individuals are presently ready to pay something else for climate well-disposed item against ecological contamination that compromises our reality along with creating innovation and industrialization.

As we can see the second greatest wellspring of CO2 discharges is the vehicle area is all the more explicitly the car area which is mindful of 10% of the aggregate sum of CO2 outflows on the planet. Up to this point, it has been truly essential to initially have a superior thought of how the promoting could manage and work on the climate. Also it was critical to view and investigations the way of behaving of the car area since it was one of the most poison and was without a doubt profoundly worried by the ecological issues. As a matter of first importance, obviously these days the auto area is truly worried about the climate. The interests in innovative work are tremendous and the vehicles business has truly perceived that the admiration of the climate by their item is actually a key to get the purchasers.

The six organizations emphatically showed worry towards the climate and have done a great deal of endeavours in arranging the system and the transformation of techniques and cycles, to act in a greater climate amicable way. The presentation in worry of the maintainable improvement seems like a test for the brands and not as an imperative any longer. It additionally turned into a need to remain in the opposition. Apparently the rush to the completely climate agreeable vehicle has been sent off.

Taking everything into account we can see that the climate has turned into

a major concern and that the organizations have a more concerned outlook on this peculiarity. It is certitude that this peculiarity is still new right now yet will be a key from here on out. To be sure, the entire society takes care about the climate to safeguard the planet and an organization without natural inclusion will become particular or will likely battle to get by.

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# Chapter - 8

## Field Emersion Report on Clevernist

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**Gagana V**

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### Abstract

Clevnerist is an e-learning stage for youngsters that spotlights on establishing a total learning climate. Benefit from an intelligent showing strategy, individualized guidance, and tweaked meeting profundity and speed in light of your educational program. Innovation has changed our lives in this advanced time.

Clevnerist Organization is a web based coaching class for youngsters concentrating on in grades Nursery-eighth. Clevnerist plan to give comprehensive opportunities for growth to kids through fascinating, intuitive, and age-proper learning models.

Clevnerist directs live meetings their spotlight isn't just on the scholarly development of kids yet additionally on teaching key delicate abilities in them, for example, decisive reasoning, critical thinking from there, the sky is the limit., Clevnerist likewise offer a preliminary classes.

Clevnerist is established in 2015, it's settled in Bangalore, Karnataka, Head of Clevnerist is "Naveen" and Prime supporter is Subrahmanyam VV more than 500-1000 representatives working in Clevnerist association. Clevnerist predominantly centers on the age gathering of (3-12). Their courses are made so that they help kids in building serious areas of strength for an of specialized and delicate abilities right since early on. Till now there are 2.5 lakh clients have been signed up for this stage.

Their intuitive learning meetings have been intended to impart the delight of advancing in sorts from their primary years.

While leading the Field Submersion on Clevnerist association, I just

comprehended what they do, what they center around and why individuals are a lot of keen on this web based educating stage.

It is essentially an internet mentoring class. I likewise did a (SWOT) Strength, Shortcoming, Opportunity and Dangers of the association. Also, I got to find out about the organization's design and their turn of events.

Primary thing I gained from this Clevernist association is the manner by which they draw in individuals to sign up for their web based showing classes, and I'm a piece of this association, am working in that association step by step am likewise working on my abilities, here in Clevernist I'm ready to learn different culture of this association and I have worked on a great deal.

## **Introduction**

Clevvernist is an e-learning platform for children that focuses on creating a complete learning environment. Benefit from an interactive teaching methodology, individualized instruction, and customized session depth and pace based on your curriculum. Technology has transformed our lives in this digital era.

Schools and children around the world are responding to the rapid changes that are occurring. As a responsible educational institution, we are keeping up with the changing learning trends. As a result, we believe in the process of acquiring knowledge, skills, values, morals, beliefs, and habits in the privacy of your own home.

Instyn is concerned with more than just the students' grades; it also wants to help them develop completely. With a focus on thoroughly understanding and grasping each concept. Apart from the content presented, we are confident that our students will not require any more tuition or assistance.



**Fig 1:** Logo of the company

- **Type:** EduTech Company
- **Industry:** EduTech
- **Service Founded:** 2015 (Bengaluru)
- **Headquarters:** HSR Layout, Bengaluru

## Top Management

1. **Naveen:** Head of Clevernist
2. **Subrahmanyam VV:** Co-founder of Clevernist
3. **Ashmita Saha:** Content Head
4. **Vanayak Bansal:** Digital marketing Lead

**Services:** Interactive Online Tuitions.

**Auditor:** Price Waterhouse & Co Chartered Accountants LLP

**Website:** <https://clevernist.com>

## Background and Inception of Clevernist

With the goal of providing something exciting, fun, and engaging for kids of all ages to break up the monotony of conventional online classes (3-12). In the year 2015, we launched 'Clevnerist,' an EduTech platform.

We firmly think that providing students with a comprehensive learning environment is critical in bringing out their best qualities.

As a result, our courses are designed to aid children in developing a strong foundation of technical and soft abilities from a young age!

## Nature of Clevernist

Clevnerist is an e-learning platform dedicated to provide children with a complete learning environment. Benefit from an interactive teaching methodology, personalized tutoring, and sessions that are customized to your curriculum's depth and pace.

## Growth Potential of Clevernist

### 2015-2021

- 2 Lac Customers enrollment
- Animated Class, Activity Based Learning kits
- Online School new startup
- Next 2/3 years: 2 – 3 lac customer for both the Instyn and Clevernist enrollment for each

## Promoters of Clevernist

### a) Verzeo EduTech Private Limited

Verzeo Edutech Private Limited was incorporated on 15 January 2018 and is 4 years and 1 month old. Bangalore, Karnataka, India is the company's registered office.

The company is active, and it has submitted all of its annual returns and financial statements up until March 31, 2020. (FY 2019-2020). According to the MCA, it is a company limited by shares with an authorized capital of Rs. 0.10 crore and a paid-up capital of Rs. 0.01 crore.

The organization is run by three directors. As directors, Mridula Bhupendra Chhetri, Subrahmanyam Venkata Vungarala, and Ramya Sai Vungarala are now involved.

CIN/LLPIN/FCRN	U80900KA2018PTC109509
Company Legal Name	Verzeo Edutech Private Limited
ROC Code	RoC-Bangalore
Company No.	109509
Company Category	Company limited by Shares
Company Sub Category	Non-govt company
Company Class	Private
Authorised Capital	₹ 0.10 cr
Paid up Capital	₹ 0.01 cr
Incorporation Date	15 Jan 2018
Date of AGM	31 Dec 2020
Date of Balance Sheet	31 Mar 2020
Listing Status	Unlisted
Industry	Education
Company Size	Unreported

### b) Sequoia Capital (Virtual Company)

Sequoia Capital is a venture capital firm based in the United States. The firm is based in Menlo Park, California, and primarily serves the technology sector<sup>[2]</sup>. In 2019, it was the most successful venture capital firm.

In addition to the United States, Sequoia manages investment funds focused on India and Southeast Asia, Israel, and China. Menlo Park, Singapore, Bengaluru, Mumbai, New Delhi, Hong Kong, Shanghai, Beijing, London, and Tel Aviv are among the firm's locations.

## Competitor Analysis

- I) **Byjus:** It does not follow a curriculum and does not provide tutoring services.
- II) **Vedantu:** This is a curriculum-based program, however they do not have a limited batch size; we have a 1:10 ratio.
- III) **Extra Marks:** They only offer animated and recorded video classes, not live classes, which are available elsewhere.

## Market Share

There is currently no market share because it is a startup company.

## Vision, Mission and Value of Clevernist

Our aim is to prepare students not only for examinations but for life!

We aim at blending the best of Western and Indian teaching scenarios to give your child an exceptional schooling experience.

## Collaboration

We collaborate by working together, proactively sharing information, ideas and solutions.

## Drive

We are driven with high focus and energy to constantly delight customers.

## Honesty

We are honest, transparent to all stakeholders and deliver what we promise.

## Achievements/Awards of Clevernist

Till now the company has achieved 2.5 lac customers.

## Objectives and Functions of Clevernist

Kids are energy-filled enthusiastic learners. We aim to nurture these curious minds throughout their foundational years of learning. With our fun, interactive online tuitions, we bring out the best versions of your child.

## Experienced Tutors

Your kids will learn from a team of qualified and experienced tutors who are well-versed in teaching children aged 3 - 12 years old.

## Personalized Attention

Learning with like-minded peers is more engaging than studying alone.

Our Live sessions consist of small batches so that each student gets the personalised attention they deserve.

## Learn Anywhere, Anytime!

Enjoy the bonus of being an active part of your kid's education. Watch them learn from the comfort of your home and avoid the hustle-bustle of travelling.

## Weekly Reports

We believe as parents you play an active role in your child's academics! Hence, we will send you weekly reports of your child's performance so that you can monitor their progress too!

## Area of Operation – Global/National/Regional

All over India in online platform.



## Future Growth and Prospect of Clevernist

It is important to stay current with changing trends and technologies in order to perform at our best. As a result, we strive to provide a holistic learning experience for your children that includes important soft skills!

- English
- Maths
- Problem Solving
- Language

- Writing
- Science
- Critical Thinking
- Social Science

## **Sales Manager**

1. Work closely with the Sales and Marketing team in assisting the growth of the business by acquiring new business leads.
2. Pitch and promote CLEVERNIST services to prospective client
3. Career counseling of prospective students and understanding their learning objectives to offer relevant products to them.
4. Build sales leads through referrals and cold calling to generate sales (monthly target/revenue oriented)
5. Collaborate with the Sales and Marketing team to plan and oversee new marketing initiatives
6. Set up meetings to prepare and deliver pitches to prospective clients
7. Follow up with potential clients
8. Work with team members to identify and manage risks

SWOT analysis (strengths, weaknesses, opportunities, and threats) is a framework for assessing a company's competitive position and developing strategic plans. Internal and external elements, as well as existing and future possibilities, are all evaluated in a SWOT analysis.

A SWOT analysis is a tool for taking a realistic, fact-based, data-driven look at an organization's, initiatives, or industry's strengths and weaknesses. The organization must maintain the accuracy of the study by avoiding preconceived notions or grey zones and instead focused on real-world scenarios. It should be used as a recommendation rather than a prescription by businesses.

## **Strengths**

- Experienced Tutors
- Personalized Attention
- Learn Anytime Anywhere (Flexible Learning)
- Limited Batches
- Low cost enrollment

## Weaknesses

- Limitation in Funds
- Limitation in marketing and Promotion

## Opportunities

- Emerging markets
- Regional language
- CBSE affiliated school
- Growing digitalization
- Aspirations of middle class

## Threats

- Limited business model
- Data Privacy
- Competitive pressure

## Financial Analysis with Ratio Analysis/Kpi

### Eduinstyn Learning Private Limited Balance sheet

Particulars	Feb-22	Jan-22
Equity and liabilities shareholder`s funds		
Equity share capital	650,000	650,000
Total Share Capital	650,000	650,000
Reserves and surplus	-5,751,299	-3,271,457
Total Reserves And Surplus	-5,751,299	-3,271,457
Total Shareholders Funds	-5,101,299	-2,621,457
Current Liabilities		
Short term borrowings	7,991,266	4,660,046
Total Current Liabilities	7,991,266	4,660,046
Total Capital And Liabilities	2,889,967	2,038,589
Assets		
Non-Current Assets		
Tangible assets	55,000	50,000
other assets		
Fixed Assets	55,000	50,000
non-current investments	395,000	-
long term loans and advances	-	-
other non-current	-	-

Total Non-Current Assets	450,000	50,000
Current Assets		
Inventories	364,594	383,189
cash and cash equivalents	1,676,122	1,340,612
short term loans and advances	129,251	64,788
other current assets	270,000	200,000
Toptal Current Assets	2,439,967	1,988,589
Total Assets	2,889,967	2,038,589

### Statement of Profit and Loss account

Particulars	Feb-22	Jan-22
Income		
Revenue From Operation (Gross)	1,340,727	1,018,226
less: excise/sevice tax/other levies		
Revenue From Operations[NET]	1,340,727	1,018,226
other income	-	13,000
Total Revenue	1,340,727	1,031,226
Expenses		
Cost of materials consumed	104,364	97,794
Operating and direct expenses	986,106	749,275
Changes in inventories of FG,WIP and stock-in-trade	-18,595	-94,704
Employee benefit expenses	2,694,181	3,496,589
Finance costs	54,513	53,729
Depreciation and amortisation expenses		
Other expenses		
Total Expenses	3,820,569	4,302,683
Profit/(Loss)	-2,479,842	-3,271,457

### Ratio Analysis of Eduinstyn Learning Private Limited

Financial Ratios	Feb-22	Jan-22
<b>Per Share Ratios</b>		
Basic EPS(Rs.)	-38.15	-50.33
Diluted EPS(Rs.)	-38.15	-50.33
revenue from operations/share(Rs.)	20.63	15.67
PBDIT/share (Rs.)	-38.15	-50.33
PBIT/Share (Rs.)	-38.15	-50.33
PBT/ share (Rs.)	-38.15	-50.33
Net profit/ share (Rs.)	-38.15	-50.33
<b>Profitability Ratios</b>		

Net Profit Margin	-1.85	-3.17
Return on Net worth/ Equity	0.49	1.25
Return on capital employed	-3.82	-5.03
Return on assets	-0.86	-1.60
Asset Turnover Ratio	1.84	0.99
<b>Liquidity Ratios</b>		
Current Ratio	0.31	0.43
Quick Ratio	0.26	0.34
Inventory Turnover Ratio(X)	0.23	0.02

## Summary

Clevernist is an e-learning platform for children that focuses on creating a complete learning environment. Benefit from an interactive teaching methodology, individualized instruction, and customized session depth and pace based on your curriculum. Technology has transformed our lives in this digital era.

Clevernist Company is an online tutoring class for kids studying in grades Nursery-8th. Clevernist aim to provide holistic learning experiences for kids through interesting, interactive, and age-appropriate learning models.

Clevernist conducts live sessions their focus is not only on the academic growth of children but also on inculcating key soft skills in them such as critical thinking, problem-solving and more., Clevernist also offer a trial classes.

Clevernist is founded in 2015, it's headquartered in Bangalore, Karnataka, Head of Clevernist is "Naveen" and Co-founder is Subrahmanyam VV over 500- 1000 employees working in Clevernist organization. Clevernist mainly focuses on the age group of (3-12). Their courses are created in such a way that they assist kids in building a strong foundation of technical and soft skills right from a young age. Till now there are 2.5 lakh customers have been enrolled in this platform.

Their interactive learning sessions have been designed to instil the joy of learning in kids from their foundational years.

## Learning Experience

While conducting the Field Immersion on Clevernist organization, I just understood what they do, what they focus on and why the people are very much interested in this online teaching platform.

It is basically an online tutoring class. I also did a (SWOT) Strength,

Weakness, Opportunity & Threats of the organization. And I got to learn about the company's structure and their development.

Main thing I learned from this Clevernist organization is how they attract the people to enroll in their online teaching classes, and I am a part of this organization, am working in that organization day-by-day am also improving my skills, here in Clevernist I am able to learn different culture of this organization and I have improved a lot.

