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3.4.4 Number of books and chapters in edited volumes / books published per teacher during the last five years

Supporting Documents | **Proof of Book and Book Chapters**

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21st & 22nd February 2020

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Editors

Dr. Gunita Arun Chandhok | Dr. Sundari Suresh
Dr. D. Sowmya | Ms. Anitha Malisetty

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CHAPTER 1
PRICING STRATEGIES

Dr. Gunita Arun Chandhok
Vice Principal Sh II
Guru Nanak College (Autonomous), Chennai

Pricing Strategies

Price fixation of a product is an important aspect of export marketing strategy. Every exporter has various alternative pricing policies suitable not only to the pricing objectives but also to its overall marketing strategy.

The following are some of the important pricing strategies.

1) **Skimming pricing strategy**

   A high premium price is charged when a product is launched in the market. This strategy aims at high profit margins in the early stages of product introduction. The skimming pricing strategy can be of two types i.e. –

   a) Rapid skimming pricing –

   When high prices are charged, and the product is promoted with heavy promotional expenditure.

   b) Slow skimming pricing –

   Where high prices are charged, and there is limited promotional effort to promote the product.

2) **Penetration pricing strategy –**

   A strategy of charging law prices in the early stages of product introduction in the market is called "Penetration Pricing Strategy".

   The objective is to launch a new product at a lower price to capture as large a share of the market as possible within a short time.

This strategy can be of two types.

a) Rapid Penetration pricing strategy

Where low prices are charged, and the product is promoted with heavy promotional expenditure.

b) Slow Penetration pricing strategy

Where low price is charged, and there is limited promotional expenditure to promote the product.

3) **Probe pricing strategy:** The exporter may fix a higher price in the export market during the early stages of product introduction. This is done to find out or probe the reaction of the buyers towards the price. The prices are then adjusted accordingly. The exporter may follow this technique, especially, when sufficient information is not available in respect of competitors pricing, purchasing power of the buyers, and so on.

4) **Follow the Leader Pricing Strategy:** Under this strategy, several exporters may fix the price very close to the price charged by the leading competitor in the market.

5) **Differential Trade margins pricing strategy:** The exporter may adopt differential trade margins pricing strategy. He may allow various types of discounts or trade margins. The various discounts that can be offered includes, quantity discounts on bulk orders, seasonal discounts during off season to push up sales, cash discounts to encourage prompt payments, goodwill discounts, trade discounts etc. the price are accordingly adjusted depending upon the type of discount offered.

6) **Standard export pricing strategy:** In this case, an exporter may charge the same price in all the foreign markets, i.e. developed as well as developing countries. The pricing is based an average unit cost.

7) **Differential pricing strategy:** Under this strategy different prices are charged in different markets. There can be differential pricing between two or more overseas markets.

8) **Market pricing strategy:** If identical or homogeneous products are already exiting in the market, the standard approach is market pricing. This means, based on the competitor's prices, the final price is determined and production and marketing functions both are adjusted to the price.

9) **Transfer pricing strategy:** Transfer pricing refers to the pricing of goods or services among subsidiaries within a corporation. This strategy is adopted by a MNC (Multinational Corporation). The subsidiaries of a MNC trade among themselves or with the parent firm. It seems that any price charged by a subsidiary to another subsidiary or to the parent firm is acceptable as the sales are undertaken within the corporation.

10) **Trial Pricing:** In this case, a firm may launch a new product with low pricing, for a limited period of time. The purpose is to win customer acceptance first and make profits later. Often, trial pricing is seen as an alternative to giving away samples of a product in order to make people to have a trial of the product.

11. **Flexible-Price Strategy:** In this case, a firm offers the same product and quantities to different customers at different prices. For example, when a new product is introduced, a firm may sell it at a special price to its loyal customers. A retailer may offer special price to frequent shopper as compared to other customers, who do not buy frequently from that store. The special price is a reward for customer's loyalty.

Marginal Cost Pricing

Meaning: The use of marginal cost in the case of export market is advocated on the grounds that if the manufacturers are able to realise their direct costs or variable costs (known as marginal costs) they would be able to carry on their export obligations without any way affecting the overall profitability. The fixed costs is usually not taken into account, while computing prices for exports, as fixed cost remains unchanged upto a certain level of production. This fixed costs supposed to be realised from the domestic market operations. However, this concept works satisfactorily when: (i) the domestic market is big enough; (ii) the market can absorb the burden of fixed costs; (iii) large-scale production will reduce the gap between the total costs and marginal costs.

Advantages of Marginal Cost

1. Price may be used as a weapon to penetrate into the overseas market.
2. This method may be used as an alternative to face competition effectively.
3. Fixed costs and sometimes, variable costs are realised from the home market.
4. By fixing a reasonably lower price, consumers from developing countries, with limited income, can be better attracted.

Disadvantages of Marginal Costing

1. When a price is fixed at reasonably lowest for the overseas market by reducing marginal costs, it becomes difficult to increase the price at a later stage when the total costs of production are increased.
2. This method of pricing is not at all advisable to a producer who mainly concentrates to export marketing.
3. The industry where the proportion of variable costs are on higher side, cannot afford to the marginal cost pricing.
4. The industry in which raw material constitutes a large proportion of the total costs, also cannot afford to such pricing.

Break-Even Pricing

It is a technique commonly used in Costing to analyse the Cost - Volume Profit Relationship. Break Even technique is concerned with finding out that level of point at which the sales will break even (no profit no loss).

The point or the level at which the sales break even is called "breakeven point". The breakeven point is that point at which the firm's total sales revenue is equal to the total cost of goods sold. The BEP can also be called as "No Loss No profit Point" because at this point there is neither profit nor loss to the firm. In other words, it can be said that it is the first or the starting points towards profit. Anything that is sold over and above BEP level of output indicates profits to the firm. This an export firm will break even when the total export revenue (FOB price plus incentives) is equal to the total cost of goods sold.

Breakeven point may be expressed either in percentage of capacity utilisation or in terms of number of units of production it may also be expressed in volume of sales revenue. The difference between break even points and the expected capacity utilisation is known as "margin of safety".

Formula to Calculate B.E.P

BEP – FC/SP-VC

SP= Selling price; VC= Variable cost; FC= Fixed Cost; C= Contribution(i.e Profit)

Web Sources

1. https://www.bms.co.in/differential-trade-margins-pricing-strategy/
2. https://www.bms.co.in/trial-pricing/

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CONTENTS

CHAPTER 3

BUSINESS PROCESS REENGINEERINGIN BPOS – A PRACTICAL APPROACH

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Abstract

Business Process Outsourcing (BPO) services has become highly competitive and the contracts are becoming shorter and output based. This has led to falling revenue and uncertainty in maintaining larger BPO personnel and system. In order to optimize the system, Business Process Reengineering has become imperative. The step by step practical approach needed to reengineer the technical call center of an origination using Erlang C and AI is delineated in this chapter. Derivation of call center and service parameters shows that 14 agents are enough to achieve the organizations target.

Keywords–*BPO, Erlang C, Business Process Reengineering, Call parameters, Agent Optimization*

I. Introduction

Business process reengineering basically involves recreating a core business process with the aim of improving product or service output, quality and reducing costs. This is done in broad steps which involve the analysis of company workflows, finding processes that are below- par or inefficient, and finalizing ways to eliminate inefficient process by altering or changing them completely.

Reason for Business Process

The business process is reengineered by an organization because of the following reasons:

- Outdated Process: The processes the company is using to manufacture products or provide services might have become outdated, inefficient or holds no relevance in the current competitive market scenario.
- Underperformance of Firm: The various divisions and branches of an organization strives to improve their respective division performance but ignore the resultant end effects on other departments. This tendency to localize department efficiency may leads to the underperformance of the organization as a whole.
- Underperformance of Employee: Due to department specific Key Result Area (KRA) given to each employee, the employee's focusesis on the performance related to only his respective department and the employee is likely toignore critical issues emerging in other areas of the organization. This necessitates the need for re-engineering the role of the employees to include broader organization's goals.
- Poorly designed Business Process: The current business process could be unduly long, time-consuming, expensive, and obsolete. Hence it might need to be redesigned to sync with the current business requirements.
- New technology: Since technology is ever changing and newer technologies are invariably more efficient and cost effective than older technology, the organization has to keepupdating . This might require reengineering the business partially.

II. BPO and Need for Business Process Reengineering

Business Process Outsourcing (BPO) is a subset of outsourcing that involves contracting the operations and responsibilities for a particular business process to a third-party service provider. There are two main types of BPO services- back office and front office. Back-office services include internal business processes, such as billing or purchasing. Front-office services include services such as tech support, help desk and marketing to customers of the contracting organization.

National Association of Software and Solutions Companies (NASSCOM) has projected a growth rate of 7-9 per cent for the IT and BPO industry in 2018-19 in the country as against 7.8 per cent in 2017-18. The exports would be at $137 billion dollars in 2018-19 as against $126 billion dollars in 2017-18. The industry is expecting to add one lakh jobs in 2018-19. The overall IT-BPO industry size would be adding $14-16 billion. However, the following factors have necessitated Business Process Reengineering in BPO :

- Increased Competition: Relentless and increased competition in BPO from within and outside country has effectively bought down the price of BPO service. Only those BPO service providers who are able to add higher value BPO services will be able to survive the market competition

- Robotic Automation and Artificial Intelligence : Legacy labor-centric BPO delivery models areslowly becoming extinct due to better Artificial Intelligence based services
- Reduction in Annual contract: More and more customers are shifting from Annuity driven contract to project-driven contract which reduces income certainty for BPO organizations over long term. This trend forces BPO organizations to fight for smaller contracts frequently and takes a toll on profit margin as the organizations try to remain competitive.

In short, falling revenue and increasing uncertainty has forced BPO organizations to review their business processes and reengineer the processes.

III. Steps in Reengineering Technical Support BPO Process

This section deals with practical approach to reengineer BPO process. The business process that has to be reengineered is 'Technical Support'. In the technical support center of a BPO organization, there are 19 agents taking calls from customers and answering their queries. The organization wants to optimize the process to reduce personnel cost and increase system utilization to at least 85%. The steps to reengineer this process and optimize efficiency are as follows:

Step I :Determine the call parameters of technical support calls to the BPO Centre

The first step is to collate data on the call parameters. The parameters include Number of calls, periodinminutes and Average Handling Time.

Step II :Determine the Service output

The second step involves determining the Required Service Level, Target Answer Time and Maximum Occupancy of system.

The analysis of the call parameters and service output is given below:

- Number of calls – 100
- In a period of minutes – 30
- Average Handling Time (seconds) – 180 (3 minutes)
- Required Service Level 70%
- Target Answer Time (Seconds) 20
- Maximum Occupancy or SLA (The actual percentage of calls answered with the target time): 85%

Step III: Deriving Technical Call service parameters

The calculations of Technical Call service parameters are based on Erlang C Formula. The Erlang C formula is a mathematical equation for calculating the various parameters of callcentre, given the number of calls and the service level the organization is trying to achieve. It allows organization to work out the probability that a call waits (P_w), given the Traffic Intensity (A) and the Number of Agents (N) available. The formula is given below:

$$P_w = \frac{\frac{A^N}{N!}\frac{N}{N-A}}{\left(\sum_{i=0}^{N-1}\frac{A^i}{i!}\right)+\frac{A^N}{N!}\frac{N}{N-A}}$$

Modification and derivations based on the above formula allows organizations to determine the following parameters:

- **Abandoned** - The percentage of callers who will abandon after a given time.
- **Agents**–The number of agents required to achieve the actual percentage of calls answered with the target time. (SLA target).
- **Agents ASA**–The number of agents required to achieve an Average Speed to Answer (ASA) target.
- **Average Speed to Answer** (ASA) - The average time taken to connect to an agent.
- **Call Capacity** – The maximum number of calls that can be handled.
- **Fractional Agents** – The number of agents required to achieve a SLA target.
- **Fractional Call Capacity** –The maximum number of calls that can be handled.
- **Queue Size** - Average number of calls queuing.
- **Queue Time** - The average waiting time for those calls that are not answered immediately.
- **Queued** - The percentage of calls that will be queued.
- **Trunks** - The number of telephone trunks required for a given call load.
- **Service Time** – The time within which a certain percentage of calls will be answered.
- **SLA** - The actual percentage of calls answered with the target time.
- **Usage** - Percentage of agent's time spent on the telephone.