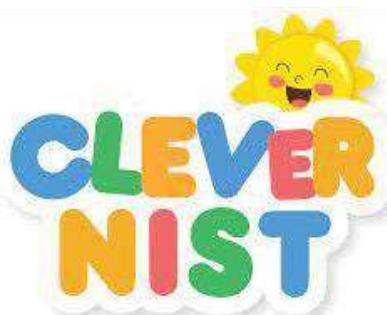
## **Conclusion**

By doing a field Immersion on Clevernist organization was effective in meeting the stated goals. And as an employee in that organization I have learned many things. It also enhanced my knowledge about the various duties and operations.

SWOT analysis helped to understand Clevernist a lot. The study has contributed to a better knowledge of how essential business activities are carried out in a firm and how data is used for decision making at different levels.

Financial performance analysis of the company helped to understand the various resources of fund, income, expense and where the organization is standing.

Project confirmed the significance and importance of the Early Childhood Education and Care, which will promote roma inclusion, Equip parents both with the Knowledge and Skills required to advocate successfully for their children's early childhood care and education in the four above mentioned localities; improve cooperation between the Roma community and other institution focusing on forma education; as well as improve awareness of roma parents amongst roma parents, particularly roma fathers, of their role as the first educators of their children in the home and community environment.



# Chapter - 9

## A Study on Present Market Position and Its Impact on Market Growth with Special Reference to MRF Private Ltd.

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### Abstract

The MRF TYRES is the one of the well-known Organization among the People. It serves the customers with a good service quality standards. MRF Tyre a prominent player in the industry. It is a great opportunity and experience and for me to carry on the corporate learning and exposure at MRF for the fulfillment of masters of business Administration course. The summer was intended to have an exposure of the working environment and the study on service quality standards and its impact on competitors at MRF.

A study on present market position and it's impact on market growth at MRF Tyres I have covered all the 5 chapters which include introduction, Conceptual background and literature Review, Research Design, Analysis and Interpretation and Findings, Conclusion and suggestions. The study was conducted in MRF with help of data which was collected by MRF TYRES organization, Employees, website, journals, and other different website etc. official data was collected from <https://www.MRFTyres.com>. This study was conducted mainly on Academic ground and will be considered as a successful effort if some findings and recommendations are approved to be useful to the Organization.

### Introduction

The Indian tire industry began in 1922 with the opening of a retail store by the American Firestone Tire and Company, and in 1926 by the Dunlop Rubber Company. The last 10 years. Economic growth, investment and road development all contribute to the growth of the tire industry. The main consumer of household rubber products tire industry. The tire industry is dominated by regulated sectors related to bicycle tires. The key players in the

managed sector MRF, Apollo Tires, Court and JK Industries account for 63% of the managed tire market.

## Manufacturing Process

Traditionally, tire factories have been divided into five categories. They usually work as independent factories inside a factory. Large tire manufacturers may have independent factories on one site, or they may have factories concentrated throughout the area.

Phase	Period	Characteristics	Policy Regime
Phase I	1920-35	No domestic production. Demand met through imports. Key players included Dunlop (U.K), Firestone & Goodyear (USA)	Liberal imports
Phase II	1936-60	Domestic production begins by erstwhile trading companies: Dunlop, Firestone, Goodyear and India Tire & Rubber Company	Imposition of tariff & non-tariff barriers on imports
Phase III	1961-74	Indian companies-MRF, Premier & In check- enter manufacturing sector with foreign technology; licensing of additional production capacity	Regulation on capacity expansion and repatriation of profits of foreign companies; enforcement of export obligation on MNC; protection from external competition
Phase IV	1975-91	Entry of large Indian business houses like Singhania & Modi & technical collaborations with MNCs, introduction of radial tires, vertical integration and exponential growth in tire production & exports	DE licensing of production, placing of imports under OGL with tariff & non-tariff barriers
Phase V	1992 onwards	External trade liberalization & reduction in import duty; re-entry of MNCs either independently or in collaboration with Indian capital	Progressive reduction in import duty; liberalized imports

Source: Mohanakumar & Tharian (2001)

MRF caters the need of all types of vehicle in India. It is pioneer in the field of major racing car tires. The company manufacture tires for trucks, bus, light commercial vehicalpassenger cars, off the road tires, two wheelers and farm services tires. Since 1984, MRF tires have always been the OEM of choice for almost all major Indian car manufacturers.

MRF has been recognized by leading advertising and marketing magazine Adam as one of India's most respected marketing companies through its top 10 corporate group votes by Far East Economic Review magazine and numerous business community awards. 1 Customer Satisfactions Award from JD Power Asia Pacific, India's Most Ethical Company, Business World and Leading Business Magazine in 2001 and 2002.

MRF has a dealer network of 2,500 dealers across the country.

## **Facts**

- In 1961, Madras Rubber Factor Pvt. Ltd. was reorganized as a public company.
- Maine Ohio USA provided additional funding to start manufacturing car tires and inner tubes in conjunction with Mansfield Tires and Rubber, Mansfield Tires and Rubber.
- Mansfield is licensed to export Mansfield branded tires to all global brands except the United States and Canada.
- Customs is known as the "Star Exporter" which allows it to reap the benefits in many areas related to customs.
- MRF became the first tire company in India to cross Rs 10 billion in 1993.
- 1995 The company received this year's Best Export Award from the All India Rubber in Distribution Association in 1995 and since then the award has been received on a regular basis.

## **Company Performance**

Our annual sales increased by approximately 8.9% from 13,450 million in 2012-13 to 14,641 million in 2013-14. Income before amortization (EBIDTA) was 1,994 billion, up from 1.769 billion in the previous year. Profit before tax for the year ended September 30, 2014 was \$ 1.339 billion, including depreciation and interest, which was \$ 122.7 billion in the prior year. After deducting tax credits, net income this year was 8.98 billion yen, up from 8.02 billion yen the previous year.

## **Tyres Infrastructure Facility at MRF Tyres**

The plant, by the production capacities and by size is the biggest plant for MRF set up in India. The plant has been developed on a 300 acre plot.

### **Future Growth and Prospects**

- According to research by Credit Analysis and Survey Limited (CARE), the Indian tire industry will post a healthy 9-10% growth over the next five years.
- Truck and bus tires are expected to show a combined annual growth rate (CAGA) of 8%, while the light commercial vehicle (LCV) segment is expected to show about 14%. CAGR will show.
- However, in making these estimates, you should also consider the effects of the global recession in this area.
- The sector is closely linked to the company's growth plans. Government-assisted road infrastructure development and procurement of automotive parts for global original equipment manufacturers (OEMs).
- Some obstacles to achieving these planned growth rates are fluctuations in commodity prices, rising rupee and the risk of cheap imports from China.
- Indian tire companies need to actively open new markets as the existing bus and truck tire market, which accounts for about 45% of total exports, is getting richer.
- There is also a need to increase the intensity level to protect our share in the export market.
- Therefore, Indian technology companies need to adopt development strategies that place constant emphasis on technological innovation and product differentiation.

### **Review of Literature**

1. According to Kim (2021), positioning decisions determine the direction of the company's overall marketing strategy, and an effective marketing mix allows the company to create clear market positioning. May be developed for the first time.
2. According to Mondy, C. (2021), over the past decade, Market penetration has received a lot of attention and has evolved into a very influential paradigm for marketing management.

3. According to Mallik (2014), in his article "Market Operations and Business Administration: Towards Structure," the existing academic and practical literature on positioning offers a variety of approaches, models and methods. The management problem is not a lack of options, but rather choosing the right overall choice. Approach to defining brand positioning and choosing the "right tool" for the positioning process.
4. Leotta (2010) "Problems and Challenges in Service Positioning" The impact of positioning strategy on the performance of a service company. Desired profit, return on investment, and market share are associated with these positioning strategies, but "not as sales and favorable 'consumer awareness'."

## **Research Methodology**

Research methodology is refers to the system used to gather information and data for business decision – making purpose, it include the publication analysis, interviews, survey and other research methods, and may include current and past research information.

## **Data Analysis**

### **Following Data Tools Used for the Study**

1. Primarydata
2. Secondary data

#### **1. Primary Data**

The proposed questionnaire collects data from vehicle owners.

#### **2. Second Data**

Data collected from merchant, newspaper and newspaper records.

## **Statement of the Problem**

This study is aimed to analyze market positioning at MRF and its impact on market growth. A market position is a long term plan. To achieve certain objectives a market positioning is therefore a marketing objective. What are the reasons for MRF for having a good marketing value in tire manufacturing industry.

## **Scope on Study**

The study helps to understanding the market position of MRF which gives whole idea about the company and their activities related to marketing and growth of the company.

This study helps to the detailed study of present market position of MRF.

Competitors, product, price of the product, quality of the product, and quality checking standards

1. To study about MRF infrastructure.
2. This study helps to the analysis of the market position
3. To analyze the competitive position of the market which help to market to take corrective

## **Actions**

### **Objectives of the Study**

- To identify market growth and developments of MRF
- To study the effectiveness of present market position of MRF
- Identify factors influencing market position
- To suggest suitable measures to improve the MRF market growth

### **Sampling Design**

Convenient random sampling will be used for the research to collect the data from 100 respondents.

To conduct a survey to identify ideas for conducting, do a survey with a different set of questions. During the investigation, I will prepare a questionnaire. We are ready to study the questionnaire with 20 questions. My questionnaire consisted of open and closing questions. But most of the time I've tried to ask a closed multiple choice question. Again, respondents were asked to measure certain options to a certain extent. We also asked some open questions for better understanding. This helped them to understand better. Primary data is been collected from 80 users and non-users of electric vehicle through questionnaire method and the result thus obtained is being analyses by using statistical tools such as mean, median, standard deviation, and correlation

### **Secondary Data was collected from**

- a) Industry profile
- b) Journals
- c) Internet
- d) Literature reviews
- e) Books

## **Data Analysis**

The data is also represented in the form of bar graphs, pie chart, and an analysis is being done to find the satisfied and unsatisfied consumers. This method of analysis will give a deep understanding about the success of MRF in India.

## **Findings of the Study**

- The findings show that there is more male number of respondents. From this we can analyze there is more male employees are working at MRF Private limited.
- The maximum number of employees is graduates and remaining is post graduate, pre university & minimum category of education in the organization. So, in organization employees who are graduate qualified are more than the remaining PG.
- The maximum number of employees is from 20-29 years' age group employees who are working in the organization and it also means more young talent is there who are working for the organization.
- The majority of employees are single in the organization.
- The maximum number of respondents is disagreed. By this we can understand that the company market growth increasing the motivation towards employees
- The company looks for more experienced employees at the time of hiring the candidates in the organization because experienced employees can give them good result in the organization than the non-experienced one.
- The maximum number of respondents is agreed. By this we can understand the employees agreed that pricing policies and cost will influence market position of MRF.
- The maximum number of respondents is agreed. By this we can understand that the market growth increasing the motivation towards productivity in MRF.
- The maximum number of employees fined that focusing on the customer needs and wants will improve the MRF market growth
- The maximum number of respondents is strongly agreed. By this we can understand that the customer satisfaction may impact on development of market growth of MRF
- The maximum number of respondents is agreed. By this we can

understand that the companies have strong internal training and development programmers for developing market growth.

- The maximum numbers of respondents are strongly agreed. By this we can understand that the customer satisfaction may impact on development of market growth of MRF
- The maximum numbers of respondents are agreed. By this we can understand that the company
- The maximum number of responded as yes. By this we can understand that the market growth of MRF Company is ethical and transparent.
- The maximum number of responded as Brand. By this we can understand that the brand is the specific factor should company assess in a market position.
- The maximum number of responded are strongly agreed. By this we can understand that the company is able to give better quality service to improve the market growth of MRF.
- The maximum number of employees has said to analyzing the profitability of company, it's important to audit market position, even when sales are up.
- The maximum number of responded are strongly agreed. By this we can understand that the employees strongly agree that market positioning is very effective and going high in MRF.
- The maximum number of respondents is strongly agreed. By this we can understand that the customer satisfaction may impact on development of MRF.

## **Suggestions**

- Only few of females working in MRF. So the MRF tyres companies should attract females by increasing salary.
- MRF tires are expensive compared to other brands, so we recommend that you take the necessary steps to reduce the price.
- The MRF should make more easy process for candidates to apply for the job in the company.
- Establishing mentoring programs for the employees
- We recommend that you post more ads to increase customer awareness and increase sales.

## Conclusion

This study attempts to find out the effectiveness of market position and its impact on market growth with reference to MRF. Based on the survey results, I concluded that the tire company MRF is in a good position. It meets the needs and goals of the client, but the problem lies in the service that the showroom provides to the client. So, according to my opinion survey based on the project, it can be said that MRF tires should think about services in order to occupy the largest segment of the market. I think a lot of people want MRF tires over other companies' tires. I will. The company offers more advertising and has consistently supported market growth by ranking high in MRF.

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# Chapter - 10

## Champion of Online Food Delivery in Urban India: A case Study on Zomato

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### **Abstract**

Zomato has grown tremendously from its inception using different digital marketing techniques. Over the past years, the brand has itself built as a top leading food delivery, restaurant reviewing, restaurant discovering and dining out transactions platform which gives complete information about more than 1.5 million restaurants in 24 countries. The marketing strategies of Zomato has also affected the consumer behavior and also have affected the competitor brands growth. The study briefs how the brand has tackled challenges like retaining customers and building a loyal customer base. Zomato gained a competitive edge through extensive data-driven market research.

Zomato uses content marketing and cater to the needs of the targeted segment of customers. Zomato highly invest on search engine marketing and search engine optimization to increase the search traffic Zomato continuously seek for trending, interesting and customer engaging contents to share on their social media platforms to earn better rankings in search engine result page. Zomato digital marketing strategies has helped the brand to stand-out in the market. Zomato has positioned itself as a best restaurant discovery tool in the minds of customers through email and content marketing.

### **Introduction**

Zomato is an Indian multinational restaurant aggregator and food delivery company which provides information, menus and user-reviews of restaurants as well as food delivery options from partner restaurants in selected cities. The brand basically targets two types of customers, first group consists of people who wants to buy their food to home and the second group consists of people

who want to dine out. Zomato manages its two types of customers by satisfying both the groups equally, on one side the brand offers most affordable delivery options and also, on the other side the brand carefully crafts.

Zomato gold program to engage customers who wanted to dine out. The success of Zomato marketing strategy is effective communications. Zomato always stays updated on the current trend in the market and make use of it. It also draws competitive comparisons about lifestyle, restaurants, food and experiences to grab the user's attention. The brand involves in various customer engagement programs to engage customers and provide personalized customer services. The brand analyses its business analytics to improve its business exposure and make favorable changes in its strategies to satisfy customer requirements. Zomato understands every criticism in right sense and praise its customers to make them feel special, which is a unique brand strategy to follow.

According to the statistics in 2021, 66.41% of directed traffic is created from the searches and 31.36% searches are from referrals, social media marketing or other paid marketing campaigns. Zomato follows mixed marketing strategies and utilizes all digital media platforms to the fullest. It also depends completely on search engine optimization to generate organic search. Its website has more than 54 million interlinked pages which plays crucial role in getting the highest ranks on user search results. Over the years Zomato has built an efficient STP (segmentation-targeting-positioning) to formulate and channelize its marketing strategies efficiently.