Step IV: Analysis of Technical Call service parameters

Based on Calculations, the following output was obtained:

Table 1: Output of Erlang C Analysis of Technical Call Parameters

No of Agents	No of Trunks	SLA%	% Queued	Aband'd	Utilisation	ASA (secs)	Queue Time (secs)	Average Queue
12	24	58%	45%	32%	83%	40	90	2
13	23	75%	29%	17%	77%	17	60	1
14	**22**	**85%**	**17%**	**9%**	**71%**	**8**	**45**	**0**
15	22	92%	10%	4%	67%	4	36	0
16	22	95%	6%	2%	63%	2	30	0
17	21	98%	3%	1%	59%	1	26	0
18	21	99%	2%	0%	56%	0	23	0
19	21	99%	1%	0%	53%	0	20	0
20	21	100%	0%	0%	50%	0	18	0
21	21	100%	0%	0%	48%	0	16	0

Step VI : Interpretation of analysis and Course of Action to reengineer

The organization has 19 agents in the technical call process. Based on table 1 data, it can be concluded that the minimum number of agents required to achieve the actual percentage of calls answered with the target time (SLA % of 85%) is 14 . Thus the organization can redeploy 5 agents (19-14) to other department as 5 agents are in excess to achieve 85% SLA and 71% system utilization.

For 14 agents, the number of telephone trunks required for a given call load is 22,the actual percentage of calls answered within the target time is 85%, the percentage of calls that will be queued is 17 %, the percentage of callers who will abandon after a given time is 9% , Percentage of agent's time spent on the telephone is 71%, the average time taken to connect to an agent is 8 seconds and Queue time is 45 seconds. The number of customers waiting for support will be nil.

The organization can reengineer the process based on any of the above parameters.
In case temporary capacity addition is needed, the organization can use natural Learning processing Artificial intelligent (AI) agents. Since Google Assistant Dialog flow agent is easy to develop and deploy the organization can use it to build AI agents to augment employees in the technical call centers.

IV. Conclusion

The chapter discussed the need for Business Process Reengineering in BPOs and delineated the steps need to reengineer the technical call center process. Primarily it was found that 14 agents were enough instead of 19 agents to achieve the call center objectives. A BPO organization with 50 branches can thus save up to 250 (50x5) agents and deploy them to other departments or to better productive jobs. The organization can also optimize process based on any of the parameters calculated including Number of Agents, No of Trunks, SLA%, % Queued, Abandoned customers, Utilization, ASA, Queue Time and Average Queue. This chapter has shown practical method to reengineer business processes which can be adapted to any process which is queue based.

References

1. Bhaskar, HariLal. (2017). Business process reengineering: A process based management tool. Serbian Journal of Management. 13. 10.5937/sjm13-13188.
2. Ku, S., Suh, Y. and Tecuci, G. 1996. Building an intelligent business process reengineering sys-tem: a case-based approach. International Journal of Intelligent Systems in Accounting, Financeand Management 5, 1.13.
3. KV Kurmanath - https://www.thehindubusinessline.com/info-tech/nasscom-pegs-growth-for-2018-19-at-7-9/article22804578.ece

4. Mylopoulos, J., Chung, L. and Nixon, B. 1992. Representing and using nonfunctional requirements: a process oriented approach. IEEE Transactions on Software Engineering 18, 6.14.
5. Pierotti, S. 1996. Assess Tech: Assessment and Expert System for Evaluating Human Issues inImplementing New Technologies for the Healthcare Industry. Wizdom Medical Systems (March15).15.
6. Rock, D. and Yu, D. 1994. Improving business process redesign. AI Expert (October), pp.27–34.
7. Sudhakar, Goparaju. (2010). The Role of IT in Business Process Reengineering. Acta Universitatis Danubius. Economica. 6.

Web Sources

1. https://www.callcentrehelper.com/erlang-c-formula-example-121281.htm
2. https://erlang-vcp.blogspot.com/2008/02/erlang-calculations-for-microsoft-excel.html
3. https://www.academia.edu/6669754/The_Role_of_IT_in_Business_Process_Reengineering

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CONTENTS

CHAPTER 8
CHALLENGES OF ONLINE MARKETING

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Abstract

This paper starts with defining online marketing and continuous with challenges, such as problems of security, privacy emerged in the field of marketing. Online marketing is also called as internet marketing which involves interactive and space for promoting products and services. Internet marketing plays the major role in this growing world. It's so cost-effective, flexible, fast and it's a global reach activity. This study concentrates on the impacts of internets interactive spaces on marketing practise. The study continues with challenges, ie. security, privacy, etc, emerged in this field of marketing.

Keywords: *online marketing, internet opportunities, challenge, marketing, Consumer*

Introduction

In the recent years many changes have undergone in the process of marketing (Petkus, 2010). Connection of all physical network which connects computer globally is known as "internet". There is an big and wide network connection which creates communication link to share and support information in the internet (Chaffey 2000). This key role in this transformation has been played by the internet. Several studies have addressed the way in which introduction of internet have reshaped the structure and performance of different sectors, e.g. hospitality, travel and tourism (Xiang et. al 2008; Beldona 2005; Gretzel, et al. 2006; Kah, Te Velde, Dirk Willem) . "The role of development finance institutions in tackling global challenges." London: ODI (2011) et al. 2006; Pan and Fesenmaier 2006; MacKayet al 2005; Weber and Roehl 1999). Internet marketing cannot be considered as promotion technique. This has brought about a turning point, a complete shift to a new business model (Deighton 1997; Wind and Rangaswamy 2001).

Online Marketing

Online marketing conveys and creates awareness on brand, services and products. Email, Instagram, facebook, Google adwords, display advertisements etc are some major technologies being followed and also a source of intermediator. Online marketing targets that person who always sits with a phone or computer jus to read, socialise and also shop. There are many new methodologies and technologies are being used to promote online marketing. Online marketing also acts as strength in many cases i.e. consumes time.

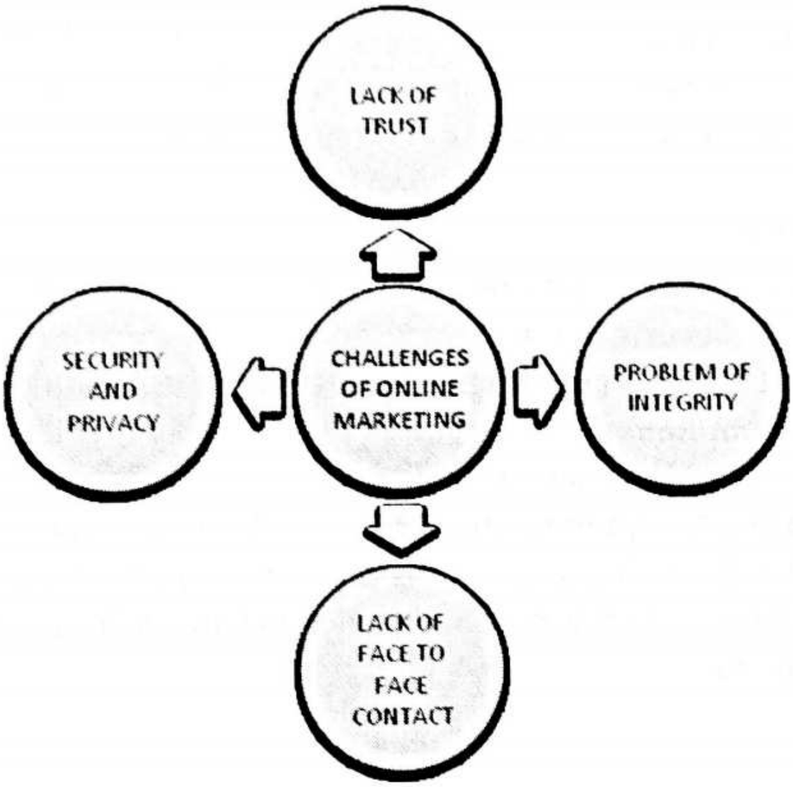

Figure 1: Challenges of online marketing

1. Lack of Trust

This has been recognized a great challenge on the way of online marketing growth. Online trust includes consumer and customers perception of how the site would deliver on expectations and how far the information given is true. Beyond all the growth still people don't trust online marketing so easily. On the other hand online fraught has made customers hold negative or doubtful attitude towards online transaction. In the modern growing world marketers and IT managers are challenged with the task of changing the online climate in order to retain online customers. This has generated a tremendous interest in learning about online trust and developing new trust designs.

2. Problem of Integrity

Integrated marketing has been a central theme of the profession (Clown and Baak, 2013; Kitchen and Burgman, 2010; Blech and Blech, 2013). One of the major problem with marketing campaign is that they have more offline and online promoters. These promotional things are done aiming at particular objectives. The websites will need emails or social media websites to communicate the message and search engines are useless without links in it. All the components together makes the better internet marketing strategy.

3. Lack of face to face Contact

Lack of personal contact is another such a complicated problem which decreases the trust among all the customers (Goldsmith and Goldsmith, 2002). The products or services which are being touched, seen or experienced have more value. In lack of trust costumers wishes to visit the place in personal and then likes the same. Though this lacks face to face contact but still in online marketing it cannot be done in the way of offline marketing. Not only face to face contact, but also the culture is also a relevant variable.

4. Security and Privacy

Information and privacy is the most concerned category which is being considered while doing online shopping. Security and privacy is the issue lack of trust on the part of customers selection in online marketing. Moreover their username password and other crucial documents are not immune from hackers (Lantos, 2011). These privacy problems are among challenges in the way of online marketing. Effective internet marketing therefore depends on resolving the related problems. The control over security and other privacy issues are to be controlled over and by the company under which the trust is being built by the company towards the customers. Beyond everything they should have the rights to access the control.

Conclusion

From the above study, Internet has revolutionilized every aspect of life including economy and marketing, which also introduced major techniques and methods of online marketing, this study is about challenges of Internet. This article emphasis on the implementation of Internet in the field of marketing involved special disadvantages such as problem of integrity, lack of face to-face contact, Security and Privacy, Lack of trust. Unless these advantage and disadvantage characteristic of Internet have not been taken into consideration, it cannot be deployed to its fullfilment. To conclude, this study is about challenges of online marketing and introduced major techniques and methods of online marketing.

References

1. Petkus Jr, E. (2010). Historical perspectives in marketing education: Justification and implementation. *Journal of Marketing Education*, *32*(1), 64-74.
2. Chaffey, D. (2000). Achieving Internet marketing success. *The Marketing Review*, *1*(1), 35-59.

3. Xiang, Z., Wöber, K., & Fesenmaier, D. R. (2008). Representation of the online tourism domain in search engines. *Journal of Travel Research, 47*(2), 137-150.
4. Deighton, J. (1997). Commentary on" Exploring the Implications of the Internet for Consumer Marketing". *Journal of the Academy of Marketing Science, 25*(4), 347-351.
5. Urban, G. L., Amyx, C., & Lorenzon, A. (2009). Online trust: state of the art, new frontiers, and research potential. *Journal of interactive marketing, 23*(2), 179-190.
6. Clow, K. E. (2016). *Integrated advertising, promotion, and marketing communications*. Pearson Education India.
7. Goldsmith, R. E., & Goldsmith, E. B. (2002). Buying apparel over the Internet. *Journal of Product & Brand Management.*
8. Lantos, G. P. (2015). *Consumer behavior in action: Real-life applications for marketing managers*. Routledge.

Web Sources

1. https://www.odi.org/publications/5979-role-development-finance-institutions-tackling-global-challenges
2. http://journals.sagepub.com/doi/abs/10.1177/0092070397254006

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CONTENTS

CHAPTER 9

A STUDY OF FINANCING SOURCES FOR START UP COMPANIES IN INDIA

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Abstract

This article provides an overview of financial resources for beginners and growers with a special emphasis on corporate finance in India. At each stage, we explore the various stages of development and sources of financing for new companies. The purpose of this study is to examine whether India has taken sufficient steps for entrepreneurial ideas with the potential for success and future growth. This article is intended to provide an overview of the financial success of Indian newcomers and to support all relevant research work. At the international level, especially in times of globalization, the importance and financing of new companies are being studied internationally. Thus, the progress made so far in India, as well as the incentives are discussed in this article.

Keywords: *Financial resources, Start up companies.*

Introduction

A start-up company is a new company in the early stages of its development. This mainly refers to projects that include the development and production of high technology, the sale of new products, processes or services. The Ministry of Industry and Trade began communication on April 1, 2015, and this was the beginning. "A start-up is a company that is in the first stage of its operations."

1. Up to five years from the date of receipt.
2. Income for the past five years does not exceed 25 kroons.
3. The company strive to innovate, develop, implement and market new products, processes or services based on technology or intellectual property. (Andaleeb and Singh, 2006).

The Early History of India Until the recent start-up hysteria, India was very popular as an IT outsourcing destination, providing companies around the world with an affordable and easy-to-use workforce for a variety of internal operations. Indian technology start-ups have been around for about 30 years. The Indian Microsoft Accelerator was the industry's most important milestone and went through four distinct stages of growth and maturity: software services and global delivery models, the era of the point, the growth of products to launch and the growth of the ecosystem of launch. One important point is the decision of US Texas Instruments to form an R&D centre in Bangalore in 1985 which further

Served to be an incubator for many of the current entrepreneurs and the launch of the infamous accounting software Tally in 1986.

New prime ministers in India to become a country to create jobs, to foster entrepreneurship and innovation, by providing an ecosystem that aids growth and prevents India from becoming a state for job seekers in Vigyan Bhawan, New Delhi, January 16, 2016 Launched an initiative formally.

Stages of Startup and Available Modes of Finance at Each STAGE

Entry levels and financial opportunities are available for all levels: from the point of view of the investor, there are six stages of investing. Self-financing or replenishment, friends and family, seeds, growth (also known as the "early stages") and expansion.

1. Self-development / Bootstrap Financing

As the first step in the overall investment process is the stage at which the founder invests money to begin the journey. The founder introduces the initial investment in his resources / savings before moving on to the next investment phase. But you can expect someone with more wealth to invest more. It also shows the entrepreneur's extra efforts against other outside investors (including angel investors) who may raise money later. Sometimes entrepreneurs prefer to lend money to the company. Most risky investors are usually needed, but this is common practice. (Flora et al. 1992)

2. Friends and family

At the investment stage of friends and family, the founder touches his friends and family and asks them to invest part, if not all, of the savings in the business idea. The founder must be very honest about the risk of losing all investments in the event of a start-up interruption and failure. So that a study on financing sources for start-up companies in India.

Their expectations are clearly defined. The biggest risk is that these investors are often not familiar with the technical details of a newly created company, which can lead to unrealistic and excessive expectations about how much property to give. (Lee and Persson, 2016)

3. Seed

Initial investment is the first step in raising capital outside the most common areas of the business, such as self-development. Typically, this circle is closed by a group of professional angels, experienced investors or equity investors, such as angel investors, individually or as part of small individual angel investors. Angel Investors has experience and in many cases has its own company, and as a founder can offer more than just capital. The knowledge, experience and knowledge of the emerging ecosystem that dominates the economy can provide entrepreneurs with useful insights. In general, wisdom, wealth, and willingness to work are one of the three most common characteristics of angel investors. These angel investors in India invest only in entrepreneurs with ideas and, as a rule, do not force entrepreneurs to fulfil corporate governance obligations. (Whitehead, 2003)

4. Growth / Initial Stage

Initial investment is the first round of venture capital. This is often used to expand a company's business model. Many well-known venture capital funds are well known in the early stages of investing in India. As an investor, the main advantage of existing venture capital funds is that they usually have enough funds for future capital growth. He is involved in Series A financing series and Series B financing, sometimes beyond. DC also invests depending on the size of the funds. Entrepreneurs wishing to increase their INR from 5 to 10 crore have access to the early stages of venture capitalists, also known as micro-venture capitalists. After the invested money was gone, I started looking for investors from the developer. Depending on the size of the investment and the stage of its beginning, venture capitalists expect income from 2 to 10 times in cash. (Inderst and Mueller, 2009)

Six Stages of Investing

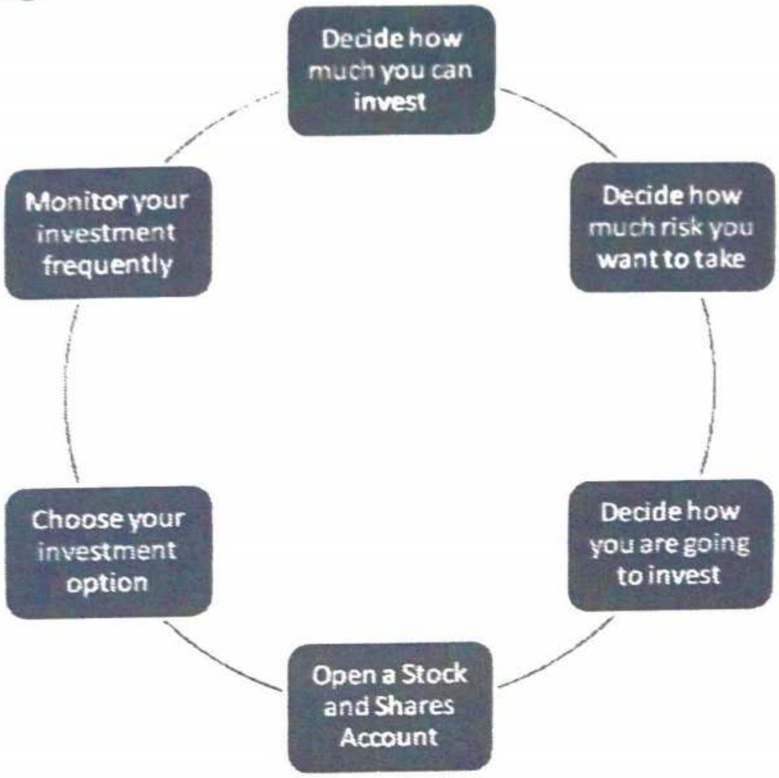

Figure1: Six stages of Investing

Tackling Risks and Challenges

Risks and challenges Risk is an important part of early success. However, warnings and criticisms are needed when making initial decisions to reduce the risk of disability. The task is part of every start-up, but the determination to overcome it in the event of a disaster and destruction is a successful start. Successful start-ups are those who are constantly looking for business opportunities, using and exploiting opportunities and finding innovative ways to solve the problems that all newcomers face. (Te Velde, 2011)

Conclusion

Start up companies operates in a world of their own. A bunch of like-minded, creative individuals come together to have fun while also working. Software start-ups that grow out of a business idea students had over beers are a rare exception in the corporate world, a tiny space within the economy and the society.

Can their innovation model be applied outside of this space? Can existing corporations embrace some of the open and boss-free spirit of software start-ups to drive innovation and increase productivity? A steel factory can simply not be built without planning and its design cannot be modified every week. But spectacular investment failures - which are more often than not planning failures rather than due to unforeseeable, sudden changes in the project environment - might be avoided if large corporations developed their culture away from hierarchies that see a few lonely decision-makers at the top and instead involved more of their own employees in flatter hierarchies.

References

1. Andaleeb, U., & Singh, D. S. (2016). A study of Financing Sources for Start-up Companies in India. International Review of Business and Finance ISSN, 0976-5891.
2. Flora, J. L., Green, G. P., Gale, E. A., Schmidt, F. E., & Flora, C. B. (1992). Self-Development: A Viable Rural Development Option?. Policy Studies Journal, 20(2), 276-288.
3. Lee, S., & Persson, P. (2016). Financing from family and friends. The Review of Financial Studies, 29(9), 2341-2386.
4. Whitehead, G. (2003). Early stage and seed financing for biotechnology start-ups: A UK perspective. Journal of commercial biotechnology, 9(3), 242-248.
5. Inderst, Roman, and Holger M. Mueller. "Early-stage financing and firm growth in new industries." Journal of Financial Economics 93.2 (2009): 276-291
6. Te Velde, D. W. (2011). The role of development finance institutions in tackling global challenges. London: ODI.

Web Sources

1. https://www.ripublication.com/irbf16/irbfv8n1_01.pdf
2. https://10innovations.alumniportal.com/startup-innovation/conclusion.html
3. https://journal.unesa.ac.id/index.php/bisma/article/view/4539
4. https://www.odi.org/publications/5979-role-development-finance-institutions-tackling-global-challenges

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CHAPTER 10
A STUDY ON BUSINESS PROCESS RE-ENGINEERING IMPLEMENTATION

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Abstract

As more and more organizations choose business process reengineering (BPR), issues within the implementation of BPR projects tend to be a significant concern. There is a need to explore empirically the problems of reengineering implementation. Supported by past theories and research related to the implementation of organizational change furthermore as field experience of reengineering experts, a comprehensive list of sixty-four BPR implementation problems was identified. Results of the various studies have clearly demonstrated the importance of change management in implementation (BPR). Project planning and technological competence were found to be necessary for reengineering success. Further, problems that are more directly associated with the conduct of a project like process delineation, project management, and tactical planning were perceived as more easy, yet highly associated with project success. This example was also true for human resource problems like training personnel for the redesigned process. These findings suggest that reengineering project implementation is complex, involving many factors. To succeed, it's essential that change be managed which balanced attention be paid to all or any identified factors, including those who are more contextual (e.g., management support and technological competence) similarly as factors that pertain on to the conduct of the project (e.g., project management and process delineation). Mutually of the primary pieces of empirical evidence supported a field study, this research emphasizes the importance of addressing BPR implementation within the broader context of organizational change during a complex socio-technical environment.

Keywords: Business Process, Business Process Reengineering (BPR), Steps involved in BPR.

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Introduction

Business process reengineering is that the act of recreating a core business process with the goal of improving product output, quality, or reducing costs. (Davenport and Short 1990).

Typically, it involves the analysis of company workflows, finding processes that are sub-par or inefficient, and deciding ways to induce obviate them or change them. Business process reengineering became popular within the business world within the 1990s (Bhaskar, 2018), inspired by a writing called Reengineering Work: Don't Automate, Obliterate (Hammer and Champy, 1993). His position was that too many businesses were using new technologies to automate fundamentally ineffective processes, as critical creating something different, something that's built on new technologies. Think, using technology to "upgrade" a horse with lighter horseshoes which make them faster, as critical just building a car.

In the decades since, BPR has continued to be employed by businesses as an alternate to business process management (automating or reusing existing processes), which has largely superseded it in popularity. And with the pace of technological change faster than ever before, BPR could be a lot more relevant than ever before (Grant, 2002).