One of the most successful game-plan of the brand in digital marketing strategies, is promoting the right content at right time. The marketing strategies of Zomato has also affected the consumer behavior and also have affected the competitor brands growth. The brand has tackled challenges like retaining customers and building a loyal customer base by increasing its presence in all social media platform. Email marketing campaigns of Zomato has played a vital role in increasing the loyal customer base during the covid-19 pandemic period. Zomato creates a strong brand image through their social media platforms to become the most top-rated food delivery app. Zomato also hosts social awareness campaigns and contribute funds to underprivileged people in the society. This way the brand establishes a strong social media presence and creates more organic traffic.

One of the successful digital marketing strategies was promoting food and culture through Zomato zomaland festival. Zomaland festival catered the

interest of Zomato targeted audience with good food along with dance, music and stand-up comedies. Zomato always stays updated on the current trend in the market and make use of it. It also draws competitive comparisons about lifestyle, restaurants, food and experiences to grab the user's attention. Zomato gained competitive advantage over its competitors by its unique digital marketing strategies. Zomato major competitors in India are Swiggy and Just Dial. The competitors in international market include Dineout, Yelp, Gruhub, Doordash. Zomato also acquires its weak competitors to gain more market share

## **Review of Literature**

Habib (2022) in his article Titled “Zomato Digital Marketing Strategy” discusses how Zomato does its deep marketing research and formulates its unique social media approach. Zomato also try to engage its targeted audience by having fun conversations, sharing trendy and topical posts. Zomato also segregates the content of their posts for each social media channel. On Instagram, it shares memes or images of delectable dishes and at the same time it runs contests on Twitter. While in Facebook, it uploads blogs and YouTube videos. This strategy has really worked out well and engaged a larger group of customers during the lockdown period in India.

Gavaravarapu (2022) in the research study titled “Analyzing the effectiveness of new media techniques to build brand value: A case study of Zomato” analyses how social media techniques enhances the marketing of Zomato using primary quantitative data and questionnaire. According to the research digital media marketing techniques has both positive and negative impacts on the brand value. The positive impacts have helped the brand to earn more revenue and has created more brand value. While, the negative impacts have resulted in reduced organic traffic to the page and has also reduced the sales volumes for certain duration of period. This has resulted in revenue loss and reduced the market share.

Bhimavarapu (2021) in her study “A case study on Zomato’s Digital Marketing Strategy” explains how Zomato distinguishes its targeted customers by providing various offers and incentives. Zomato also uses its blog as a medium to share any news and updates about its latest incentive schemes. According to her study, Zomato also uses various search engine optimization techniques to create more organic traffic to its website and mobile applications. It also has blocked all other search engine optimization tools from scanning their sites. The brand has also established a strong social media presence in all platforms such as Facebook, Pinterest, Instagram, Twitter to run real-time conversations and thus create a good brand image.

## **Consumer Awareness**

According to Choi (2022) every new product in the market needs consumer awareness so as to educate the consumers about the needs, merits and demerits of the new product. Zomato has an excellent Brand Equity. Most consumers are aware of this brand and can recall the logo. It can be seen that consumers have a great degree of loyalty for Zomato.

The brand caters to the most relevant needs of the customer and fulfilled them better than its competitors. It gives ROI to the advertiser/ restaurant owner. Zomato is the leader in the segment which it serves.

Zomato is only built for food/restaurant discovery. Hence, it has a very targeted audience. Most of its users buy a meal within an hour of visiting Zomato. The brand Zomato is attractive as an advertising avenue. Majority of the users are working professionals with high disposable incomes.

Zomato has been smart enough to react swiftly to technological developments. With more and more consumers using phones to research for food, the company launched a mobile application in 2011. The app has recorded more than 3 million downloads so far.

## **Research Methodology**

The study attempts to analyze the effectiveness of digital marketing strategies used by Zomato to gain competitive advantage over its competitors. The purpose of this study is to look into numerous characteristics and elements in Zomato's digital marketing strategies. It aims to study how the brand forecasts effective digital marketing strategies to attract new customers as well engage its potential customers.

## **Objectives of the Study**

1. To analyze how the brand engages its potential customers
2. To study how the brand forecasts effective digital marketing strategies to attract new customers.
3. To study how the brand gained competitive advantage over its competitors by its unique digital marketing strategies.
4. To study the effectiveness of email marketing strategies used by Zomato.

## **Sampling Design**

The survey method is used here as the sampling technique. The method of data collection used for the survey will be structured questionnaire and

google forms. Data consists of original information gathered from sample size of 100 respondents who are either potential or loyal customers of Zomato. The population of the study are the customers of Zomato as well as its competitor brands residing in India and abroad.

The data collected will be analyzed to get the desired results. Analysis and interpretation are central steps in the research process. The aim of the analysis is to organize, classify and summarize the collected data, so that they can be better comprehended and interpreted to give answers to the questions that triggered the study.

## **Sources of Data Collection**

### **Primary Data**

The type of data that is gathered by the researchers directly from main sources of data through interviews, surveys and experiments is known as primary data. Primary data are usually collected from the source in the information collected is originally from research source and are described as the prime source of data in research. The primary sources of data have been gathered here through questionnaire-based survey by sending out google forms through social media platforms to either potential or loyal customers of Zomato.

### **Secondary Data**

Secondary sources of data have been collected from journals of past research works, articles from media, relevant websites, as well as other periodicals from libraries.

## **Data Analysis**

This chapter focuses on the analysis and interpretation of the information obtained from the data collected on the topic “Effectiveness of digital marketing for Zomato”. The data was collected from 113 potential consumers across India through a structured questionnaire which was circulated among the respondents via Google forms. The data collected were analyzed to get the desired results. The data collected will be analyzed to get the desired results. Analysis and interpretation are major steps in the research process. The aim of the analysis is to organize, classify and summarize the collected data, so that they can be comprehended and interpreted to give answers to the questions that are discussed in the study.

## **Findings of the Study**

1. Out of 113 respondents, 74.3% respondents order food from Zomato less than 10 times in a month on average basis. 17.7% respondents

order food from Zomato 11 to 20 times on a monthly average basis and 4.4% of respondents order food from Zomato 21 to 30 times on a monthly average basis. 3.5% of respondents, that is around 4 respondents usually order food from Zomato more than 31 times in a month.

2. Out of 113 respondents, 44.2 % of respondents thinks that the contents of email marketing of Zomato as attractive, while 47.8% respondents think it's as neutral which means it is either attractive or unattractive. 8% of respondents as voted the contents are unattractive and can be improvised.
3. Out of 113 respondents, 51.3% of respondents feels Instagram plays a major role in social media marketing to convert leads into sales. The rest all social media handles such as Facebook, Pinterest and twitter attract 29.2% of respondents to order food using Zomato through social media advertisements. Facebook pages of Zomato has been updated on regular basis but the respondents prefer Instagram over Facebook according to the survey.
4. The survey suggests that 73.5% thinks that digital media advertisement has improved brand value of Zomato. While 11.5% of respondents thinks that digital media has not improved the brand value. The rest 15% has neutral opinion about role of digital media advertisement in improving brand value.
5. This analysis suggest that majority of peoples likes all the contents shared in social media handles such as post, video and memes. This way Zomato is able to achieve the attention of targeted audience. The survey suggests that 69 % of respondents are interested with the post memes and video shared in the social media handles of Zomato. While, 15% have a neutral opinion about the contents shared.
6. This analysis suggest that majority of respondents that is 71.7% of respondents is able to Zomato recommendation on the top of their search list, when searched for restaurants near their locality. This shows the effectiveness of brand robust combination of search engine optimization and search engine marketing.
7. It is analyzed that digital media marketing in total influences 47.7% respondents from the sample collected regarding coupon codes. This includes marketing through brand owned social media handles, social media influencers and YouTube ads. Word of mouth gives information about coupon codes to around 25.7% respondents from the sample collected.

8. The data with which chi square test was performed suggests that the variables Frequency of buying and digital marketing are associated with each other. This means customer buying behavior of the respondents are closely integrated with digital marketing strategies of the brand.

## Suggestions

- Zomato can actively focus on its email marketing campaigns to attract more targeted audiences. The content of email marketing has wide acceptance but the company can improve on the consistency in frequency of emails.
- Zomato must work on digital media marketing influences on social media platforms such as Facebook and Pinterest to cater the audience from all age group.
- The awareness on coupon codes on all digital media platforms must be enhanced to attract larger group of loyal customers.
- The brand can also target customers in older age group using advertising proportionally in digital as well as mass media.
- Zomato can collaborate more with social media influencers through PR campaigns to attract the followers of digital media celebrities and increase the customer base.

## Conclusion

The study attempts to analyze the effectiveness of digital marketing strategies used by Zomato to gain competitive advantage over its competitors. The purpose of this study is to look into numerous characteristics and elements in Zomato's digital marketing strategies. It aims to study how the brand forecasts effective digital marketing strategies to attract new customers as well engage its potential customers. The study gives an idea about the different digital marketing strategies used by Zomato to increase as well as maintain its current customer base. The study would help us to understand how Zomato gained competitive advantage over its competitors by its unique digital marketing strategies. The study helps to analyze the variation in the usage of different social media platforms and google ad-words to improve the listing in organic search results. The study helps to compare to positive and negative impacts of digital marketing strategies on brand value of Zomato.

The study also gave a clear picture about how the digital marketing strategy of Zomato has led to the changes in consumer behavior and consumer perception. The majority of respondents from survey conducted for the study, that is 66.4% of respondents are repeated customers of Zomato and rest 33.6%

are not the loyal customers of the brand. The above table 4.5 states that out 113 respondents, 75 respondents once have ordered using Zomato prefers to order food from online only through the platform. Zomato has established a strong customer perception by carefully crafting discounts, coupon codes, promotional strategy schemes and user-friendly mobile applications. The brand ensured customer good engagement in its digital marketing strategies to encourage its sales by actively responding to customer queries and posting fresh contents in its social media platforms regularly. The brand also tries to understand the customer preferences to post trending and customer engaging contents in all its social media platforms. The increase in number of active users on digital media accounts of Zomato is constantly rising, which effectively helps the brand to convert social media success to business leads.

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# Chapter - 11

## Disruption in the Event Industry: Headway to the Challenges of Covid-19

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### 1.1 Introduction about Topic

The Covid-19 is unaccustomed to the world, many business sectors are affected globally. The pandemic has highly affected and permanently changed the event industry. In the lockdown many events are cancelled or postpone to future days, this may lead to a downfall in their growth. Event professionals all around the world are pitting their unique skills to face the challenges that arrived from the pandemic.

Coronavirus spread throughout the world, this effect on the event industry to shelter-in place's orders, a restriction against the meeting, event industry found itself unable to control. Event and meeting will be retrieved, but it won't be quite identical. Since the mass gatherings are a way to spread the diseases, thus a various mode of events has been introduced due to the pandemic that are video conferences, webinars, virtual. In future, there might be both offline and online events. The virus recovery is still not promising, the event organizer cannot be frozen. Therefore, many little meeting and events are with the minimum audience are the present growth of the event industry. In this unusual scenario, event planners have only two options: first, the health and safety of staff attendees & sponsors, second it is a need to meet the financial obligation.

The world is in the fact that HIV and covid-19 etc., Will be there in future. So we have to adapt and run business. Moreover, upcoming events are quite different, profitability is less compare to the before pandemic strike. Due to the pandemic, many event organization has been shut down, hence staff

termination is increased. Therefore the event industry is decline state. Coronavirus outbreak impacted on every business. As event business are more socialized and people-oriented.

It's difficult to manage people in this scenario, but taking measures in each and every step using covid-19 guidelines it helps to manage people on the day of events. Different kind of events may have different types of problems as an entrepreneur has to plan future demands to overcome the problem.

## **1.2 Statement of the Problem**

Due to the pandemic strike event industry is under loss. Dealing with uncertainty during this period is different from other challenges occurred in this industry. Many event organization has shut down and moved to other business and other event organization running with all the financial obligation to retain their business in future. The problems and challenges that arrived from the pandemic has led to the cancellation of many events like business conferences, private and public events, national and international events /conferences / exhibitions. The Event and Entertainment Management Association conducted a survey in recent days, 90% of their business had been cancelled in the month of March to July 2020 due to covid-19. Coronavirus outbreak made many organization to postpone their events, such as Olympics, music awards and IFFA Awards etc... Are Postponed to 2021. According to a survey done by (EEMA) in recent days, 10% of their business had been postponed to future days. Postponement of events may occur due to travel restrictions, health and safety of human resource. Thus event industry going through a tough time since the outbreak of covid-19. Over the past few months, we have seen many private events relocated from this pandemic and many of redesigned as virtual events, having a mind in health and safety of host and attendees. Moreover, travel arrangements are not possible in this scenario, many of them relocating to their convenient place with less attendee. This may cause to downfall of the event organization. Destination events are not possible thus relocation of events are in high demand from pre-booked clients. Due to covid-19 many event organization have terminated their staff because of financial obligation. Staff termination highly took place in the month of March 2020 due to outbreak of coronavirus. Moreover, many event organization had been shut down, so more number of employees under that organization were searching for jobs for their daily needs. The event industry is where high potential human resource is needed, thus this industry is in under loss so staff termination has highly occurred.

### 1.2.1 Literature Review

The literature review contains the work already done on the world of research in hand. Literature review is additionally needed for understanding the character of the research topic in details so in step with that, researcher can mould his approach for research topic. The literature review on the event industry is as follows:

**Congrex team (March 30, 2020):** If there's one subject driving the conversation among meeting and assistant and organizer today that should be disruption? During matter of weeks, the world landscape has changed enormously, and professional within the meeting industry now pressing has to make tough decision quickly. In this article authors, have clearly spoken about the event industry which is strongly suffering by the covid-19 and also to overcome from this pandemic strike. They need mentioned the management crisis and event planning, thinking of future events and also they explained virtual and hybrid events and also the benefits are:

- monetary benefits
- Increased audience
- quantifiable
- transition are ease

### They Have Given Some Information to Add For Virtual Meeting

- Anticipating the obstacles
- The way of facilitators
- Gathering feedback

**ET Brand Equity (April 21, 2020):** The report highlights the loss of business, the revenue impacted, employees affected and also the funds required within the long run to achieve stability. Recently EEMA has filed a petition appealing to the government of India to intervene with measures to support the lives of the 60 million Indian the event industry employs-directly and indirectly.

### Some of Finding of the Blog Report

- 90 percent of their business being cancelled between March-July 2020.
- 107 companies suffered from a revenue loss of up to 1CR.
- Around 97 companies will have to raise capital or debt from institution or shareholder VC funding etc.

The 170 member survey represents over a 1 lakh of companies that were stricken by this crisis and EEMA urges the government to contemplate some steps just like the immediate payout of tax refunds which have been due for ages and also the due payment from Indian governments to event companies for work done.