The Six Key Steps of Business Process Reengineering

Define Business Processes: Map the present state (work activities, workflows, roles and reporting relationships, supporting technology, business rules, etc.).
Analyze Business Processes. Identify gaps, root causes, strategic disconnects, etc. within the context of improving organizational effectiveness, operational efficiency and in achieving organizational strategic objectives.
Identify and Analyze Improvement Opportunities: Identify, analyze and validate opportunities to handle the gaps and root causes identified during analysis. This step also includes identifying and validating improvement opportunities that are forward facing - often strategic transformational opportunities that aren't tethered to current state process.
Design Future State Processes: Select the advance opportunities identified above that have the foremost impact on organizational effectiveness, operational efficiency, which will achieve organizational strategic objectives. ensure to pick out opportunities that the organization has the budget, time, talent, etc. to implement within the project timeframe.
Develop Future State Changes: Frequently overlooked (and a key root cause in failed BPR initiatives), this is often where the above opportunities are operationalized before implementation. Changes and opportunities can't be implemented until they're operationalized.

Implement Future State Changes: Classic implementation supported dependencies among changes/opportunities, change management, project management, performance monitoring, etc. (Motwani et al. 1998)

When and how to use Business Process Reengineering in Your Company:
Since the 1990s, there was a large revolution within the way companies conducted their operations and managed their business processes. Different schools of commerce and various academicians developed models that will help an organization improve their production and minimize losses. By the mid 1990s, about 60% of Fortune 500 companies round the world had adopted BPR, or started initiatives to use such a system. Today, Business Process Reengineering may have evolved distinctly from the 1990s, but much of the basic concepts and applicable activities remain similar.

This system of rethinking a company's business strategy might not be easy for an enterprise which are accustomed managing their operations a really certain way; but it's a very efficient system. The highest management gurus swear by the efficiency of BPR, and have devised their own modification to the core concept to assist companies become better competitors. While an oversized a part of this method depends on the industry concerned and therefore the business involved; the central stem for this process will be explained by over viewing a straightforward flowchart (Figure.1).

Mission

Defines ↓↑ Accomplish

Work Processes

Execute ↓↑ Guide

Decisions

Consider ↓↑ Support

Information

Employs ↓↑ Processes

Technology

Figure 1: The core understanding of Business Process Reengineering

The simple chart above (Figure.1) may be a format that helps define how the asso... aspects involved in BPR can help re-mould a company's production methods and impr... their capacity. However, the implications and utilization of this method to your ... operations is really lots more complicated. To know when and the way to use Busi... Process Reengineering in your company; you wish to investigate your performance, ... find the proper corporate trainers to assist your employees understand and use ... system in their daily work. The objectives and scope of this type of management trai... requires an expert to execute well. Only with the proper professional training an... radical understanding of the system will such a management and reengineering solu... actually help in your business.

When you are already doing all your business for a substantial number of years, and yo... have got very old employees who are experts at their work, bringing about even the be... of changes may be difficult. People get accustomed working in an exceedingly certain way and always feel that they're doing the easiest they will under the circumstances. However management processes like BPR can greatly benefit your production and performance when properly applied. Within the coming years Psychology Articles, competition in business can only increase; and you'll have to re-strategize and reinvent. Find the simplest possible corporate trainers to assist you improve your team by applying Business Process Reengineering and such effective management techniques into the daily fold of your work. These systems not only improve the standard of your production and cause you to a higher competitor; but will provide your enterprise a fresh new brand image.

References

1. Bhaskar, L. H. (2018). Business process reengineering: A process based management tool. *Serbian Journal of Management, 13*(1), 63-87.
2. Davenport, T.H. and Short, J.E. (1990). The New Industrial Engineering: Information Technology and Business Process Redesign, Slogan Management Review, pp. 11 – 27.
3. Grant, D. (2002). A wider view of business process reengineering.*Communications of the ACM, 45*(2), 85-90.
4. Hammer M. (1990). Reengineering Work: Don't Automatic Obliterate. Harvard Business Review pp. 104 – 112.
5. Motwani, J., Kumar, A., Jiang, J., & Youssef, M. (1998). Business process reengineering: A theoretical framework and an integrated model. *International Journal of Operations & Production Management, 18*(9-10), 964-977.

Web Sources

1. https://tallyfy.com/business-process-reengineering/
2. https://www.emerald.com/insight/content/doi/10.1108/EUM0000000004536/full/html

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CHAPTER 13

BLOCKCHAIN & BITCOIN: AN INTRODUCTION

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Everything has a measure – whether definite or indefinite – and the measure has come to create a standard for everything. One of the things we frequently measure is the current global environment's pace of change, especially in terms of technological advances.

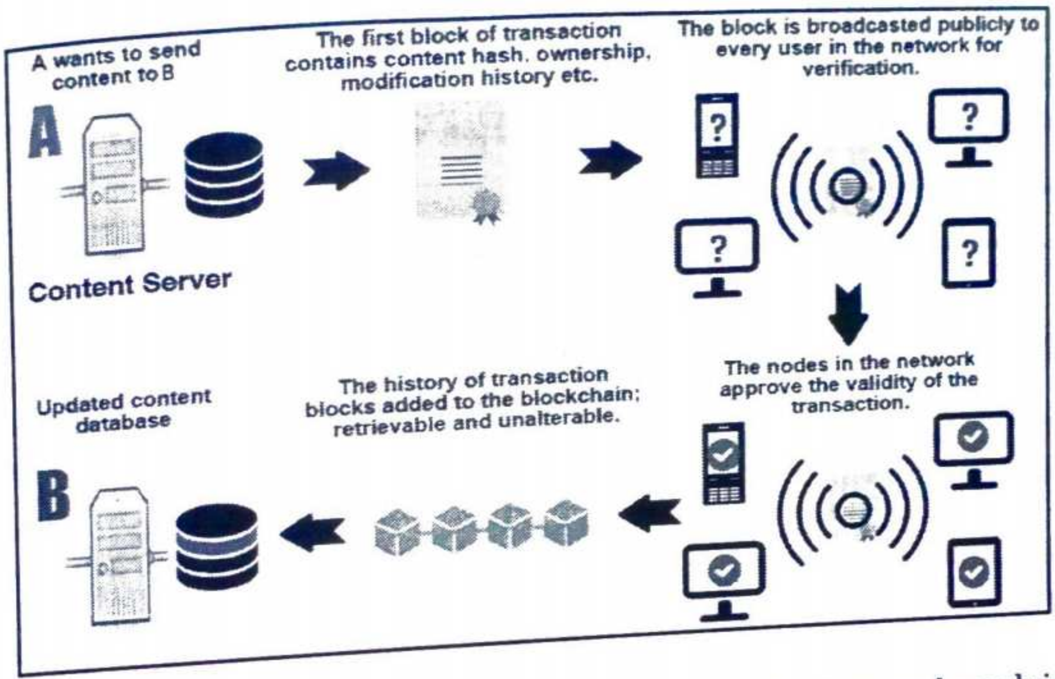
And a good example of this is '*Blockchain Technology.*' Though a fairly novel improvement in as recent as 2009, the blockchain has great potential to become the next big bang.

The term itself is of wide scope, and has encountered multiple definitions over the years. Webopedia defines a blockchain as, *"A type of data structure that enables identifying and tracking transactions digitally and sharing this information across a distributed network of computers, creating in a sense a distributed trust network. The distributed ledger technology offered by blockchain provides a transparent and secure means for tracking the ownership and transfer of assets."*

The words 'blockchain' and 'bitcoin' are often confused to be synonymous. Though they are related, both words in the individual sense have completely different meanings. 'Blockchain' – as mentioned previously – is a decentralized, global ledger with public access. 'Bitcoin' is a cryptocurrency or specifically, the most commonly used electronic currency in the blockchain network. Essentially, blockchain is the system and bitcoin is one of the components that supplement its functioning.

The bitcoin was first founded by Satoshi Nakamoto. The name itself is a pseudonym, and to date, the details of his real identity still remain a mystery. Nakamoto came up with bitcoin in his ground-breaking white paper on its working in 2008.

The main purpose of the blockchain is to remove the concept of centralization and remove centralized institutions, primarily banks. A bank controls and holds authority over its customers' accounts, operating and carrying out transactions on their behalves. But the blockchain is a peer-to-peer system, meaning the users have full and exclusive control over their accounts and transactions are directly carried out between them with no third-parties.



In conclusion, these two concepts are still foetuses, developing and evolving from their instabilities and flaws. It will be a while before the blockchain and bitcoin can be tamed by people from all walks of life. But that is not to say it doesn't have the makings to take the way we transact today to greater heights.

References

1. https://arxiv.org/ftp/arxiv/papers/1806/1806.03693.pdf
2. https://www.google.com/search?rlz=1C1CHBD_enIN707IN707&ei=95Q5XrD_J96K4-EPzaW =satoshi+nakamoto+white+paper&oq=satoshi+nakamoto&gs_l=psy-ab.1.3.0i67j0j0i67j0l7.0.0..138893...0.0..0.125.199.1j1......0......gws-wiz.......0i7i30.Koi2qfvnm2U
3. https://www.researchgate.net/profile/Deepayan_Bhowmik/publication/319128148/figure/fig1/AS:531744652369920@1503789212085/Overview-of-the-blockchain-working-principle.png

Web Sources

1. https://www.webopedia.com/TERM/B/blockchain.html

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CHAPTER 15

ROLE OF BPR IN MANAGEMENT

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Business Process Reengineering

BPR is a management strategy designed to enhance the efficiency of business processes across organizations by enhancing organization's effectiveness. BPR explores the current static business processes and seeks to decide how they may be modified to improve the overall business performance. The reengineering process is a big process that seeks to make significant changes in a company. It interacts with subordinates to observe different processes to develop a BPR skeleton.

It is the basis on which the different mechanisms for the organization's performance can be further analyzed. It demonstrates improvement and management of stocks and also the management of customer contact. Obviously, the management of inventories has become inefficient, slow and unable to handle recent growth due to the use of various old-fashioned technologies. In regard to customer service issues, due to delayed delivery, more automation and a certain amount of technology-based route have been proposed to save costs and increase performance.

Role of BPR

The businesses use Business Process Reengineering to achieve results that both minimize costs and time. The cost and cycle times are minimized by neglecting employee tasks, which impede efficiency. Business process reengineering recommends that executives take five big steps to bring about drastic change in their organizations. These steps include, refocusing the values of the company on customer requirements, redesigning processes with the latest technology, reorganizing teams across the board by allocating end-to-end responsibilities to them for a whole process. This means that, if the teams are reorganized, they review the hierarchical borders which speed up the communication flow and that their defects and faults as well as their ownership process. Additionally, workers at all levels are accountable for each production and measure performance on regular assessments.

Key Determinants of BPR

The key determinants of Business process reengineering are as follows

- The Top Management
- Human Resource Management
- Strategic management
- Performance measures
- Projects for process improvement
- Business environment
- **The Top Management**: The top executives should engage regularly in business activities or subordinates should not be used just to do so.
- **Human Resource Management**: The HRM needs to learn about the impact and moral effects of new changes on workers. This allows them to train employees without discriminating between them in order to face the same challenges.
- **Strategic management**: Such procedures should be in direct line with the organization's overall objectives and with the company's long-term vision, as differences in values could compromise such companies ' chances.
- **Performance measures**: To evaluate the results of any process, stringent policy must be developed for performance measurement policies.
- **Projects for process improvement**: The programs should be carefully selected and broadly defined to include as many activities as possible in order to ensure that the subsequent changes are implemented across the company.
- **Business environment**: New training, modern technology, recruiting and data demands are necessary for these new procedures. To order to evaluate the potential significant changes, the changes that exist in the external environment must also be addressed during that process.

Impact of BPR in Business

There are several factors to the success of this concept. The world level has been highest because the management is complete and improvements have happened according to an organization's culture. It has adopted standardized strategies that employ the professionals in order to successfully sustain the enterprise and to incorporate financial results and other corporate profits into the fundamental system.

Several experts have used this approach to set and achieve objectives and therefore stress the importance of the simple and challenging targets that are rigorously defined and communicated to all concerned. It is important for compensation, bonuses, benefits and preparation to achieve the optimal performance standards for employees.

Limitations

In the past, we have often seen failures and successes over BPR systems as well. Many analysts have also identified many causes of deficiencies in the organization's application of BPR. Some experts suggest deficiencies of the execution of BPR which include personal problems of managers such as incompatibility and arrogance, staff resistance, organizational inefficiencies, increased cost, less target, etc. There are further flaws, including lack of a process viewpoint, a very fixed or static structure that is not sufficiently versatile to be consistent with new developments, lack of cooperation on the part of employees in the decision-making processes, delegation of staff who do not understand BPR, technical limitations, too much emphasis on reductions of costs and reductions. Many organizations also complain that shortcomings in financial and human resources coupled with insufficient IT infrastructure stop these ventures from rising. Certain reasons that the experts also consider are the lack of support of the people within the company, including the top leaders, the lack of a strategic vision, a poor organizational structure, and the lack of strong leadership in supporting the efforts of the BPR. The time constraint, because policies, methods and ideas cannot be implemented at all levels of management is another limit, because BPR is a vast concept. Therefore, the process is a time consuming process to understand, identify the loopholes, view the new process, have it reviewed and approved by management.

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on

BUSINESS PROCESS REENGINEERING - A GLOBAL PERSPECTIVE

21st & 22nd February 2020

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Editors

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CHAPTER 16

BUSINESS PROCESS RE-ENGINEERING

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Business Process Reengineering a Preface

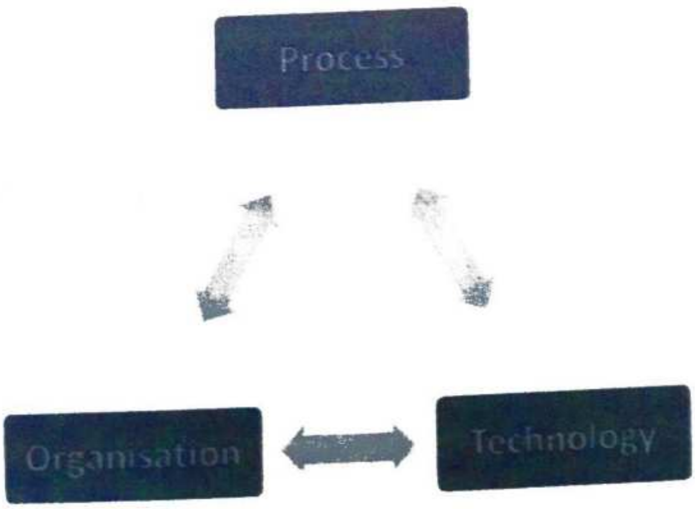
Business process reengineering is the reconstruction of a core business process to enhance product production, quality or cost reduction. It typically involves evaluating client workflows, identifying subpar or unreliable procedures and seeking ways of getting rid of or improving them. **In the 1990s, reengineering was popular in the world of business, inspired by an article entitled Reengineering Work: Don't Automate,** a **work published by Michael Hammer in the Harvard Business Review.** He believed that too many businesses used new technologies to simplify inherently inefficient processes rather than to develop something else based on new technologies. Think, using technology to *"upgrade"* a horse with lighter horseshoes which make them faster, as opposed to just building a car. Proper implementation of the reengineering business process can be a shift for any organization. When properly handled, a company with a failed or stagnant business process may perform miracles, raise profit and lead to growth. However, the reengineering of business processes is not the most understandable concept.

This involves changing the company - dismantling something that is used to people and creating something different. In the decades since, BPR has remained a popular choice for organizations as an alternate to business process management (automation or reuse of existing processes) and BPR is much more important than ever with the pace of technological change. While handling or developing business processes, which focused on working with existing processes, BPR requires fundamental changes to these processes. This can take a lot of time, be expensive and dangerous. If you do not succeed in every move, your improvements may be ineffective.

Benefits of Reengineering Process

- Reengineering enables a company to make radical efficiency improvements (measured by expense, cycle time, service and qualities).
- Simpler, slightlier and more productive processes improve the competitiveness of the operations network.
- Reengineering encourages organizations to give up traditional strategies and to think "high" (revolutionary thinking).
- The sluggish, gradual cycle of systemic changes leaves many organizations, which are rapidly changing today, unable to compete.
- By reengineering a company can become a marketing organization system that focuses directly on consumers from a regulated, employment-centered organisation.
- Reengineering also leads to new, innovative organizational ideas that can help companies better respond to competitive pressure, increase market share and productivity and boost cycle times, cost ratios and efficiency.
- The most important achievement of the reengineering is the change in the corporate culture and the fundamental principles underlying departments. Workers at all levels are encouraged to make suggestions for improvements and to expect management to listen.
- Reengineering has contributed to the creation of more challenges and rewarding jobs with broader employee responsibilities (job redesign).
- Finally, reengineering helps the society evolve from an Insular to an Insular culture which accepts and knows how to deal with change.

Elements of Business Process Reengineering



The elements of business process reengineering are process, technology and organisation are as follows.

Process Related Elements

The process related elements of business reengineering are the business procedure simplification, business process standardization and work flow.

Technology Related Elements

The technology related elements of business process reengineering are the information technology, business technology and project management technology.

Organisation Related Elements

The organisation related elements of business process reengineering arethe organisation structure, role assignment, regulation and culture, incentive and education/ training. These are the three main elements of business process reengineering.

Steps in Business Process Reengineering

- The identification and propagation of change needs
- Put a team of experts together
- Find the ineffective processes and set key indicators of performance
- Reengineering and comparing key indicators of success

Step 1 : The identification and propagation of change needs

For small scale industries the business process reengineering can be a piece of cake. But for a large scale industries it a be harder. There is always people, both from the management and from the staff, who are happy with things as they are. The first could be afraid of a sinked investment, the latter for the security of their jobs. We need to persuade them why the organization needs to make the move. This should not be too hard if the business doesn't do well. In some cases if the company is not doing well or processes might not be working and the situation is worse, by keeping the details and information, a very comprehensive plan must be drawn up that involves representatives from various departments. Management will be the salesmen: it will express a dream of progress and explain how it will have a positive effect on even the least qualified employee.

Step 2 : Put a Team of Experts Together

For any other project, the reengineering of business processes requires a team of qualified and driven personnel who take the necessary steps. The senior manager role is to make an important shift, someone who can call the shots needs to be monitored. If a Senior Management BPR team does not have anyone, they will contact you for every minor. Operational Manager has to know about the process is all about have worked through the process and have a vast knowledge to add for the success of the process. Reengineering may involve skills in a variety of areas, from IT to fabrication. The right change could be anything – hardware, software, workflows, etc, although usually depends on case by case can be done by reengineering experts.

Step 3: Find the Ineffective Processes and Set Key Performance Indicators

The team have to be alert and they have to define the right key performance indicators. The new process has to be adopted. The Idea of key performance is to optimize not the other way around. Although RPIs usually vary depending on the optimization process, the following can be quite typical. In case of manufacturing, the cycle time , changeover time, defect rate, inventory turnover and planned vs emergency maintenance. For IT, mean time to repair, support ticket closure rate and cycle time. If profits increase and the forecasts look great, it is rare to somebody to reengineer business processes. It must be done correctly and not hurried into a more interesting part of the business review. The next step is to define and prioritize the required changes and the areas and processes to be removed.

Step 4: Reengineering and Comparing Key Indicators of Success

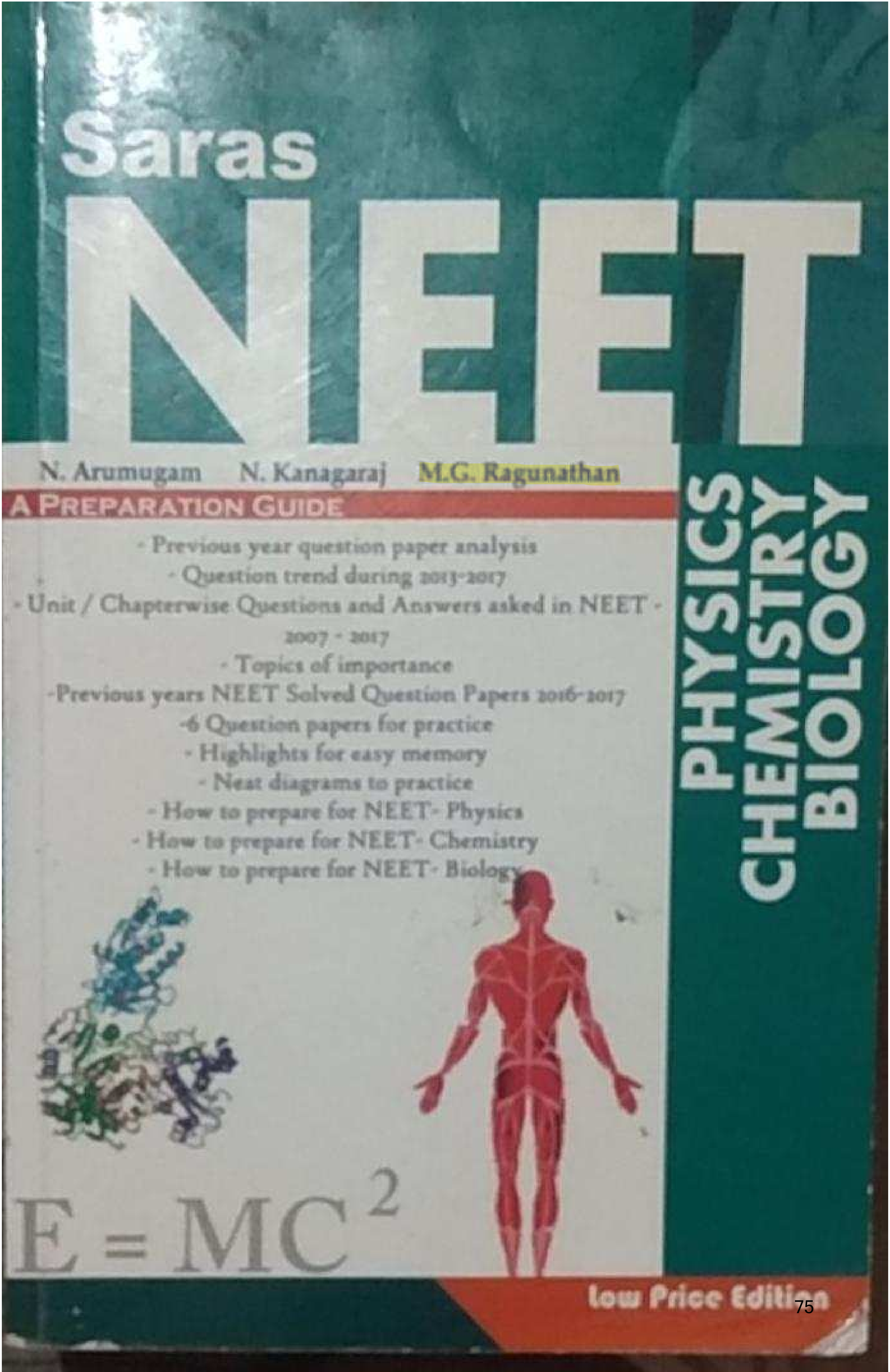
Once the analysis and planning done the solutions and changes has to made on small scale and the theories put into practice and see how the key performance indicator works. So that key indicator shows how the new solution works better. The solution can begin to scale slowly and be implemented in more and more business processes. Otherwise, return to the drawing board and begin to pick up new possible solutions.