**Kristi Choi (June 23, 2020):** The world events industry was valued at over \$1.1B in 2018 and expected to over at \$ 2.3B in 2026. But after the pandemic those projections have clearly changed. What's visiting to happen to the event after coronavirus? Here the authors have explained how coronavirus affected the event industry & meeting industry and also they have need spoken a few survey conducted by (PCMA) on business events. 87 percent of respondents canceled their events, with 66 percent of these being postponed as a results of covid-19. The same report provides that 7 out of 10 business have switched their events to a virtual platform, and 25 percent of surveyed have a way of digital events. Here author mentioned about event industry future after coronavirus and also the new technologies &startups to assist the industry.

### **1.3 Need and Relevance of the Study**

The main purpose of the study is to understand the challenges and disruption in the event industry at the time of covid-19. To know how event industry works in future days, and also how this study helps event industry and other industry to do business worldwide.

1. The impact of covid-19 pandemic on event industry plays major role on economic growth. Event industry is growing at com
2. Pound annual growth of 15% over last 5 year it expected to 16% to next Year. Due pandemic strike economic growth are fallen.
3. To know about future event industry, event industry may change due to covid-19 the business can see the new era in the event industry like digitalization, less attendees, hybrid events etc.
4. Impacted on entrepreneurs by the covid-19, entrepreneurial business is most affected by the pandemic strike. Many startup business and retain business are closed by the lock down. This may laid to down fall in entrepreneurial business.
5. The challenges faced by the event organization and organizer during lockdown is not as same as challenges raised in time of event. Event business is one which affected by the pandemic strike.
6. Impact and influence of event industry on other sectors, event

industry is connected with other business like travel, hospitality, food, floral industry etc. it can impact on other industry if event industry go to digitalization. Due to that they can suffer loss.

7. Covid-19 outbreak had made loss at INR 3000 cr on event organization in the first two months. After two months it has adopted new guideline given by the government of Karnataka. To retain the business many small events are happening in the society.
8. Scope of event industry in India, in last 5 to 10 year there is enormous growth in the event business. This may affected in the economy growth of india.it poised to grow by at least by 25% annually
9. Study will be examining various event organization and analysis the data given by the organization in Bangalore. It helps in finding the new strategies to do event business in the society.

## **2.1 Objective of Study**

1. To Study How COVID Pandemic has affected the Event Industry.
2. To identify the new strategies in order to facilitate the Future Business activities in the Event Industry.

## **2.2 Research Methodology**

Research methodology is an actual procedures accustomed identifying selecting the process and analyze the information about the identical area. In the research paper the methodology section allows the researcher to evaluate a study's overall validity and reliability.

### **There Are Two Variety of Research Methodology**

- Quantitative Research
- Qualitative Research

## **2.3 Research Design**

This study is an exploratory research design, where no prior studies or information is accessible for reference. Basically, this can be initial stage of future in depth investigation. A general exploratory research design attempts to produce maximum information in minimum time with least possible effort and money.

We have collected the knowledge from the target population, it's called as pilot survey. There are of short duration involving a tiny low fraction of people, organization, or place from the larger target population. Thus pilot surveys, the procedures and techniques to be followed are loosely structured

and not strict and accurate enough as in quantitative techniques. Pilot study is an economic technique.

## **2.4 Tools for Data Collection**

Data staple for information is defined as group of nonrandom symbols which represents quantities action objects etc. Data items in data system are formed from the characters these could also be alphabetic numeric or special symbols Gathering information is understood as data collection. Depending upon the sources being utilized any statistical data is divided into two categories which are as follows:

- Primary Data
- Secondary Data

### **2.4.1 Primary Data**

Data has been directly collected from the employees of the Company.

#### **2.4.1.1 Tools for Primary Data Collection**

- Questionnaires
- Phone conservation
- Through E-mail
- Face to face interview

Main and more information collected through questionnaires and phone conservation due to covid-19. Filed works isn't possible during this scenario for the primary data collection.

### **2.4.2 Secondary Data**

Data has been collected through official website of event industry and also from other official website.

#### **2.4.2.1 Tools for Secondary Data Collection**

- Private sources
- Journals
- Census
- Research Article

## **2.5 Data Analysis**

It can be defined because the process of gathering modelling and reworking data so on get useful information suggestions and conclusions in

deciding the main objective of data analysis to assessment and improve of the quality of the data.

### **There are Two Aspect of Data Analysis**

- Descriptive Analysis
- Inferential Analysis

### **3. Summary of Findings**

Through the observation that the majority of 66.7% of respondents says employees are laid off by the company by covid-19 and 33.3% respondents says employee's salary has been reduced by the company to meet financial obligation raised by the covid-19 on event business in the

1. form of pay cuts reduced hours and loss of commission etc. are changed in job
2. It observed that the majority of 84% responders says 60%-100% of cancellation and postponed of events are happen due to covid-19, 12% of respondent says 20%- 40% of cancellation and postponed of events are happen & 4% of respondent says 40%-60% of cancellation and postponed of events are happen due to covid-19. After march was the pivotal month with respondents saying it was they decided to cancel and postponed. as travel and gathering bans, social- distancing requirements, heavy attendee cancellations, fear of putting employees at risk hotel pressure etc. cause for cancellation and postponed of events.
3. In the study majority 64% of respondents says 80,000- 1,00,000 of loss occurred in the events business due to covid-19, 24% of respondents says 50,000-80,000 of loss occurred & 4% and 4% respectively for 10,000-20,000 and 20,000-50,000 of loss occurred by the covid-19 in the event business because of the cancellation and postponed of events. This may raise form pandemic having in the mind of employee safety and also attendee safety
4. it can ascertained that the majority 64 of responders says in the month of January to march 50%-70% of sales are happened and 36% for 70% -100%, 96% of responders says in the month of April-May 10%-30% of sales are happened and remaining 4% for 30%-50%, in the month of June-July 96% said 10%-30% of sales happened and remaining 4% for 30%-50% and 76% of responders says in the month of august-September sales are increasing for 30%-50%, 16% of responders says sales increasing for 50%-70% and 8% of them said 10%-30% of sales happened.

#### **4. Suggestion**

1. Management should provide advertisement for company's growth and also they should use all tools for recreating the position of a company in the society.
2. Event industry should take measure to prevent spread of covid-19 in the time of hosting the events and also check host and attendees health
3. When it comes food and beverage plays major role in the event during times of social distancing. Will be difficult so that self-services buffet wont possible, they can make seating dining could be an alternative.
4. The location has to sanitized and increase the awareness for hygiene and effective social distance among the staff and attendees.
5. In the time of pandemic crises they have terminated their staff, so Event organizer should contact their employees for future events and also help them to overcome the financial obligation.
6. Coordinate with local health officials, and hotels, also venues to make sure control over everything so that in the time hosting event will not be difficult to contact them, so that event can go smoothly.

#### **5. Conclusion**

The purpose of the present research is to known how event industry retain the business and what will be the future of event business. Services sectors is playing vital role in the development of Indian economy, as event industry more revenue are collected through this business. Due to covid- 19 many services sectors are affected by the lockdown, gradually the business are moving towards the minimum profit. Nowadays many event are done through virtual platform, this made event industry to come back with the new strategies to attract the clients.

Hosting events will be difficult in the time pandemic. The component of risk is unbearable however events will not be same as before. The health and safety are given more priority in the time of event, because of the covid-19.the organizer have to host the meeting with all measures to resist the spread of the virus. The measure are to prevent the spread of virus in the time of event are:

1. Thermal scanning
2. Hand washing and sanitizing booth
3. Social distance

4. Self –serving buffet
5. Decontamination and missing booths

Where there is a will, there is away, with more reopening taking place around the world there is great pressure to see traditional events. The event industry will continue to innovate and adopt new technologies and promotes to keep everyone safe, the show must go on after all.

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# Chapter - 12

## Operation Management Practices and Operation Analytics in Schneider Electric India Pvt. Ltd: A Case study

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### Introduction

Operations management (OM) is the administration of business practices to create the highest level of efficiency possible within an organization. It is concerned with converting materials and labour into goods and services as efficiently as possible to maximize the profit of an organization. Operations-management teams attempt to balance costs with revenue to achieve the highest net operating profit possible.

Operations management involves utilizing resources from staff, materials, equipment, and technology. Operations managers acquire, develop, and deliver goods to clients based on client needs and the abilities of the company.

Operations management handles various strategic issues, including determining the size of manufacturing plants and project-management methods and implementing the structure of information-technology networks. Other operational issues include the management of inventory levels, including work-in-process levels and raw-materials acquisition, quality control, materials handling, and maintenance policies.

Operations management entails studying the use of raw materials and ensuring that minimal waste occurs. Operations managers use numerous formulas, such as the economic order quantity formula to determine when and how large an inventory order to process and how much inventory to hold on hand.

Operations management practices are internal factors that contribute to competence development; and therefore, offer competitive advantages for firms. Today's competitive global market is characterized by stringent business regulations, high operating costs, scarcity of resources, and unpredictable demand from increasingly informed customers.

This study will establish the standard operations management practices used by Schneider Electric India Pvt. Ltd. India and how these impact the organisation performance. An exploratory case study design was considered in this Case.

The study was carried at Schneider Electric India Pvt. Ltd. The study revealed that there is regular inspection of machines and facilities and the operators are responsible for their own machine cleaning, lubrication, and regular maintenance. The study revealed that; the organization has a documented quality management system in place and also that the magnitude and frequency of quality-related occurrences have reduced significantly over the past years and that statistical quality control techniques are understood and used. The study concluded that total productive maintenance, total quality management, international lean practices, just in time, six sigma, and continuous improvements are operations management practices that aid in decreasing times or new item's advancement and commercialization and also ensure flexibility of an organization in adapting to different production capacity thereby in an overall improvement in reliability and reduction of costs. The study recommended that the management of the company should set clear policies regarding work comparison; also the management should come with strong internal controls that support the selected operations management practices. The management of the company should adopt operations management practices for effectiveness and efficiency.

## **Operations Management Practices**

Operations Management Practices (OMP's) include every one of the exercises important to arrange, create and enhance the business forms required in the assembling of an item. OMPs allude to assembling forms, as well as to every one of the operations identified with co-ordination and the improvement of new items. OMP's cover various regions including light-footed and incline fabricating, six sigmas, new item advancement, ISO 9000 and ISO 14000, handling investigation and reproduction, quality capacity sending, production network administration, and measurable process control, and factual quality control.

The operations management practices applied in manufacturing firms today are internal lean practices, just-in-time, continuous improvement, total quality management, total productive maintenance, and six sigma. Many operations management rehearses thought to be powerful in enhancing operational execution are gathered in the “incline” classification.

The activities advancing hence blending with the end goal that they speak to an assortment of best operations management practices just in time (JIT) is a grading method that has concurred far-reaching appropriation in assembling organizations. It is a system whereby equipment's and parts for generation are conveyed in time from the dealer to the assembling procedure. This implies there is no holding up time while equipment or parts hold up preceding being handled. The JIT framework incorporates three components; individuals, plant and frameworks. Total productive maintenance (TPM) goes for giving the most productive utilization of hardware. The essential measure of TPM execution is general OEE.

### **Schneider Electric, India**

Schneider Electric is a worldwide pro in vitality administration and mechanization. Schneider Electric creates associated advances and answers for oversee vitality and process in ways that are sheltered, solid, effective and manageable. The Group puts resources into Research and Development so as to support advancement and separation, with a solid responsibility for reasonable improvement. From 1836 to today, Schneider Electric with a base camp in France has changed itself into a worldwide expert in vitality administration. Beginning from its foundations in the iron and steel industry, substantial apparatus, and ship building it moved into power and computerization administration. Following 180 years of history, Schneider Electrics' dynamic procurement methodology has conveyed more than 100 brands to its portfolio.

### **Schneider Electric (SE)**

<b>Type</b>	: Public company (Societas Europaea)
<b>Industry</b>	: Electrical equipment
<b>Founded</b>	: 1836; 186 years ago (as Schneider & Cie)
<b>Founders</b>	: Eugène Schneider and Adolphe Schneider
<b>Headquarters</b>	: Rueil-Malmaison, France
<b>Area served</b>	: Worldwide

**Products:** Building automation, home automation, switches and sockets, industrial safety systems, industrial control systems, electric power distribution, electrical grid automation, Smart Grid, critical power & cooling for data centres.

The company began in 1836 as Schneider & Cie. It was ultimately renamed Schneider Electric in May 1999. Schneider Electric (SE) is a French multinational company providing energy and automation digital solutions for efficiency and sustainability. It addresses homes, buildings, data centres, infrastructure and industries, by combining energy technologies, real-time automation, software and services. Schneider Electric is the parent company of Square D, APC and others. It is also a research company.

Schneider Electric is a Fortune Global 500 company, publicly traded on the Euronext Exchange, and is a component of the Euro Stoxx 50 stock market index. In 2020, Revenue €28.91 billion, Operating income was €4.33 billion, Net income was €3.27 billion, Total assets €54.54 billion, Total equity was €28.11 billion, Number of employees 166,025.

## **Sectors of Operation**

Utilities & Infrastructure, Industries & Machines Manufacturers, Non-residential Buildings, Data Centres & Networks, Residential Segments.

## **Business Activities**

Energy Management, Energy Consulting Services, EE products and solutions, Industrial, Building and Energy Automation, Electrical Switchgear and Control Gear, Green Building Solutions, Smart Buildings.

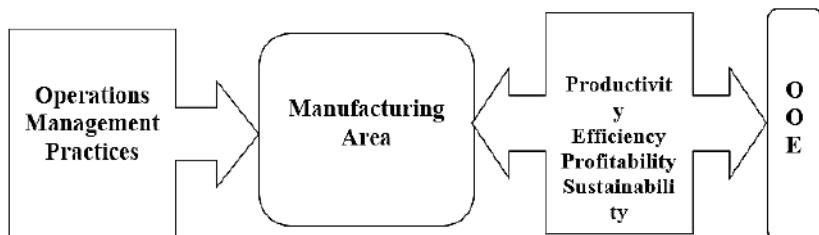
India is one of the most important markets for Schneider Electric globally and has an increasingly active presence in the country both in terms of contributing to infrastructure growth as well as strong CSR (Corporate Social Responsibility) initiatives. Despite the significant social and economic initiatives that make India a global powerhouse today, the demand and supply gap for energy is a cause for serious concern.

## **Need of the Study**

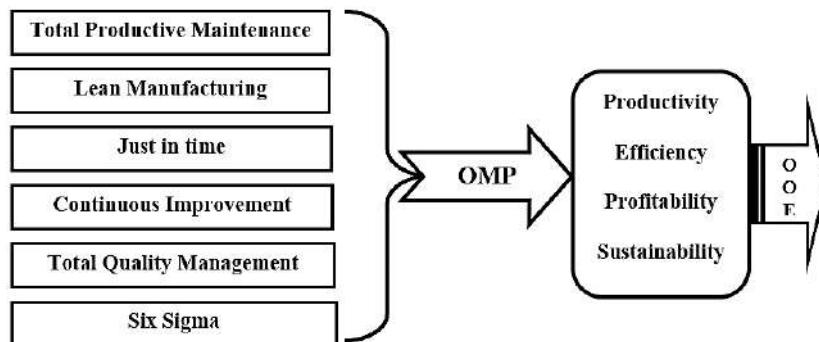
The study will be used by multinational firms as a source of information on operations management practices used by manufacturing multinational firms in India. Other manufacturing firms will also benefit by gaining more knowledge on operations management practices being used in the manufacturing sector. The study will be of value to the government as it will provide a guideline in the design of policies aimed at enhancing the manufacturing sector policy guideline for the regulation and governance of

the multinational manufacturing firms. This study identifies the different operational practices, set by the Schneider Electric India, will be a standard operational used by manufacturing multinational firms in India.