Best Practices in Business Process Reengineering

Reengineering of the business process is a dynamic time-consuming undertaking, and the entire project fails in some situations. The most successful teams noticed that reducing the size of the team to a group of 10 or less would make a major performance difference. It is highly recommended that key stakeholders buy-in before starting the project.BPM software is an effective means of effectively managing the reengineering of business processes, since process maps offer the process to be investigated a visual representation. These tools promote improvements during the project planning stage and allow users to assess and report on the progress of a new process after its implementation.

Web Sources

1. https://www.verywellhealth.com/ssrisnri-antidepressants-for-fibromyalgia-and-mecfs-716039
2. https://hudsoncountyview.com/the-hoboken-yard-redevelopment-plan-whats-changed-since-2014/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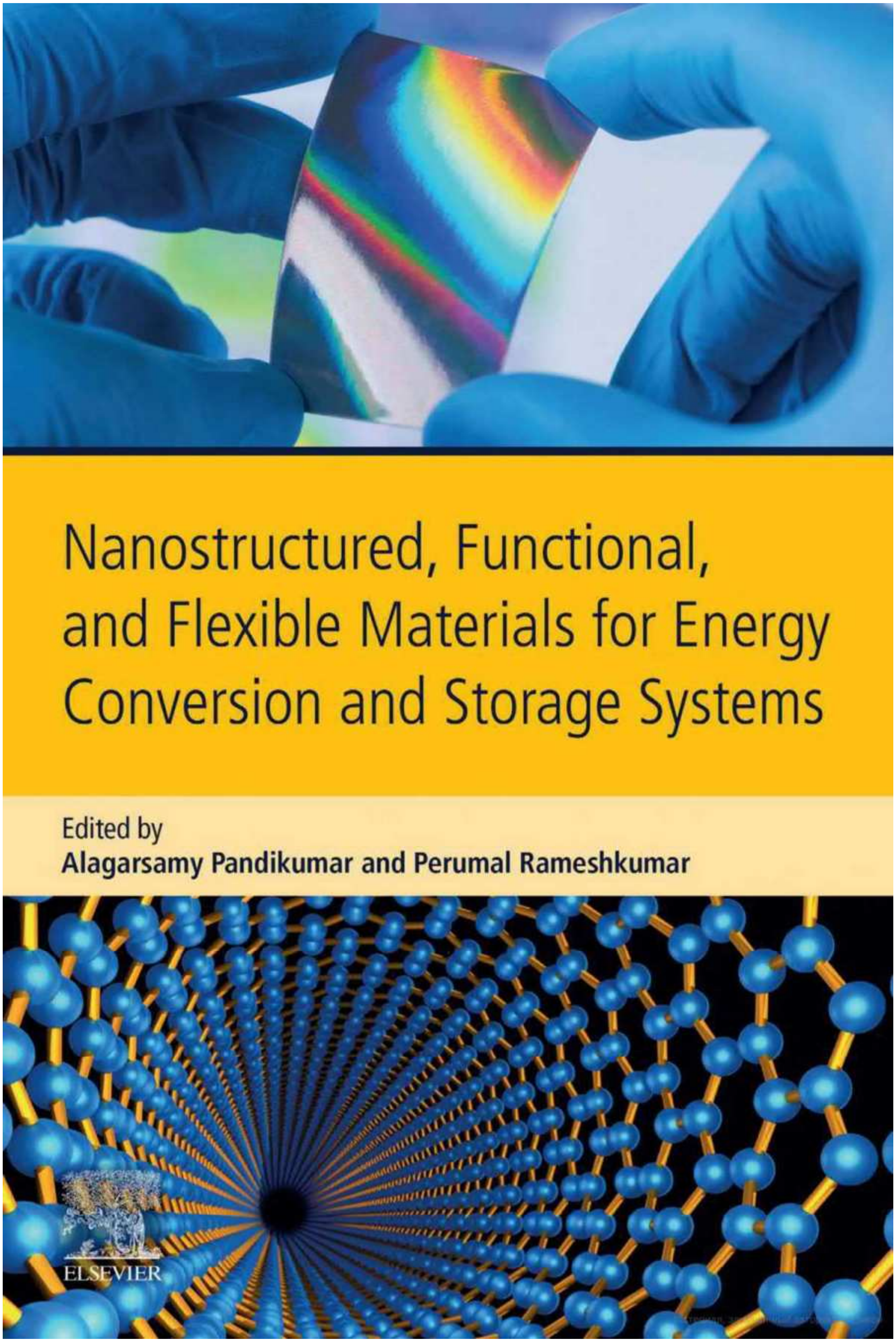
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CHAPTER 7

Hierarchically nanostructured functional materials for artificial photosynthesis

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1. Introduction

Artificial photosynthesis is one of the interesting researches in the field of photochemistry. The photosynthesis of plants or trees by nature is done by converting the carbon dioxide and water into carbohydrates and oxygen under solar energy. In a similar manner, artificial photosynthesis is also performed by the conversion of carbon dioxide and water into hydrogen fuels as well as carbon-based products using sunlight [1]. In artificial photosynthesis, the photon energy is converted into chemical energy through the photocatalytic process. In order to process the above reaction, an efficient and highly stable photocatalytic arrangement is crucial. Generally, various metal oxide–based materials such as TiO_2, ZnO, Fe_2O_3, Cds, and Cu_2O have been studied for CO_2 photoreduction. However, their working efficiency is not sufficient due to their large band gap, high recombination rate, and cost. Alternatively, hierarchical nanostructures of these metal oxide materials could offer less band gap, large surface area, high CO_2 adsorption, and enhanced photocatalytic properties [2]. Also, hierarchical nanostructured materials can provide a conceivable way to enhance the photocatalytic activity owing to their significant dimensional ratio aspects. Jiao et al. [3] reported that the hollow and mesoporous TiO_2 shows enhanced conversion of CO_2 into CH_4 as compared with solid, low surface area, TiO_2 crystals. Accordingly, the synthesis of semiconductor-based photocatalyst with well-defined hierarchical structures is becoming an important parameter to enhance their photocatalytic efficiencies . To understand the photocatalytic efficiency of various nanostructures such as

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Phytobiomes: Current Insights and Future Vistas

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Phytobiome Engineering and Its Impact on Next-Generation Agriculture

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Baby Kumari, Mahendrakumar Mani,
Anjali Chandrol Solanki, Manoj Kumar Solanki,
Amandeep Hora, and M. A. Mallick

Abstract

Phytobiomes exist in plant biome and consist of diverse microbial communities. In the recent past, a new field emphasizing on the characterization of the plant-associated microbiome, referred to as the phytobiome, is seen as a solution toward the green agriculture methods as these phytobiomes can be easily manipulated for the betterment of agricultural practices in a eco-friendly method of crop production. Microbiome engineering plays a fundamental role in plant's requirements of nutrients and disease management, and it helps in maintaining the soil conditions for agricultural production. This chapter discusses about the influential role of microbiome on the plant and related environment. This chapter focuses on the role of quorum sensing and signaling and its application in the eco-friendly method of farming that is sustainable agriculture.

Keywords

Phytobiomes · Eco-friendly · Quorum sensing · Sustainable agriculture

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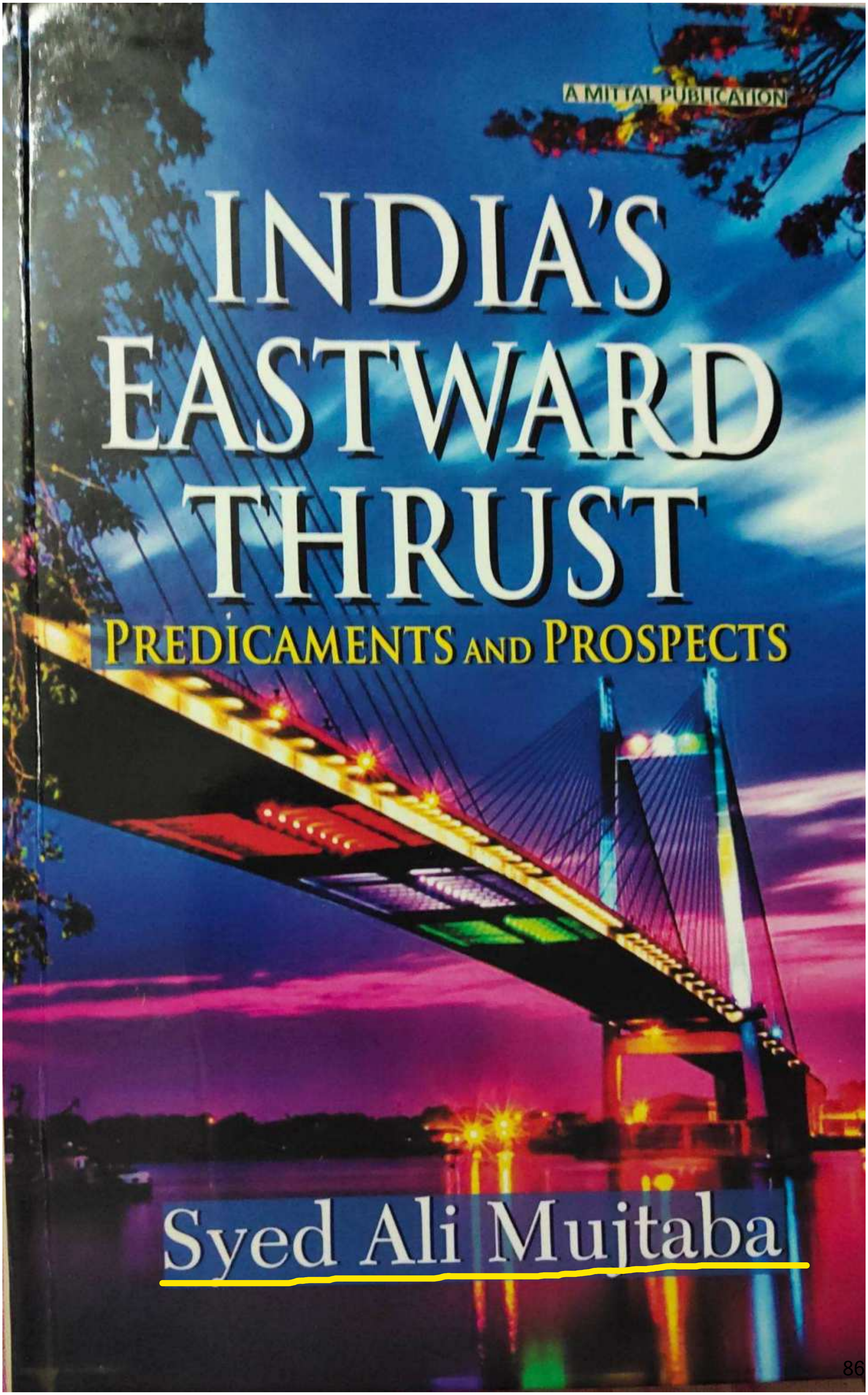
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The book 'India's Eastwards Thrust – Predicaments and Prospects' is an attempt to critically analyze India's Act East policy summed up into three 'Cs'; Connectivity, Commerce and Culture.

There is an ambitious progress being made in India's connectivity projects linking northeast region with the ASEAN countries. These are through Land, Rail, Air, Sea and Optic Fiber Linkages. India and ASEAN partnership is making huge progress in trade and commerce inching towards the targeted five trillion economies. India and ASEAN on cultural side are building bridges of friendship through people to people and business to business contacts.

The development of India's northeast region,by gaining access through Bangladesh, to develop a seamless land and sea connectivity with Myanmar and Thailand are key elements of India's Act East policy.

However, China is a pedominant factor in India's Eastward Thrusts. China has an overwhelming presence in in their region. Many ASEAN countries are keen to see India gain foothold in Southeast Asian region but are reluctant to openly do so for want of annoying China. As a result, due China factor, India is finding it difficult to enter into the Southeast Asian region.

Then South China Sea dispute and the security of sea lanes in the Strait of Malacca are important factors in India's Eastward Thrusts. The Quadrilateral Security Dialogue between United States, Japan, Australia and India is an attempt to maintain peace in the region but each country has its own axe to grind.

The success of India's Act East policy as much depends on the cooperation with the ASEAN countries as on China. So how India can manage China and woo the ASEAN countries is the litmus test of India's Eastward Thrusts.

The book 'India's Eastwards Thrusts – Predicaments and Prospects' is based on ground reports from where India's Act East policy is being anchored. The critical analysis gives a realistic touch to understand the nuances of India's ambitious Act East policy of Eastwards Thrusts. In sum, there are enough predicaments in India's grandiose policy but if all of them could be managed well, there are no stopping back to India's Eastward Thrusts.

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சேப்பாக்கம், சென்னை – 600 005.

எம்.ஏ.

முதலாமாண்டு

முதல் பருவம்

தாள் – 2

இந்தியப் பொருளாதாரம் – I

பாடப் பகுப்பு

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Translation of Books and Chapters

Translated by: Dr. L.R.S. KALANITHI, Vice Principal (Students' Affairs)

Content:

SPEC 102T

P.G.DEGREE PROGRAMME

M.A.ECONOMICS

I Year

I Semester

Paper: II

Name of the Book: Indian Economy -I

Course Offered by: Institute of Distance Education, University of Madras,
Chepauk, Chennai-600005, Tamilnadu, India

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தமிழ் இலக்கியங்களில்

அறநெறிகள்

ஔவை அடிப்பொடி

முனைவர் மு.கலைவேந்தன்

தொகுப்பாசிரியர்

தமிழ் இலக்கியங்களில்
அறநெறிகள்

"ஔவை அடிப்பொடி"
முனைவர் மு. கலைவேந்தன்
தொகுப்பாசிரியர், தமிழ்ஐயா கல்விக் கழகம்,
திருவையாறு.

அனைத்துலக
18 ஆவது அறநெறித் தமிழ் ஆய்வு மாநாட்டுக்
கருத்தரங்கக் கட்டுரைத் தொகுப்பு

தமிழ் ஐயா வெளியீட்டகம்
பதிப்பாசிரியர்: கண்ணகி கலைவேந்தன்,
ஔவைக்கோட்டம், திருவையாறு-613 204,
தஞ்சாவூர் மாவட்டம்.
அலைப்பேசி : 94867 42503

55. இலக்கியங்களில் விருந்தோம்பல் அறம்

ம.செல்வரோசாி புட்பா
முனைவர்பட்ட ஆய்வாளர் (பகுதிநேரம்)
தமிழ்த்துறை
குருநானக் கல்லூரி (தன்னாட்சி)
வேளச்சேரி, சென்னை

முன்னுரை

மனித இனம் தோன்றிய நாள்முதல் விருந்தோம்பல் எனும் அறம் அவர்தம் பண்பாட்டுக் கூறுகளில் ஒன்றாகிவிட்டது. உணவு அளித்து உயிரினைக் காத்தல் வாழ்க்கையின் தலையாய அறமாகக் கருதப்படுகின்றது. உறவினர்களுக்கு மட்டுமல்லாது புதிதாக வருவோர்க்கும் விருந்தோம்பிக் காத்தலே சிறந்தது என மக்கள் கருதினர். இரவுப்பகல் எந்நேரமாயினும், மற்றவர்கள் பசியறிந்து உணவளித்தல் சாலச்சிறந்தது. இத்தகைய பெருமைக்குரிய விருந்தோம்பலைத் தமிழ் இலக்கியங்கள் வெகுவாகப் பாராட்டுகின்றன. சங்க இலக்கியம் தொடங்கி பல்வேறு நூல்களும் விருந்தோம்பலை அறச்செயலாகச் செவ்வனே எடுத்துரைக்கின்றன. மனித உயிருக்கு வழியான விருந்தோம்பல் அறத்தினை இலக்கியங்கள் எவ்வாறு எடுத்துரைக்கின்றன என்பதை நாம் பின்வருமாறு காணலாம்.

விருந்தோம்பல் பொருள்

பண்டைய காலம் முதல் நம் மக்களின் பண்பாட்டில் ஒன்று விருந்தோம்பல். பசியோடு நம் இருப்பிடம் நாடி வரும் மக்களுக்கு உணவு கொடுத்து பசிபோக்கித் தானும் மகிழ்வதே அறவாழ்வின் அடிப்படை என்பதை இலக்கியங்கள் கூறுகின்றன. விருந்து என்றால் புதுமை என்று பொருள். இதனைத் தொல்காப்பியம், “விருந்தே தானும் புதுவது

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Translation of Books and Chapters

Translated by: Dr. L.R.S. KALANITHI, Vice Principal (Students' Affairs)

Name of the Book: Ethics in Tamil Literature

Book Chapter: 55- Hospitality in Tamil literature

Author's Name: Ms. M. Selvarosary Pushpa, Assistant Professor, Department of Tamil, Guru Nanak College, Chennai-600042.

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ஸ்ரீ ஆனந்த கல்ப அறக்கட்டளை – கோவை

24 பிப்ரவரி 2020

பூசாகோஅர கிருஷ்ணம்மாள் மகளிர் கல்லூரி
(தன்னாட்சி உரிமை, தனிச்சிறப்புத்திறன், தேசியத்தர மதிப்பீட்டில் "ஏ" தகுதி, தேசியத் தர வரிசைப்பட்டியலில் (NIRF 2019) 22 – வது இடம் பெற்றது)

இணைந்து நடத்தும்

பன்னாட்டு ஆய்வுக் கருத்தரங்கம்

பன்முகப் பார்வையில் சமய இலக்கியங்கள்

பொருளடக்கம்

உணவில் கடைப்பிடிக்க வேண்டிய அறம்

முனைவர் ப. சசிரேகா
உதவிப் பேராசிரியர்
தமிழ்த்துறை, குரு நானக் கல்லூரி, சென்னை

நாம் ஒவ்வொருவரும் ஒவ்வொரு செயலிலும் அறத்தை கடைப்பிடித்து வருகின்றோம். வாழ்க்கையானது அறத்தின் அடிப்படையில்தான் இயங்குகின்றது. நாம் உண்ணும் உணவிலும் சில அறத்தை கடைப்பிடிக்கின்றோம். திருக்குறள், ஆத்திச்சூடி, கொன்றைவேந்தன் போன்ற நீதி இலக்கியங்களின் வாயிலாக உணவில் கடைப்பிடிக்க வேண்டிய அறத்தைப்பற்றி காண்பதே இக்கட்டுரையின் நோக்கமாகும்.

நமது சிறந்த உணவு

நம்முடைய முக்கிய உணவாக இருப்பது அரிசி. அதனால்தான் நெற்பயிரை விளைவிக்க வேண்டும் என்பதை ஔவையார்,

"நெற்பயிர் விளை" (ஆத்திச்சூடி பா : 72)
"பூமி திருத்தியுண்" (ஆத்திச்சூடி பா : 82)
"போனகம் என்பது தான் உழுந்து உண்டல்" (கொன்றைவேந்தன் பா : 69)
"தொழுதூண் சுவையின் உழுதூண் இனிது" (கொன்றைவேந்தன் பா : 46)

நெற்பயிரை விளைவித்துதான் உண்ணவேண்டும். சிலர் உழைக்காமல் மற்றவரின் உழைப்பால் வரும் உணவை உண்ணுகின்றனர். அவ்வாறு உண்பது சிறப்பான உணவு ஆகாது. ஒருவரிடம் பிச்சையெடுத்து உண்ணும் உணவைவிட உழுது உண்ணும் உணவுதான் சிறந்த உணவாகும் என்கிறார்.

பிச்சையிட்டு உண்

ஏழைகளுக்கும், வேலை செய்ய முடியாத குருடர், முடவர், நோயாளிகளுக்கும் கொடுத்துவிட்டுதான் உண்ணவேண்டும்.

"ஐய மிட்டுண்" (ஆத்திச்சூடி பா : 9)
"சைஒத்து இருந்தால் ஐயம் இட்டு உண்" (கொன்றைவேந்தன் பா : 34)

என்ற வரிகளில் ஔவையார், உன்னிடத்தில் பொருள் இருக்குமானால் பிச்சையிட்டுதான் உண்ணவேண்டும் என்கிறார்.

பகிர்ந்து உண்ணுதலே சிறந்த அறம்

எந்தவொரு உயிரினமும் தன்னிடமுள்ள உணவை பங்கிட்டுக்கொடுத்து உண்டு வாழவேண்டும். இதனால்தான் விசேசமான நாட்கள் மற்றும் சனிக்கிழமைகளில் காகத்திற்கு படைத்துவிட்டுதான் உண்ணுகின்றனர். இதனை வள்ளுவர்,

"பகுத்துண்டு பல்லுயிர் ஓம்புதல் நூலோர்
தொகுத்தவற்றுள் எல்லாந் தலை" (திருக்குறள் கு : 322)

என்கிறார். காகம் போன்ற உயிரினங்களும் தனக்கு மிகுதியான உணவு கிடைத்தால், தன் இனத்தை அழைத்து பகிர்ந்து உண்ணுகின்றன. நம்மிடம் எவ்வளவு குறைவாக உணவு இருந்தாலும், அதை விருந்தினரோடு சேர்ந்து உண்ண வேண்டும் என ஔவையாரும், வள்ளுவரும்,

"மருந்தே ஆயினும் விருந்தோடு உண்" (கொன்றைவேந்தன் பா :70)
"வித்தும் இடல்வேண்டும் கொல்லோ விருந்தோம்பி
மிச்சில் மிசைவான் புலம்" (திருக்குறள் கு : 85)

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(தன்னாட்சி உரிமை, தமிழ்ச்சிறப்புத்திறன், தேசியத் தர மதிப்பீட்டில் 'ஏ' தகுதி, தேசியத் தர வரிசைப்பட்டியலில் (NIRF 2019) 22-வது இடம் பெற்றது)

தமிழ்த்துறை, உளவியல்துறை மற்றும் யோகா கல்வி மையம்

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இணைந்து நடத்தும்

பன்னாட்டுக் கருத்தரங்கம்

பன்முகப் பார்வையில் சமய இலக்கியங்கள்

International Conference on

Multi Facets of Sacred Literature

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In recognition of the Publication of the Paper Entitled

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Proceeding Chapter: Principles to be followed in Food, International Conference- "Multi Facets of sacred literature"