The Schneider Electric India consider the following are the standard Operation Management Practices (OMP), to achieve the Overall Organizational Efficiency (OOE).



### Operation Management Practices



### Operations Management Practices

By operations administration hones, the analyst alludes to each technique arrangement done on the shop floor and which is intended to enhance the productivity of creation and calculated procedures for modern merchandise. These incorporate general methodologies including the 'World Class Manufacturing' (WCM) method which grasps point by point apparatuses considered to streamline work environment association, proficient support et cetera. More particular practices will likewise be viewed as, for example, the aggregate quality administration as to quality administration (this practice additionally incorporates particular instruments, for example, Statistical Process Control), the aggregate beneficial support as to upkeep rehearses, the in the nick of time practice, with respect to creation operations, six sigma and consistent change.

The selection of aggregate quality administration approach appeared to be emphatically connected with change of executing generally, higher operations effectiveness and with better money related results. Additionally, TQM's outcomes are connected decidedly to an association's piece of the pie in the assembling division, as it is likewise a capable partner for the ideal abuse of monetary resources. Measurable instruments used to control the generation procedures can realize a beneficial outcome on level of quality saw by the last client (business or purchaser) and can significantly decrease creation squander – this out and out prompting better practical results.

To sum up, the primary OM practices can create upgrades in the execution of assembling organizations; beneficial outcomes are even expanded by the collaborations rising up out of the consolidated utilization of various methodologies –, for example, TQM, JIT, TPM and Six sigma streamlining. Reliably, operations administration practices ought not to concentrate on only one single strategy, but rather ought to reach the organization as an intricate framework, where collaborations between components are more critical than every single component considered as a different part of the streamlining issue.

## **Measures of Operational Performance**

Operational execution, likewise, called fabricating abilities or assembling execution measures the degree to which firms really executed as planned versus the measurements of focused needs. Execution by gauging, it accentuates or worried with quick result of production line operations and henceforth is regularly utilized just with the end goal of processing plant execution evaluation as opposed to generally, marketing execution.

This idea is regularly measured as far as various measurements in the writing frequently running from two to eight or ten measures. The different measures of assembling execution incorporate perspectives like waste lessening, working effectiveness, opportune conveyance, prevalent quality, inspired representatives and consumer loyalty. Other execution measures: minimal effort, conformance quality, quick conveyance, process duration, volume adaptability, and outline adaptability in their study.

The above audit shows that the particular measures of assembling execution shift from writing to writing, and disregarding these varieties, it is noticed that there is agreement in the writing concerning the utilization of numerous measures of this idea. With the end goal of this study, the specialist will receive the four every now and again utilized measures of assembling execution, i.e. fabricating cost, conformance quality, conveyance, and adaptability measurements.

## **Operations Management Practices and Performance**

These days most organization are working in an exceptionally aggressive and dynamic external environment, they require abilities and practices that contenders can't impersonate and/or create with a specific end goal to survive and/or keep on being focused in the market. Producing firms, specifically, need to have or create operations administration hone to adapt to the aggressive difficulties in the market and thusly make weight on their rivals. The operations administration hones, which are established or installed in the association's operations work, in such manner, can possibly give upper hand, all the more particularly assembling based operational execution to the firm. These practices are useful as an imperative apparatus for enhancing benefits, expanding piece of the overall industry, and growing new markets and consequently are the important drivers of operational execution. The fundamental wellspring of these abilities, thusly, rests in the assembling plant, and particularly in the company's operations work.

The operations capacity is, in this way, a critical business work with regards to assembling that presents beat administration the chances to create upper hand through phenomenal operational execution.

### **Empirical Study**

A considerable number of studies have been undertaken on operations management practices. Significant research has been done to understand the contributions of operations management practices to competitive advantage of organizations. The operations management practices contributed significantly to competitive advantage if the manufacturing firm adopted a cost leadership strategy. This eventually led to production of high quality products at relatively the same cost. This however did not explain the contribution of operations management practices to the other business strategies beyond cost leadership. Most multinational manufacturing firms were deepening forays into operations management practices that ensured their survival by increasing their competitiveness through efficiency and quality of service delivery. The operations strategies applied in manufacturing multinational firms for competitiveness in India and found that, strategic partnerships with suppliers, improving on customer relationship, internal lean practices and reliable quality of goods produced as priority operations strategies for competitiveness. Further there focused on manufacturing competitive priorities of multinationals in India and found them to be; Cost, Quality, Flexibility, Innovation, and Delivery. Exploratory contextual analysis outline used as a part of this study.

## Research Objectives

Main research objective was to find out the operations management practices used by multinational manufacturing firms in India and how they impact performance.

### The Specific Objectives are

- To identify the operations management practices in Schneider Electric, India.
- To determine the relationship between the operations management practices and the operational performance.

### Summary of Data analysis

Objectives	Types of Analysis
To identify the operations management practices in Schneider Electric, India.	Descriptive analysis
To determine the relationship between the operations management practices and the operational performance.	Gap and Regression analysis

### OMP Analysis

Analysis of the OMP has been carried out after collecting data with the workers in Manufacturing areas all supervisory and line workers were interviewed and relevant data collected and qualitative data analysis were carried out, following are the results of the same

#### 1. Total Productive Maintenance

There is a documented maintenance program for shop equipment
TPM is done when there is less work or when equipment breaks down
There is regular inspection of machines and facilities and the operators are responsible for their own machine cleaning, lubrication, and regular maintenance.
The organization keeps detailed TPM and work order records
The organization has standardized maintenance checklists
There are scheduled regular maintenances and inspections

#### 2. Total Quality Management

The organization has a documented quality management system in place
The magnitude and frequency of quality related occurrences has reduced significantly over the past one year
The organization welcomes and acts on end user complaints
Quality levels are determined by end user bench marks and the regulatory authorities.

Measurable quality control procedures are comprehended and utilized.
All representatives are urged to check the nature of every operation they finish before continuing to the following operation.

### 3. Internal Lean Practices

There has been a relentless pursuit to optimize production process
The organization keen on removing and / or improving inefficient activities?
The organization emphasizing improved labour productivity and operating efficiency as means of reducing cost, as opposed to sourcing low cost materials and reducing overhead costs.
There efforts in place to improve equipment performance.

### 4. Just in Time

The organization keen on improving on-time delivery.
There reduction of stocks in stores.
There is no abnormal state of Work-in-Progress things
The organization adhere to compliance with the daily production as planned?
There will be on time deliveries from suppliers
There is stability of the master production schedule

### 5. Six Sigma

There are lessening times for new item's improvement and commercialization
The organization has flexibility in adapting to different production capacity
There is overall improvement in reliability and reduction of costs
The company analyses and actively responds to customers' needs and systematically makes use of ad-hoc practices
The organization is ready to gather profitable data and to successfully interface with generation forms

### 6. Continuous improvement

The organization has a determined interest to accomplish cost lessening focuses in all assets.
The organization seeks to improve plant equipment effectiveness through technology where it's cost-effective.
The organization practices ideas of zero misfortunes in each circle of movement.
There is continuous improvement on handling of beneficiaries/end users
There is continuous improvement on handling of all activities within the organization.
There is focus on re-designing and re-examining work flow.

## **Impact of operations management practices on the performance of Schneider Electric India**

TPM has a solid positive effect on a large portion of the KPIs used to gauge producing execution

JIT generation framework emphatically influences the association's execution and specifically that of its creation through improved supply chain performance by way of quantities required and when they are required

The reception of TQM has been decidedly connected with the change of execution, with operation proficiency and better monetary results

Receiving Six Sigma enhances authoritative execution, through the effectiveness with which workers are sent furthermore through enhanced profitability

Internal lean management is an important practice for the optimal utilization of production assets.

A continuous improvement culture can encourage enhanced operational execution, especially in the zones of value and profitability.

### **Summary of Findings**

The study revealed that the following OMPs are practiced in Schneider Electric India, OMP includes; Internal Lean management, six sigma's, Continuous improvement, Total quality management, Total productive maintenance, and Just-in-time. Further, the study indicated that all these management practices were considered very important to the company.

Further, the study revealed that; a continuous improvement culture can encourage enhanced operational execution, especially in the territories of value and profitability, and also that the adoption of TQM has been decidedly connected with change of executing generally, with utmost operation proficiency and with better budgetary results. Additionally, the study revealed that the JIT creation framework decidedly influences the association's execution and specifically that of its generation through improved supply chain performance by way of quantities required.

In addition, the study revealed that embracing Six Sigma enhances authoritative execution, through the proficiency with which representatives are sent and also through improved productivity. Further, the study revealed that internal lean management is an important practice for the utilization of production assets and also that majority of the IPIs used to gauge producing execution have a solid positive effect on TPM.

Regarding the operations management practices used by Schneider Electric India, the study revealed that workers are urged to check the nature of every operation they finish before continuing to the following operation. Thus the study recommends that the management of the company should set clear policies regarding work comparison, also the management should come with strong internal controls that support the selected operations management practices.

With respect to the relationship between the operations management practices used in Schneider Electric, India and the performance of operation. The study revealed that Internal lean management is an important practice for the utilization of production assets and also that Receiving Six Sigma enhances authoritative execution, through the proficiency with which workers are conveyed furthermore through enhanced efficiency. Thus the study recommends that the management of the company should adopt the operations management practices for effectiveness and efficiency.

# Chapter - 13

## A Study on Waste Management

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### **Abstract**

Solid municipal waste collection systems often cover only a small percentage of the urban population in the developing world. Often, low-income communities live in urban areas with people living outside the garbage collection service. Lack of financial resources to manage the growing amount of waste generated by fast-growing cities is one of the key factors. Insufficient funds and insufficient funds in the central municipal budget are often unable to afford the appropriate levels of performance. In addition, the available buildings are concentrated in high-income areas with high taxes where people have greater political control, leaving the poor with little or no space in urban areas. However, the availability or availability of a waste collection point is not limited to financial problems. In definite cases, technological challenges also interfere with efficiency and greater human availability. In developing countries, the "standard" collection process, as developed and applied in developed countries, is also being used. Used cars are heavy, expensive and difficult to operate and maintain, often inadequate in developing lands. After a while, only a small portion of the fleet remains.

### **Introduction**

Solid waste refers to a type of waste that is rejected as unnecessary and unusable because of animal and human activities. In a given area, solid waste is produced from agriculture, commercial and commercial activities and can be stored in many ways. Thus, landfills are often identified as sanitation, municipal, construction and demolition sites. Waste, including plastic, newspaper, cutting glass, metal waste and animal waste, can be classified according to content. Risks, such as radioactive, flammable, contagious, toxic,

or non-toxic, may also depend on digestion. Groups can also refer to waste sources, such as production, domestic, commercial, institutional or construction and demolition processes. Regardless of the source, quality or potential of the hazard, solid waste must be managed regularly to ensure efficient environmental practices. transportation or transfer, ankle and waste recycling in a way that best suits the various aspects of public health, conservation, economics. Solutions can include complex disciplinary action, Relationships between sectors such as public health, city and regional planning, communications and conservation, census and architecture'.

### **Functional Elements of the Waste Management**

1. Waste-disposal systems that facilitate collection are used in their application and use. Garbage bins, are placed in areas that generate enough waste.
2. Waste disposal, an important waste management process, includes activities such as the disposal of garbage collection containers, garbage collection from such containers, and garbage collection at a collection point. While transportation is involved in the collection process, this is often not a major phase of waste collection.

### **Statement of the Problem**

Solid municipal waste collection systems often cover only a small percentage of the urban population in the developing world. Often, low-income communities live in urban areas with people living outside the garbage collection service. Lack of financial resources to manage the growing amount of waste generated by fast-growing cities is one of the key factors. Insufficient funds and insufficient funds in the central municipal budget are often unable to afford the appropriate levels of performance. In addition, the available buildings are concentrated in high-income areas with high taxes where people have greater political control, leaving the poor with little or no space in urban areas. However, the availability or availability of a waste collection point is not limited to financial problems. In definite cases, technological challenges also interfere with efficiency and greater human availability. In developing countries, the "standard" collection process, as developed and applied in developed countries, is also being used. Used cars are heavy, expensive and difficult to operate and maintain, often inadequate in developing lands. After a while, only a small portion of the fleet remains.

### **Need for the Study**

Some of the problems related to the current solid waste management scheme are highlighted below.

1. We fail to process waste collection and segregation on a regular basis for full reporting
2. There may be a shortage of waste disposal and treatment facilities
3. Open waste disposal near roads and open pipelines.
4. Waste disposal during the holidays and uncontrolled dumping of waste at the production facility itself.
5. Waste disposal during the holidays and uncontrolled dumping of waste at the recycling facility itself.
6. No waste management practices.

### **Limitations of the Study**

- Lack of coordination from the people of anekal municipality during the collection of data of waste management.
- Waiting time is too much to meet the officials of municipality of anekal for data collection.
- No proper response from the people of municipality about the waste management in anekal.
- Wastage of time for the meeting of individuals of anekal municipality to collect data about waste management of anekal.

### **Research Methodology**

The research method is the basic procedures or techniques used to classify, select, process, and evaluate subject information. In the research paper, the method section helps the student to properly assess the validity and reliability of the sample. Formal literature reviews of secondary information from a variety of sources that are relevant to the intended purpose are conducted as a course of study such as online research.

The research methodology involves a systematic process by which the investigator initiates from the initial diagnosis to the end of the problem. The role of how to do research in a scientific and comprehensive way. This section deals with problem statement, research plan, objectives, modeling method, study program and data collection.

### **Data Collection**

Data collection is the process of collecting and evaluating data in an existing system with targeted flexibility, which helps a person to answer relevant questions and analyze results.

## **Primary Data**

1. Visited to municipality of anekal town and taken feedback from the people of the municipality.
2. Interacted with waste collectors and taken feedback about waste management in anekal.

## **Secondary Data**

### **Secondary Data Have Classified Into Two**

1. Internal secondary data: secondary data produced within the organization conducting research is known as secondary internal data.
2. External secondary data: inside the organization, often substantial secondary data is found.

The secondary data obtained from various sources outside the corporation is referred to as external secondary data.

**Examples:** Library, reference and bibliography, private sources, etc.

### **The Secondary Data Collected Through**

1. Official websites
2. Article
3. Case study
4. Google scholarly research

## **Importance of Waste Management**

1. Waste management is important because it helps to preserve the cleanliness of the entire planet.
2. It needs to be followed because it relies on the health and safety of the whole population.
3. Inadequate hygiene can lead to major issues, so it is important to practice waste management to avoid drastic harm to the environment in the future.
4. Recycling helps you minimize the waste management that, by selling your recyclable, also allows you to earn extra cash.
5. Control of waste eliminates foul smells.
6. Waste management strengthens the internal protection and sanitation of the plan.

## **Suggestion Regarding the Study**

- The suggestion that I suggest that people start tracking waste production through waste management measures is very good and necessary in fact it is actually the start of waste minimization that will reduce the amount of waste.
- Natural waste management does not require high technology and can be done anywhere, but a waste pit needs space.
- If more people start using this strategy, the amount of waste collected will decrease significantly.
- The Municipality can make a lot of effort, especially if the municipality has enough money for these courses and if the municipality starts paying people for the disposal of waste such as metal, glass, organic matter) and simultaneous billing for waste, there will be good progress in recycling.
- Door to door collection of waste should be undertaken daily on regular basis.
- The solid and liquid waste must be separated during the collecting of waste.
- Advanced techniques and technology should be implemented in the recycling of waste.
- Waste to energy conversion plants should be set up at the waste dumping centers.
- Awareness about the benefits of waste management should be provided by the municipality to the people.
- Sufficient funds should be sanctioned in the central municipality budget for the waste management.

## **Conclusion**

The community has to pay to increase the inadequate physical resources of MSWM residents. Group participation in SWM is key to promoting a solid waste management study. Today, no such tax has been levied on SWM.

People should be informed to know the value of a source proposal when it is established as a borrowed, inaccessible and renewable content management. In order to reduce the load on ULB storage and transmission MSW, it is important to install easy-to-use composting plants, which has led to a decrease in the amount of waste placed in landfills. In big cities, low-end computer units should be set up with local wisdom. Disposable waste disposal

from each community or unit must be verified by the community contribution and disposed of in these composted distribution units.

Waste disposal at the collection and disposal site should be made public. Government must take the initiative to enable universities to manage waste in their studies. In addition, India will therefore be covered and practical solutions for waste management can be created. Selecting appropriate energy efficiency solutions in certain regions can also help. Waste should be considered as a resource, and a formal recycling sector / industry should be built to recycle recyclable materials that can be recycled from the waste, thus providing waste collectors with more work and installation. Regulation, fiscal consolidation and enforcement of quality standards for recycling and recycling of C&D waste also developed and marketed for disposal / reuse by manufacturers in accordance with the guidelines, thereby reducing the burden on landfill. It is important to prevent the development of recyclable polyethylene bags or to conduct research to produce decaying polyethylene.

In many parts of India, garbage collectors and garbage collectors are still considered inferior, although there are several laws in place to add honor to their work. To change the attitudes and opinions of citizens, information about this important service in the city should be added, and personnel involved in such activities should be named as Green Brigade / Crew, and so on. While leach eats / water / waste disposal is not permitted by the existing MSWR in India, decaying waste is then mixed during transport and eventually dumped in a landfill. Recycling activities at landfills, as is done in developing countries, should also be supported to improve waste management and gas recovery. It is important to make the safety of groundwater contamination compulsory from an open landfill / waste disposal site. Effective technical solutions must be introduced to achieve this goal.

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# Chapter - 14

## The Halting Problem: Undecidability and the Limits of Algorithmic Computation

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### Abstract

The Halting Problem is the canonical example of an undecidable problem—a decision problem for which no general algorithm can exist that always provides a correct yes-or-no answer. First proven by Alan Turing in his seminal 1936 paper, this result is a cornerstone of computability theory and has profound implications for mathematics, computer science and philosophy. This chapter provides a comprehensive examination of the Halting Problem and its consequences. We begin by introducing the Turing Machine model, which provides the formal definition of an algorithm. We then present a detailed constructive proof of the undecidability of the Halting Problem, employing a diagonalization argument that leads to a logical contradiction. The chapter explores major consequences of this result, including the undecidability of Hilbert's *Entscheidungs problem*, the existence of unprovable statements in formal systems (Gödel's Incompleteness Theorems) and the limitations of program verification. Furthermore, we survey other related undecidable problems and discuss the practical implications for software development. Finally, we consider the philosophical ramifications of Turing's proof, which fundamentally delineates the boundaries between what can and cannot be computed.

**Keywords:** Halting Problem, Undecidability, Computability Theory, Turing Machine, Algorithmic Limits

# 1. Introduction

## 1.1. The Quest for Algorithmic Solutions

For centuries, mathematicians have sought mechanical procedures—algorithms—to solve classes of problems. A pinnacle of this quest was David Hilbert’s *Entscheidungs problem* (decision problem), which asked for an algorithm that would take as input a statement in formal logic and output whether that statement is universally true or not. The belief in the early 20th century, embodied by Hilbert’s program, was that all mathematical questions were, in principle, decidable by a mechanical process.

This belief was shattered in the 1930s by a series of groundbreaking results. Kurt Gödel’s Incompleteness Theorems showed that within any sufficiently powerful formal system, there exist true statements that cannot be proven within the system. Alonzo Church, using his lambda calculus, showed that the *Entscheidungsproblem* was undecidable. Most famously, Alan Turing, working independently, arrived at the same conclusion using a simple abstract machine model of computation. At the heart of his proof was the demonstration that a specific, seemingly simple problem—the Halting Problem—was undecidable.

## 1.2. Objectives and Outline

This chapter aims to provide a deep and accessible exploration of the Halting Problem and its vast implications. Our objectives are:

- To formally define the Turing Machine model and the concept of decidability.
- To present a clear, step-by-step proof of the undecidability of the Halting Problem.
- To explore the direct consequences of this result, including its connection to Gödel’s Incompleteness Theorems and the resolution of Hilbert’s *Entscheidungs problem*.
- To catalog other important undecidable problems in mathematics and computer science.
- To discuss the practical and philosophical ramifications of

undecidability for the fields of mathematics, computer science and logic.

## 2. Foundations: Turing Machines and Decidability

### 2.1. The Turing Machine Model

To formally talk about algorithms and what they can compute, we need a precise mathematical model. Alan Turing's 1936 paper introduced what we now call the **Turing Machine (TM)**. A TM is an idealized model of computation that consists of:

- An infinite **tape** divided into cells, each containing a symbol from a finite **tape alphabet** ( $\Gamma$ ), which includes a special **blank** symbol.
- A **tape head** that can read and write symbols on the tape and move left or right one cell at a time.
- A **state register** that stores the current **state** of the machine, one of a finite set of states  $Q$ . This set includes a special **start state** ( $q_0$ ) and one or more **halting states** (e.g.,  $q_{\text{accept}}$ ,  $q_{\text{reject}}$ ).
- A **transition function**  $\delta$ , which is the "program" of the machine. It dictates the machine's behavior based on its current state and the symbol it is reading:  $\delta:Q \times \Gamma \rightarrow Q \times \Gamma \times \{L,R\}$

This means: "If in state  $q$  and reading symbol  $s$ , then enter state ' $q'$ , write symbol ' $s$ ' and move the head Left or Right."

A TM computes by starting in state  $q_0$  with the input string on the tape and the head on the leftmost symbol. It then repeatedly applies the transition function until it enters a halting state, at which point the computation ceases. The output of the computation is considered to be the contents of the tape left of the head when it halts (or simply the decision to accept or reject for decision problems).

The **Church-Turing Thesis** asserts that any function that can be computed by an algorithm (intuitively understood) can be computed by a Turing Machine. This thesis is not a mathematical theorem but a fundamental belief that underpins modern computer science.

## 2.2. Decidable and Recognizable Problems

We can now formally define what it means for a problem to be algorithmically solvable.

**Definition 2.1 (Decidable Problem).** A decision problem (a problem with a yes/no answer) is **decidable** if there exists a Turing Machine  $M$  that, for every input string  $w$ :

- $M$  eventually halts on input  $w$ .
- $M$  halts in the  $q_{\text{accept}}$  state if  $w$  is a "yes" instance of the problem.
- $M$  halts in the  $q_{\text{reject}}$  state if  $w$  is a "no" instance of the problem.

We also say such a problem is **recursive**.

**Definition 2.2 (Recognizable Problem).** A decision problem is **recognizable** (or **semi-decidable**) if there exists a Turing Machine  $M$  that, for every input string  $w$ :

- If  $w$  is a "yes" instance, then  $M$  eventually halts in the  $q_{\text{accept}}$  state.
- If  $w$  is a "no" instance, then  $M$  either halts in the  $q_{\text{reject}}$  state or runs forever.

The key difference is that a decider must always halt; a recognizer is only required to halt on "yes" instances. We also say such a problem is **recursively enumerable (RE)**.

It is clear that every decidable problem is recognizable. The Halting Problem will show that the converse is not true.

## 3. The Halting Problem and its Proof

### 3.1. Problem Statement

We can now formally define the Halting Problem.

**Definition 3.1 (The Halting Problem).** The **Halting Problem** is the decision problem defined as follows:

- **Input:** 1) A string that encodes a Turing Machine  $M$  and

2) An input string  $w$  for that machine.

- **Question:** Does  $M$  eventually halt when run on input  $w$ ?

We denote this problem as **HALT**.

This seems like a very useful problem to solve. If we could decide **HALT**, we could avoid writing programs that get stuck in infinite loops. Turing's profound result is that no such decision algorithm can exist.

### 3.2. Turing's Proof by Contradiction

The proof is a masterpiece of logical reasoning and self-reference.

**Theorem 3.1 (Turing, 1936).** *The Halting Problem is undecidable.*

**Proof.** Assume, for the sake of contradiction, that the Halting Problem is decidable. This means there exists a Turing Machine  $H$  that decides **HALT**.  $H$  takes two inputs: the encoding of a machine  $\langle M \rangle$  and an input string  $w$ . It always halts and outputs:

$$H(\langle M \rangle, w) = \begin{cases} \text{accept if } M \text{ halts on } w \\ \text{reject if } M \text{ does not halt on } w \end{cases}$$

We now construct a new Turing Machine  $D$ , which we will call the **diagonalizer**. Machine  $D$  is designed to take as input the encoding of any Turing Machine  $\langle M \rangle$  and then do the following:

- 1) Run  $H$  on the input  $(\langle M \rangle, \langle M \rangle)$ . In other words, it uses the machine's own description as its input.

Item  $H$  will always halt and give an answer because we assumed it is a decider.

- 2) Now,  $D$  does the *opposite* of what  $H$  predicts:

- If  $H$  accepts (meaning  $M$  halts on  $\langle M \rangle$ ), then  $D$  enters an infinite loop.
- If  $H$  rejects (meaning  $M$  does not halt on  $\langle M \rangle$ ), then  $D$  immediately halts and accepts.

We can describe  $D$ 's behavior succinctly:

$$D(\langle M \rangle) = \begin{cases} \text{accept if } M \text{ halts on } w \\ \text{reject if } M \text{ does not halt on } w \end{cases}$$

Now, consider what happens when we run  $D$  on its own description,  $\langle D \rangle$ . We ask: Does  $D$  halt on input  $\langle D \rangle$ ?

- **Suppose  $D$  halts on  $\langle D \rangle$ .** By the construction of  $D$ , it only halts if  $H(\langle D \rangle, \langle D \rangle)$  outputs **reject**. But by the definition of  $H$ , if it outputs **reject**, it means  $D$  does *not* halt on  $\langle D \rangle$ . This is a contradiction.
- **Suppose  $D$  does not halt on  $\langle D \rangle$ .** Then, by the definition of  $H$ ,  $H(\langle D \rangle, \langle D \rangle)$  must output **accept** (because it is a decider for the halting problem). But by the construction of  $D$ , if  $H$  outputs **accept**, then  $D$  must loop forever. This means  $D$  does not halt on  $\langle D \rangle$ , which is consistent. However, the consistency is broken by the path taken:  $H$  claimed  $D$  would halt (**accept**), but our assumption was that it does not. The contradiction arises from  $H$ 's incorrect prediction.

In both cases, we arrive at a logical contradiction. Therefore, our initial assumption must be false. There cannot exist a Turing Machine  $H$  that decides the Halting Problem. The problem is undecidable.

This proof technique is a form of **diagonalization**, similar to Cantor's proof of the uncountability of real numbers. The machine  $D$  is constructed to differ from every machine  $M$  on the input  $\langle M \rangle$ , ensuring it cannot be correctly categorized by  $H$ .

## 4. Consequences and Corollaries

The undecidability of the Halting Problem is not an isolated curiosity. It is a fundamental result that has profound and sweeping consequences.

### 4.1. Rice's Theorem

The Halting Problem is just the tip of the iceberg. Henry Rice proved a powerful generalization in 1953.

**Theorem 4.1 (Rice's Theorem).** *Every non-trivial semantic property of Turing Machines is undecidable.*

A "semantic property" is one that depends on the *function* the

machine computes (e.g., does the machine accept a palindrome?) rather than a "syntactic property" of the machine itself (e.g., does the machine have more than 5 states?). A property is "non-trivial" if it is neither true for every Turing Machine nor false for every Turing Machine.

**Corollary 4.2.** *The following problems are all undecidable:*

- **Emptiness Problem:** Does a given TM accept any strings at all? ( $L(M)=\emptyset$ ?)
- **Totality Problem:** Does a given TM halt on every input?
- **Equivalence Problem:** Do two given TMs accept the same language?
- **Accepts-Palindrome Problem:** Does a given TM accept all palindromes?

Rice's Theorem shows that virtually any interesting question about the *behavior* of a program is undecidable.

## 4.2. The Entscheidungsproblem and Gödel's Incompleteness

Turing's result provided the final nail in the coffin for Hilbert's *Entscheidungsproblem*. By reducing the problem of determining whether a TM halts to the problem of determining whether a corresponding logical formula is valid, Turing showed that no algorithm could exist for the latter. If it did, it could be used to solve the Halting Problem, which is impossible.

Furthermore, there is a deep connection between undecidability and incompleteness. Gödel's First Incompleteness Theorem states that in any consistent, sufficiently powerful formal system (like Peano Arithmetic), there are true statements that cannot be proven within the system. The proof often involves constructing a sentence that essentially means "I am not provable." This is a form of self-reference similar to the construction of machine  $D$  in the Halting Problem proof. In fact, the Halting Problem can be used to prove Gödel's results: the set of provable statements is recognizable (a TM can enumerate all possible proofs), but if it were decidable, then the Halting Problem would also be decidable.

## 5. Practical Implications and Related Undecidable Problems

### 5.1. Limitations of Program Verification

A direct practical implication of the Halting Problem and Rice's Theorem is that it is impossible to create a perfect, general-purpose program analyzer. For example, no algorithm can exist that:

- Perfectly determines if an arbitrary program has a virus (a semantic property).
- Perfectly finds all memory leaks in an arbitrary program.
- Perfectly proves correctness for an arbitrary program (this is a form of the equivalence problem: does the program compute the same function as its specification?).

This does not mean these tasks are hopeless. In practice, we build tools that work for *specific* classes of programs or that provide approximate answers (e.g., "this program might not halt" or "no bugs found"). But the undecidability results prove that these tools will always have inherent limitations; they will either sometimes fail to give an answer (**incompleteness**) or sometimes give a wrong answer (**unsoundness**).

### 5.2. Other Undecidable Problems

Undecidability is pervasive in mathematics. Some famous examples include:

- **Hilbert's Tenth Problem:** Determining whether a Diophantine equation (a polynomial equation with integer coefficients) has an integer solution. Proven undecidable by Yuri Matiyasevich in 1970, building on work by Davis, Putnam and Robinson.
- **Post Correspondence Problem (PCP):** A simple problem involving matching strings from dominoes that is often used to prove undecidability of properties of context-free grammars.
- **Wang Tiling:** Determining whether a set of tiles can tile the infinite plane without rotation.

These results show that undecidability is not a quirk of computation but a fundamental feature of mathematical systems.

## 6. Philosophical and Concluding Remarks

The proof of the Halting Problem is more than a technical result; it is a landmark in intellectual history that forced a re-evaluation of the limits of human knowledge. It formally demonstrated that there are well-defined, precise questions that lie beyond the reach of any mechanical deductive process.

This has philosophical ramifications. It suggests a fundamental limit to what can be achieved by automation and artificial intelligence. There will always be problems that require human intuition, creativity and insight—or perhaps problems that are forever beyond our grasp. It draws a boundary between the knowable and the unknowable, a boundary that is defined not by our current technology but by the very laws of logic and mathematics.

In conclusion, the Halting Problem stands as a beautiful and profound result. Its elegant, self-referential proof provides the key that unlocked our understanding of computability. It showed us that the universe of computation is vast and rich, but it has its shorelines. We can build machines of immense power, but we cannot build a machine that perfectly understands all other machines. This humble result, more than any other, defines the field of computer science and continues to inspire and challenge mathematicians, computer scientists and philosophers to this day.

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# Chapter - 15

## A Comprehensive Analysis of Perfect and Triangular Numbers

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### Abstract

This chapter presents a comprehensive study of the well-established but profound result that every even perfect number is a triangular number. We move beyond a simple proof to explore the historical genesis of this idea, its deep connections to the Euclid-Euler theorem, and its pedagogical utility in number theory instruction. The chapter includes a detailed investigation of the properties of the sum-of-divisors function, a systematic exploration of the converse proposition, and a discussion on the implications for the ongoing search for odd perfect numbers. Furthermore, we examine related classes of numbers, such as hexagonal numbers, and provide extensive computational data to illustrate the theorems. This work serves not only as a consolidation of classical knowledge but also as a resource for educators and students, highlighting the elegant unity within mathematical theory.

**Keywords:** Perfect Numbers, Triangular Numbers, Mersenne Primes, Euclid-Euler Theorem, Figurate Numbers, Sum-of-Divisors Function, Multiplicative Number Theory, Additive Number Theory, Mathematical History, Pedagogy.

### 1. Introduction and Historical Context

#### 1.1. The Allure of Perfection and Form

The pursuit of patterns in the integers is one of the oldest and most fundamental endeavors in mathematics. Among the most captivating patterns are those defining perfect numbers and figurate numbers. A perfect number, a concept steeped in numerology and mysticism since antiquity, is an integer that equals the sum of its proper divisors. Figurate numbers, such as triangular numbers, represent integers as geometric arrangements, providing a visual and additive perspective on number theory.

The observed coincidence that the first four perfect numbers (6, 28, 496,

8128) are also triangular numbers ( $6 = T_3, 28 = T_7, 496 = T_{31}, 8128 = T_{127}$ ) prompts a deeper investigation. Is this a mere curiosity, or does it point to a fundamental connection between the multiplicative structure defining perfection and the additive structure defining triangularity?

## 1.2. Objectives and Chapter Structure

This chapter aims to dissect the relationship between these two classes of numbers with thoroughness and rigor. Our objectives are:

1. To provide a complete historical background on perfect and triangular numbers.
2. To present a detailed, multi-faceted proof of the central theorem.
3. To rigorously analyze the converse proposition and its failures.
4. To explore generalizations and connections to other figurate numbers (e.g., hexagonal numbers).
5. To discuss the pedagogical value of this result in teaching number theory.
6. To examine the implications for the open problem of odd perfect numbers.

## 2. Mathematical Preliminaries

This section establishes the definitions and theorems required for our analysis.

### 2.1. Definitions

**Definition 2.1 (Perfect Number).** A positive integer  $n$  is perfect if the sum of its proper positive divisors (divisors excluding  $n$  itself) is equal to  $n$ . This is equivalent to the statement that the sum-of-all-divisors function  $\sigma(n)$  satisfies:

$$\sigma(n) = 2n.$$

**Definition 2.2 (Triangular Number).** The  $k$ -th triangular number, denoted  $T_k$ , is defined as the sum of the first  $k$  natural numbers:

$$T_k = \sum_{i=1}^k i = \frac{k(k+1)}{2}$$

The sequence begins  $T_1 = 1, T_2 = 3, T_3 = 6, T_4 = 10, T_5 = 15, T_6 = 21, T_7 = 28$ , etc.

**Definition 2.3 (Mersenne Prime).** A Mersenne number is a number of the form  $M_p = 2p - 1$  for some prime  $p$ . If  $M_p$  itself is prime, it is called a

Mersenne prime.

## 2.2. Theorems

**Theorem 2.4** (Euclid-Euler Theorem) .An even positive integer  $n$  is perfect if and only if  $n = 2^{p-1}(2p - 1)$ , where  $p$  is a prime and  $M_p = 2p - 1$  is a Mersenne prime.

**Proof.** The proof has two parts:

1. (Euclid's Sufficiency): Assume  $M_p = 2^p - 1$  is prime. The divisors of  $n = 2^{p-1}M_p$  are  $1, 2, 4, \dots, 2^{p-1}, M_p, 2M_p, 4M_p, \dots, 2^{p-1}M_p$ . The sum of these divisors is a geometric series:  $\sigma(n) = (1 + 2 + \dots + 2^{p-1})(1 + M_p) = (2^{p-1})(2^p) = 2n$ . Thus,  $n$  is perfect.
2. (Euler's Necessity): Let  $n$  be an even perfect number. Write  $n = 2^k m$  where  $m$  is odd and  $k \geq 1$ . Using the multiplicative properties of the  $\sigma$ -function and the fact that  $\sigma(n) = 2n$ , Euler showed that  $m$  must be prime and of the form  $m = 2^{k+1} - 1$ . Setting  $p = k + 1$  completes the proof.

**Theorem 2.5** (Properties of the  $\sigma$ -Function). Multiplicativity: If  $\gcd(a, b) = 1$ , then  $\sigma(ab) = \sigma(a)\sigma(b)$ .

Prime Powers: For a prime power  $p^\alpha$ ,  $\sigma(p^\alpha) = \frac{p^{\alpha+1}-1}{p-1}$ .

## 3. Main Result: The Triangular Nature of Even Perfect Numbers

We now present the central theorem of this chapter.

**Theorem 3.1.** Every even perfect number is a triangular number.

### 3.1. Direct Algebraic Proof

**Proof.** Let  $n$  be an even perfect number. By the Euclid-Euler Theorem,  $n$  can be written as:

$$n = 2^{p-1}M_p \quad (1)$$

where  $p$  is prime and  $M_p = 2^p - 1$  is a Mersenne prime. Consider the triangular number  $T_k$  for  $k = M_p$ :

$$T_{M_p} = \frac{M_p(M_p + 1)}{2} \quad (2)$$

Substituting  $M_p = 2^p - 1$  into equation (2) yields:  $T_{M_p} = \{(2^p - 1)((2^p - 1) + 1)\}/2 = \{(2^p - 1)(2^p)\}/2$

Simplifying the right-hand side:  $T_{M_p} = \{(2^p - 1)\frac{2^p}{2} = (2^p - 1)(2^{p-1})$

Comparing this result with equation (1), we see that:

$$n = 2^{p-1}(2^p - 1) = T_{M_p}.$$

Therefore, the even perfect number  $n$  is equal to the triangular number  $T_k$  where  $k = M_p = 2^p - 1$ .

**Corollary 3.2.** The even perfect number  $n = 2^{p-1}(2^p - 1)$  is the  $(2^p - 1)$ -th triangular number.

**Corollary 3.3.** Every even perfect number is congruent to 1 modulo 9 for  $p > 2$ .

### 3.2. Numerical Verification

**Table 3.1:** Even Perfect Numbers and their Triangular Indices

#	Prime (p)	Mersenne Prime ( $M_p$ )	Perfect Number (n)	Triangular Index (k)	$T_k = n?$
1	2	3	6	3	Yes
2	3	7	28	7	Yes
3	5	31	496	31	Yes
4	7	127	8128	127	Yes
5	13	8191	33550336	8191	Yes
6	17	131071	8589869056	131071	Yes
7	19	524287	137438691328	524287	Yes
8	31	2147483647	2305843008139952128	2147483647	Yes

### 4. Analysis of the Converse Proposition

A natural question arises: Is every triangular number that is of the form  $T_{M_p}$  perfect? More generally, are there perfect numbers that are triangular but not generated by a Mersenne prime index?

#### 4.1. The Restricted Converse

**Proposition 4.1.** If  $k$  is a Mersenne prime ( $k = M_p$ ), then the triangular number  $T_k$  is a perfect number.

Proof. This is essentially a restatement of Euclid's part of the theorem. If  $k = M_p = 2^p - 1$  is prime, then  $T_k = \frac{k(k+1)}{2} = \frac{(2^p-1)2^p}{2} = (2^p-1)2^{p-1}$

which, by Euclid's proof, is a perfect number.

#### 4.2. The General Converse

The more interesting question is: If a triangular number  $T_k$  is perfect, must  $k$  be a Mersenne prime?

We show the answer is no by demonstrating that the conditions are not equivalent; perfection is a far more restrictive condition.

**Example 4.2.** Let  $k = 5$ , which is prime. Then  $T_5 = 15$ . The divisors of

15 are 1, 3, 5, 15. The sum of proper divisors is  $1 + 3 + 5 = 9 \neq 15$ . Therefore,  $T_5$  is not perfect, even though its index is prime.

**Example 4.3.** Let  $p = 11$ , which is prime. Then  $M_{11} = 2^{11} - 1 = 2047$ . However,  $2047 = 23 \times 89$  is not prime. Consider the triangular number  $T_{2047}$ :  $T_{2047} = (2047 \times 20480/2) = 2047 \times 1024 = 210 \times 2047 = 2^{10} \times 23 \times 89$ .

Let us check if this is perfect. We calculate  $\sigma(n)$  using its multiplicative properties:

$$\sigma(n) = \sigma(210) \cdot \sigma(23) \cdot \sigma(89) = (2^{11} - 1) \cdot 24 \cdot 90 = 2047 \cdot 24 \cdot 90.$$

$$2n = 2 \cdot (2^{10} \cdot 23 \cdot 89) = 2^{10} \cdot 23 \cdot 89 = 2048 \cdot 23 \cdot 89.$$

Clearly,  $2047 \cdot 24 \cdot 90 \neq 2048 \cdot 23 \cdot 89$ . Therefore,  $T_{2047}$  is not perfect.

### 4.3. Conclusion of Converse Analysis

The implication is strictly one-way. The set of even perfect numbers is a proper subset of the set of triangular numbers:

$$\{\text{Even Perfect Numbers}\} \subsetneq \{\text{Triangular Numbers}\}.$$

## 5. Generalizations and Related Concepts

The connection between perfect numbers and triangular numbers is a special case of a broader interplay.

### 5.1. Perfect Numbers as Hexagonal Numbers

The  $k$ -th hexagonal number  $H_k$  is given by:  $H_k = k(2k-1)$ .

**Theorem 5.1.** Every even perfect number is a hexagonal number.

**Proof.** Let  $n = (2^p - 1)2^{p-1}$  be an even perfect number. Set  $= 2^{p-1}$ . Then:  $H_k = k(2k-1) = 2^{p-1} \cdot (2 \cdot 2^{p-1} - 1) = 2^{p-1} \cdot (2^p - 1) = n$ .

Therefore, every even perfect number is the  $2^{p-1}$ -th hexagonal number.

## 6. Pedagogical Implications

The result that every even perfect number is triangular provides a rich context for teaching several key concepts in number theory:

- The interplay between multiplicative and additive structures.
- The use of the Euclid-Euler theorem in characterizing number classes.
- The importance of counterexamples in understanding mathematical implications.
- The historical development of number theory from ancient to modern times.

This topic can serve as a capstone project in undergraduate number theory courses, illustrating the unity and elegance of mathematical theory. The study of perfect numbers offers an excellent opportunity to introduce students to the concept of mathematical proof. The Euclid-Euler theorem provides a perfect example of how ancient mathematical results can be extended and refined through modern mathematical techniques. The connection to triangular numbers demonstrates how different areas of mathematics can intersect in surprising and beautiful ways.

Furthermore, the search for perfect numbers introduces students to computational mathematics and the challenges of working with very large numbers. The ongoing search for odd perfect numbers and Mersenne primes shows students that mathematics is a living, evolving field with many open questions yet to be answered.

## 7. Implications for Odd Perfect Numbers

The existence of odd perfect numbers remains one of the oldest unsolved problems in mathematics. If an odd perfect number  $N$  exists, it must satisfy numerous rigorous conditions:

- $N > 10^{1500}$  (a lower bound that continues to increase with ongoing research)
- $N$  must have at least 101 distinct prime factors
- $N$  must have a specific form:  $N = q^\alpha p_1^{2e_1} \dots p_k^{2e_k}$  where  $q \equiv \alpha \equiv 1 \pmod{4}$
- $N \equiv 1 \pmod{12}$  or  $N \equiv 9 \pmod{36}$
- The largest prime factor must be greater than 108
- The second largest prime factor must be greater than 104

Could such an  $N$  be triangular? Suppose  $N = (k(k+1))/2$ .

Then:

$$\sigma(N) = 2N = k(k+1).$$

Given the complexity of  $\sigma(N)$  for odd  $N$  and the numerous constraints that any odd perfect number must satisfy, it seems highly unlikely that  $N$  would also be triangular. The multiplicative structure required for perfection appears fundamentally incompatible with the additive structure of triangular numbers for odd integers.

However, this question remains open and represents an interesting

direction for future research. A proof that no odd perfect number can be triangular would represent a significant step toward resolving the larger question of whether odd perfect numbers exist at all.

## 8. Historical Development and Modern Research

The study of perfect numbers dates back to ancient Greek mathematics, with the first known reference appearing in Euclid's Elements (circa300BCE). In Book IX, Proposition 36, Euclid proved that if  $2^{p-1}$  is prime, then  $2^{p-1} \cdot (2^p - 1)$  is perfect. This remarkable result stood for nearly two thousand years before Euler proved its converse in the 18<sup>th</sup> century: all even perfect numbers must have this Euclidean form.

The connection to triangular numbers was observed empirically long before it was proven formally. The Pythagoreans were particularly fascinated by triangular numbers and other figurate numbers, attributing to them mystical properties. The observation that 6, 28, 496, and 8128 are all both perfect and triangular would not have escaped their notice.

Modern research on perfect numbers continues to be active and multifaceted:

- The Great Internet Mersenne Prime Search (GIMPS) continues to search for new Mersenne primes, which generate new perfect numbers
- Researchers continue to refine the conditions that any odd perfect number must satisfy, pushing the lower bound higher and adding more constraints
- Connections to other areas of mathematics, including cryptography and computational complexity, are being explored
- The distribution of Mersenne primes and perfect numbers remains a topic of intense study, with connections to the Riemann Hypothesis and other deep results in analytic number theory
- The interplay between perfect numbers and triangular numbers represents just one example of how classical number theory continues to inspire modern mathematical research.

## 9. Computational Aspects and Algorithmic Approaches

The study of perfect numbers has been greatly enhanced by computational methods. The Lucas-Lehmer test provides an efficient algorithm for determining whether a Mersenne number is prime:

**Theorem 9.1** (Lucas-Lehmer Test) .Let  $M_p = 2^p - 1$  be a Mersenne number. Define the sequence  $s_0 = 4, s_{n+1} = s_n^2 - 2 \bmod M_p$ . Then  $M_p$  is prime if and only if  $s_{p-2} \equiv 0 \bmod M_p$ .

This test, combined with modern computing power, has enabled the discovery of increasingly large Mersenne primes. As of 2023, the largest known prime number is  $2^{82,589,933} - 1$ , which has 24,862,048 digits. This correspondingly generates the largest known perfect number.

The computational verification that each new perfect number is indeed triangular is straightforward given its Euclidean form. However, the computational challenges increase exponentially with the size of these numbers, requiring specialized algorithms and high-performance computing resources.

## 10. Conclusion and Future Research Directions

This chapter has thoroughly established that the property of being triangular is a necessary consequence of the Euclid-Euler form for even perfect numbers. We have shown that the converse is false, highlighting the special nature of perfect numbers among figurate numbers.

The research presented here suggests several promising directions for future investigation:

- **Odd Perfect Numbers:** Continue the search for odd perfect numbers or work toward a proof of their non-existence. The question of whether any odd perfect number could be triangular remains open.
- **Generalizations:** Explore connections between perfect numbers and other classes of figurate numbers, such as pentagonal numbers, hexagonal numbers, or centered polygonal numbers.
- **Distribution Questions:** Investigate the distribution of perfect numbers within the sequence of triangular numbers. While we know that all even perfect numbers are triangular, questions about their density and spacing remain interesting.
- **Pedagogical Applications:** Develop teaching materials and curricula that use the connection between perfect and triangular numbers to introduce students to deeper concepts in number theory.
- **Computational Challenges:** Improve algorithms for testing Mersenne primes and verifying properties of very large perfect numbers. The continuing growth in computing power makes

increasingly large computations feasible.

- **Historical Research:** Further investigate the historical development of these ideas, particularly how different mathematical cultures discovered and understood these relationships.

The elegant relationship between perfect numbers and triangular numbers serves as a beautiful example of the unity of mathematics, showing how multiplicative and additive structures can intersect in profound ways. This connection continues to inspire both theoretical research and practical computational work, demonstrating the enduring fascination of these ancient mathematical concepts.

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# Chapter - 16

## Cervical Spondylosis as a Lifestyle-Driven Occupational Health Disorder

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### Abstract

Cervical spondylosis, once regarded predominantly as an age-related degenerative disorder, is now increasingly recognized as a lifestyle- and occupation-related musculoskeletal condition. Rapid urbanization, prolonged desk-based work, excessive computer and smartphone use, faulty posture, physical inactivity, and poor ergonomic practices have contributed to its rising prevalence among young and middle-aged adults. Pathologically, cervical spondylosis involves progressive degenerative changes of the intervertebral discs, vertebral bodies, facet and uncovertebral joints, and supporting ligaments, leading to neck pain, stiffness, restricted mobility, and, in advanced cases, radiculopathy or myelopathy. Alongside contemporary preventive and rehabilitative measures, the Unani system of medicine offers a holistic and temperament-based approach to management. Unani management emphasizes with therapies such as *hijāmah*, *dalak*, *takmīd*, *riyāżat*, and lifestyle regulation aimed at restoring humoral balance, relieving pain, and improving function. An integrative approach focusing on prevention, ergonomics, and holistic care can significantly reduce disease burden and improve quality of life.

**Keywords:** Cervical spondylosis, neck pain, lifestyle disorder, posture and occupation, Unani medicine, cupping, hijamah.

### Cervical spondylosis

Once regarded largely as an inevitable degenerative condition of advancing age, has now emerged as a significant lifestyle- and occupation-related musculoskeletal disorder affecting individuals across a wide age spectrum. The changing patterns of modern life characterised by rapid urbanisation, prolonged desk-based work, excessive computer and smartphone use, reduced physical activity, poor ergonomic awareness, and persistent psychological stress have profoundly altered the epidemiology of

cervical spine disorders. Consequently, cervical spondylosis is increasingly encountered among young and middle-aged adults, leading to chronic neck pain, functional impairment, reduced work efficiency, and a diminished quality of life during the most productive years.

### **Pathologically**

Cervical spondylosis encompasses progressive degenerative changes involving the intervertebral discs, vertebral bodies, facet joints, uncovertebral joints, and supporting ligaments of the cervical spine. Disc desiccation, reduction in disc height, and loss of elasticity disturb normal load transmission, initiating secondary changes such as osteophyte formation, ligamentous thickening, and joint degeneration. These structural alterations may result in narrowing of neural foramina or the spinal canal, giving rise to clinical manifestations ranging from localised neck pain and stiffness to cervical radiculopathy and myelopathy. In the contemporary context, these degenerative processes are strongly influenced and accelerated by posture-related mechanical stress and occupational habits rather than ageing alone.

### **Cervical Spine, Posture, and Biomechanical Stress**

The cervical spine plays a vital biomechanical role in supporting the head while permitting a wide range of movements. In a neutral posture, the head, weighing approximately four to six kilograms, is efficiently balanced over the shoulders, allowing optimal distribution of forces across cervical vertebrae and discs. However, faulty postures, particularly forward head posture, markedly increase mechanical loading on cervical structures. With progressive neck flexion, compressive and shear forces acting on intervertebral discs and facet joints increase several-fold, leading to early disc degeneration, muscle fatigue, ligamentous strain, and osteophyte formation. Sustained poor posture disrupts the normal cervical lordosis and produces muscle imbalance, characterised by tightness of anterior cervical and upper trapezius muscles and weakness of deep cervical flexors and scapular stabilisers. Over time, this imbalance compromises spinal stability and accelerates degenerative changes.

### **Computer Use and Cervical Spondylosis**

Among the most influential contributors to posture-related cervical spondylosis is prolonged computer use. Continuous sitting with the neck flexed, shoulders rounded, and gaze directed toward a poorly positioned screen promotes persistent forward head posture. Inadequate breaks further exacerbate muscular fatigue and impair local circulation. Prolonged keyboard and mouse use leads to sustained contraction of neck and shoulder muscles,

particularly the trapezius and levator scapulae, resulting in pain, spasm, and stiffness. Poor workstation ergonomics, such as inappropriate chair height, lack of lumbar and cervical support, incorrect screen distance, and insufficient arm support, intensify cervical strain. Over months and years, these repetitive microstresses contribute to disc dehydration, disc space narrowing, and degenerative changes typical of cervical spondylosis.

### **Smartphone Use and “Text Neck”**

The widespread adoption of smartphones has introduced an additional and increasingly important postural hazard commonly referred to as “text neck.” Smartphone use often involves sustained and extreme neck flexion, frequently exceeding forty-five to sixty degrees, which substantially increases the effective load on the cervical spine. Repeated and prolonged exposure to such postures, particularly among adolescents and young adults, results in early onset neck pain, stiffness, reduced cervical mobility, and accelerated degenerative changes in cervical discs and facet joints. The cumulative microtrauma associated with habitual smartphone use has thus become a major contributor to early cervical spondylosis in the digital age.

### **Occupational Factors and Work-Related Habits**

Occupational factors further play a decisive role in the development and progression of cervical spondylosis. Office workers, software professionals, students, and call-centre employees are particularly vulnerable due to prolonged sitting, continuous screen exposure, and limited postural variation. Drivers are exposed to sustained static posture and whole-body vibration, which accelerates disc degeneration. Manual labourers and construction workers often carry heavy loads on the head or shoulders, subjecting the cervical spine to excessive axial compression. Healthcare workers, tailors, and factory workers frequently maintain awkward neck positions for prolonged periods, increasing musculoskeletal stress. Long working hours, inadequate rest intervals, and lack of ergonomic awareness compound these occupational risks, leading to cumulative cervical spine damage.

### **Daily Habits Contributing to Cervical Spondylosis**

Beyond occupational exposure, daily habits exert a substantial influence on cervical spine health. Inappropriate sleeping posture and the use of unsuitable pillows that fail to maintain cervical lordosis result in prolonged nocturnal strain. Poor posture during reading or television viewing, physical inactivity, and lack of regular exercise weaken postural muscles and reduce their capacity to support the cervical spine. Psychological stress often manifests as increased muscle tension in the neck and shoulders, aggravating

pain and stiffness. Smoking impairs disc nutrition and hastens degenerative changes, while obesity increases mechanical load on the spine and reduces overall musculoskeletal endurance.

### **Clinical Implications**

Clinically, posture- and occupation-related cervical spondylosis most commonly presents with chronic neck pain, stiffness, and restricted range of motion. As degeneration progresses, nerve root compression may produce radiating pain, numbness, paraesthesia, and weakness in the upper limbs, while spinal cord involvement may result in gait disturbances, impaired fine motor coordination, spasticity, and, in advanced cases, bladder or bowel dysfunction. If left unrecognised or inadequately managed, cervical spondylosis may lead to chronic disability, permanent neurological deficits, psychological distress, and significant work-related impairment.

Given its strong association with modifiable lifestyle and occupational factors, cervical spondylosis is largely preventable. Preventive strategies emphasise maintenance of neutral neck posture, ergonomic workstation design, and regular postural breaks during computer use, and limitation of prolonged smartphone exposure. Strengthening of deep cervical flexors and scapular stabilisers, combined with stretching of tight neck and shoulder muscles, helps restore postural balance. Regular physical activity, stress management, adequate sleep, and avoidance of smoking further protect cervical spine health.

### **Preventive and Corrective Measures**

Management of cervical spondylosis is primarily conservative and individualised, aiming to relieve symptoms, restore function, and prevent progression. It includes pharmacological measures for pain and inflammation, structured physical therapy, lifestyle modification, ergonomic correction, and patient education focused on self-care. Supportive measures such as short-term cervical collars, manual therapy, massage, yoga, and stretching exercises may provide additional benefit. Interventional procedures and surgical management are reserved for selected cases with refractory pain or progressive neurological deficits.

### **Therapeutic Management of Cervical Spondylosis in the Unani System of Medicine**

In the Unani system of medicine, the management of cervical spondylosis is primarily therapy-oriented and is guided by the principles of *Ilāj-bil-Tadbīr* (regimenal therapy), supported by pharmacotherapy and dietotherapy.

Cervical spondylosis is considered under *Amrāz-e-Mafāsil*, and therapeutic interventions are selected to evacuate morbid humours, relieve pain and inflammation, restore normal temperament, and strengthen the affected joints, muscles, and nerves.

Among the therapeutic modalities, *Hijāmah* (cupping therapy) holds a central position and has gained renewed clinical relevance in recent times. Both *Hijāmah bilā-Shart* (dry cupping) and *Hijāmah bil-Shart* (wet cupping) are employed according to the nature of humoral involvement. Dry cupping is primarily used for diversion of morbid matter, improvement of local blood circulation, and relief of muscle spasm, whereas wet cupping facilitates evacuation of morbid humours, reduces congestion, and alleviates pain and stiffness. Classical Unani texts recommend specific sites such as *Nuqra* and *Akhdā'ain* for cervical and neck-related disorders, and contemporary clinical studies have demonstrated significant improvement in pain, mobility, and functional outcomes following *hijāmah* therapy in cervical spondylosis.

**Dalak (massage therapy)** is another important therapeutic measure, performed either alone or following application of medicated oils (*Roghaniyāt*). Gentle to moderate massage helps in relieving muscle spasm, improving circulation, enhancing lymphatic drainage, and restoring the flexibility of cervical muscles. Medicated oils such as *Roghan-e-Suranjān*, *Roghan-e-Bāboona*, *Roghan-e-Zaitūn*, and *Roghan-e-Nargis* are commonly used for their analgesic, anti-inflammatory, and nervine properties.

**Takmīd** (fomentation) and **Bukhoor** (medicated steam therapy) are employed to provide warmth, relieve stiffness, and promote relaxation of cervical muscles. These therapies are particularly beneficial in conditions associated with cold temperament and dryness, as they soften tissues, improve circulation, and facilitate the resolution of morbid matter.

**Hammām** (therapeutic bath) is recommended to induce general relaxation, reduce musculoskeletal rigidity, and enhance the effects of massage and other therapies. Warm baths followed by adequate rest are considered especially useful in chronic cases with stiffness and restricted movements.

**Riyāzat** (therapeutic exercise) forms an essential adjunct to regimenal therapy. Moderate and regulated exercises are advised to strengthen cervical musculature, improve joint mobility, and prevent recurrence. Exercise is prescribed according to the patient's strength, temperament, and stage of disease, ensuring avoidance of overexertion.

**Fasd** (venesection) is selectively indicated in cases of cervical

spondylosis associated with sanguineous humour predominance. By evacuating qualitatively or quantitatively morbid blood, fasd helps reduce congestion, inflammation, and pain, particularly in acute or inflammatory presentations.

Overall, the therapeutic management of cervical spondylosis in Unani medicine emphasises non-invasive, regimen-based interventions that address both local pathology and systemic humoral imbalance. Through the judicious application of *hijāmah*, massage, fomentation, steam therapy, exercise, and other regimenal measures, Unani therapy aims to provide sustained pain relief, improve functional capacity, and prevent disease progression in a holistic and patient-centred manner.

In conclusion, cervical spondylosis has evolved from a condition predominantly associated with ageing into a modern lifestyle disorder driven by faulty posture, prolonged computer and smartphone use, occupation-related mechanical stress, and physical inactivity. The rising prevalence among younger populations underscores the urgent need for postural education, ergonomic awareness, and lifestyle modification. Early recognition and a holistic, lifestyle-oriented approach remain central to reducing morbidity, preserving functional capacity, and improving long-term quality of life in individuals affected by cervical spondylosis.

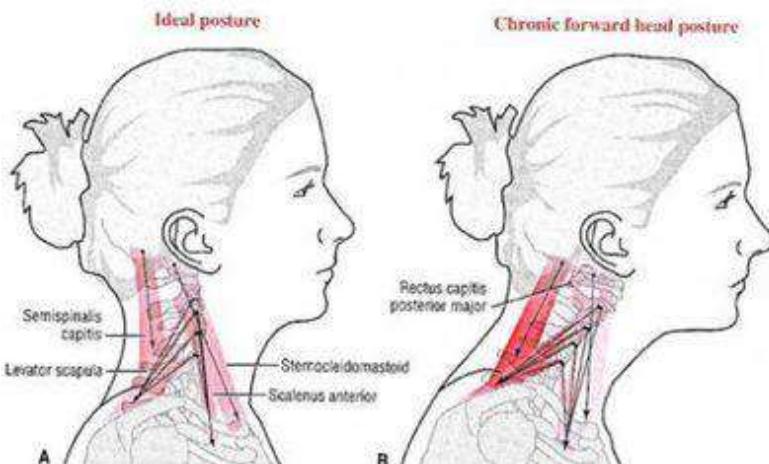


Fig. 1

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