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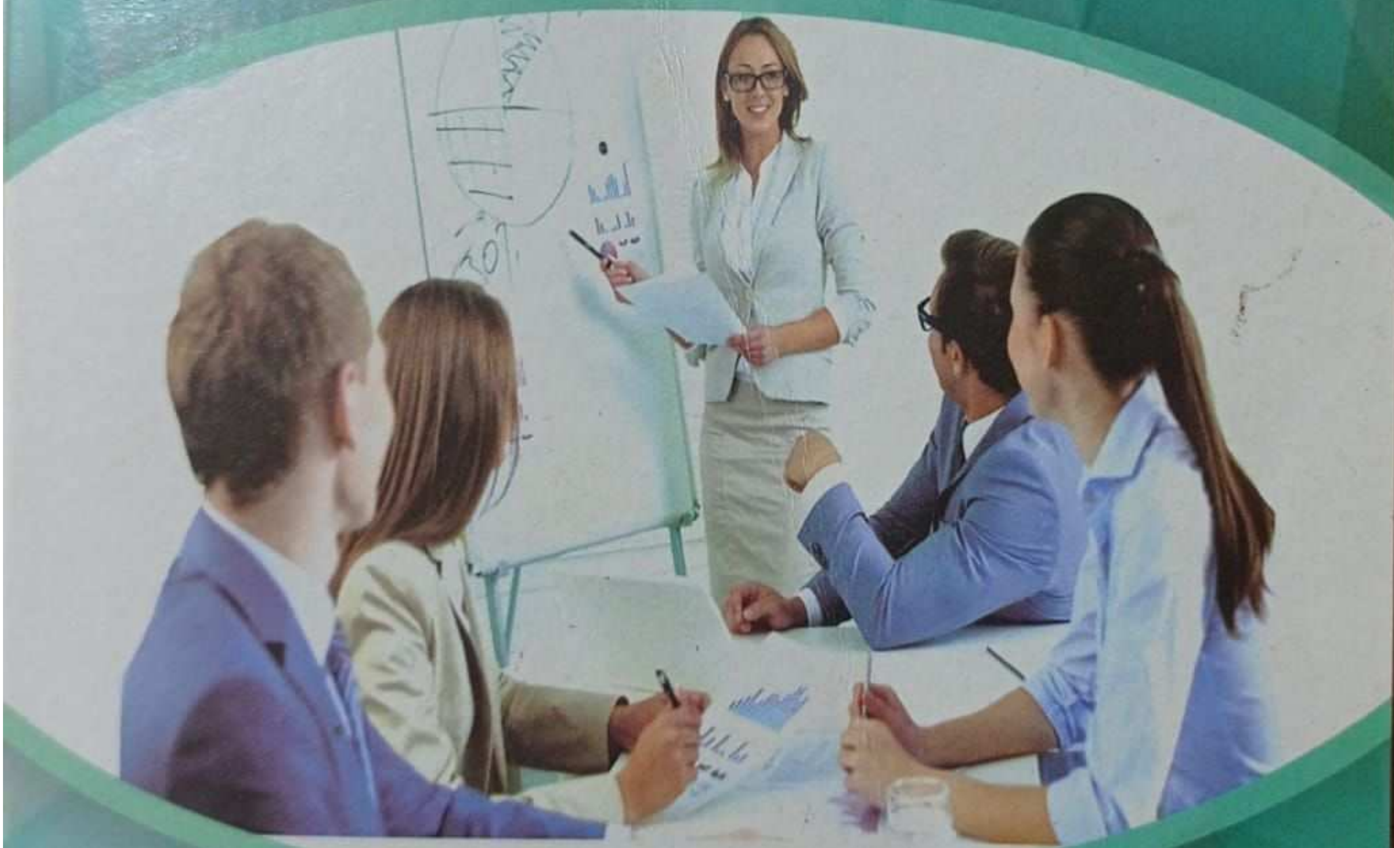
Human Resource Management



Dr. V. Sujatha
Prof. Anitha Malisetty
Dr. V. Krishna Kumari
Prof. M.L. Mayalekshmi
Prof L.I. Mary Pauline

Preface

The subject of Human Resource Management which was earlier referred to as, Personnel Management has witnessed several path breaking changes. Though it was considered to be a support function in the earlier days, it has transformed itself to a strategic function and plays an important role in strategy formulation and its implementation for creating and sustaining competitive advantage. With the growing realisation that it is human talent and competence that plays an important role in influencing the growth and success of organisations, the subject is expected to assume greater importance as the knowledge component gets embedded in all areas of work.

This book is an outcome of the collective knowledge and rich experience of the authors gained by teaching the subject and conducting research. The authors have taken care to ensure comprehensive coverage of the subject matter and have presented the various topics in a precise, concise, simple and interesting manner. Latest ideas, concepts and practices are an integral component of this book.

To enable students understand the practical application of theoretical concepts, instances of their application in the corporate sector have been included throughout the text. To aid the students to prepare for their exams and perform exceedingly well, University Section A questions along with their answers have been given at the end of each chapter. Section B and Section C questions have also been provided.

It is hoped that the academic community would welcome this initiative. Suggestions for the further improvement of the book are most welcome.

Dr. V. Sujatha

Prof. Anitha MaliSetty

Dr. V. Krishna Kumari

Prof. M. L. Mayalekshmi

Prof. L. I. Mary Pauline

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HUMAN RESOURCE MANAGEMENT
(PERSONNEL MANAGEMENT)

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Chapter 24
Anti-Leprosy Vaccine (Hansen's Disease Vaccine)

Jerusha Santa Packyanathan, Ira Christabel Packyanathan, and A. Indra Balini

Introduction

Leprosy exists in a bacteriologic, immunologic, clinical and pathologic spectrum. The infection found in the peripheral nerves is the locus of diseases, from where neuronal damage leads to functional impairment and phenotypic expressions of leprosy. The precise pathogenetic mechanisms by which the underlying nerve is damaged is not known (Joyce and Scollard 2004). The bacterium responsible for this disease is *Mycobacterium leprae,* identified before 200 years, by Armauer Hansen, a physician from Norway. Human beings are considered the sole reservoirs for the infection and armadillos are a host for *M. leprae* (Talwar et al. 1978).

There are five categories according to Ridley-Jopling scale. This includes borderline lepromatous (BL), lepromatous leprosy (LL), borderline-borderline (BB), tuberculoid leprosy (TT) and borderline tuberculoid (BT) (Ridley and Jopling 1966; Scollard 2004). Owing to limited resources and for ease of practice and treatment, clinical criteria are preferred. The WHO classification, based on clinical criteria, is based on the number of nerves involved and number of skin lesions and is classified as multibacillary (MB) leprosy (presenting five or more lesions) and paucibacillary (PB) leprosy (presenting with less than five lesions) (WHO global Leprosy situation 2010). An in-depth histological analyses showed that MB patients, possessing the BB, BL and LL forms, revealed multiple skin lesions, characterized by highly dysfunctional lymphocytes. Extreme immune deficit and increased *M. leprae* devoid of

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specific cell-mediated immunity are seen in multibacillary lepromatous leprosy (Ridley and Jopling 1966). Bacterial replication is not controlled in LL patients and they have high bacterial indices (BI refers to a logarithmic scale that represents the number of acid-fast bacilli that occur in the dermis). Patients with tuberculoid leprosy (TT) have limited number of lesions with scanty bacilli showing low granulomatous dermatopathology and lower or negative BI (Skinsnes 1973).

On the diagnosis of leprosy, patients ought to be provided antibiotic therapy in the form of multidrug therapy (MDT) indicated by WHO. Since 1995, WHO has supplied MDT, free of cost, for all patients diagnosed with leprosy. It initially gave the treatment through a drug fund funded by Nippon Foundation and currently MDT therapy is sponsored by Novartis and the Novartis Foundation. A combination of dapsone, rifampicin and clofazimine is provided for multibacillary patients for 12 months. On the other hand, dapsone and rifampicin is administered for paucibacillary patients for 6 months (Joyce and Scollard 2004).

In India, the stigma towards those affected by the disease itself is a road block to end the reign of leprosy. Another discouraging factor affecting the treatment is the fear of the patients being termed 'untouchable' when people are aware they are affected with the same. The war on leprosy has to be raged from various medical and social aspects should this neglected complex disease be eradicated. MDT is just one tool used by many and a vaccine may hold the future to end this ancient suffering.

Leprosy: The Current Situation

Leprosy is not a disease that is native to India. However, research and surveys have identified around 1, 27,326 cases in 2015 in India, contributing to 60% to the overall number of new cases identified that year (accessed from WHO report, 2018). Although in 2009, more than 1000 cases were newly reported in 16 countries, countries like Brazil, Mozambique and Democratic Republic of Congo were successful in completely eliminating leprosy as it is prevalent at a rate of less than one case per 10,000 people (WHO global Leprosy situation 2010). When the spread of leprosy is analysed it is found that it is not evenly spread across populations. However, the close contacts with the leprosy patients have known to be at significantly greater risk of contracting this disease. This leads to the occurrence of smaller pockets of higher incidence rates (Bakker et al. 2002).

The introduction of the multidrug therapy (MDT) regime has created a fall in the incidence of leprosy with prevalence rates dropping to presently 2,50,000 cases per year internationally from figures as enormous as 12 million cases per year, approximately 20 years ago. The current emphasis is on early detection and timely administration of MDT (WHO global Leprosy situation 2009).

Need for a Leprosy Vaccine

The advent of MDT was a saviour to all those crippled by the disease. It has made a powerful change especially to the victims. But it does not end there; there are still many who fall prey to this disease. In order to completely eradicate leprosy, a vigorous effort has to be taken to bring down the incidence. This can be achieved with the introduction of vaccines for the disease. This vaccine should be both prophylactic and therapeutic in its action. It must be stated that some cases have been reported to relapse in patients with raised BI noted at diagnosis, indicating that these patients demand increased duration of treatment, particularly in the Indian population (south) (Norman et al. 2004; Matsuoka et al. 2000).

There is strong reason to believe that lowered potential of MDT could be due to drug resistance (Honrado et al. 2008; Roche et al. 2000). Resistance to dapsone has been established which when coupled with no clofazimine compliance, the gross therapy is rifampicin monotherapy (Ellard et al. 1988). It has been reported that certain strains of *M. leprae* present with the disadvantage of multidrug resistance (Honrado et al. 2008; Chen et al. 1999). In 2009, 213 MB relapse cases were studied and the results showed that 12 cases were resistant to dapsone, 9 cases to rifampicin and 2 cases to both the drugs (WHO Technical report series 2011). Recently, newer drugs like ofloxacin and minocycline have been an addition to the drug arsenal for the treatment of leprosy.

It is found that the relapse may be related to lower MDT compliance. Patients often do not follow their treatments sincerely, as one of the drugs, clofazimine, causes dark skin discolouration which could be stigmatising. Some patients were stressed by the duration of treatment and, in consequence, commitment to the treatment declined (Roche et al. 2000; Ellard et al. 1988). The largest reported study is a 6-year follow-up of 47,276 patients conducted in China, which revealed an overall relapse rate of 0.73/1000 person-years (Chen et al. 1999). A 10-year prospective study in the Philippines observed an overall relapse rate equivalent to 2.8/1000 person-years (Cellona et al. 2003).

Attempts by educational campaigns to bring about awareness of the disease and elimination of stigma continue globally; however, stigma continues to be a major obstacle to reporting for diagnosis and prompt treatment. Research has shown that the time period between the first noticeable symptom and clinical diagnosis of leprosy ranges from 1 to 3 years among nearly 50% of patients (De Rojas et al. 1994). The effect of the delay can be dramatic with crippling nerve damage leading to functional impairment and disability (Ferreira et al. 2000; Van Veen et al. 2006). Another challenge is misdiagnosis due to inadequate expertise, poor resources in rural areas and poor patient compliance. This elevates anti-*M. leprae* antibodies making existing untreated patients sources for further continued transmission in the region (Duthie et al. 2011).

A decline in the incidence was reported with the introduction MDT but it was premature. *M. leprae* still propagates and this is evident with new cases identified ever year (WHO Global leprosy situation 2007). These concerns, along with the current limitations in control and treatment strategies, suggest that the advancement of additional tools and strategies is critically needed. The development of a subunit vaccine that would both prevent and treat leprosy would herald a major step towards eradication of this dreaded scourge.

Mechanism Behind the Vaccine

The French word 'la vacche' was the origin of the English word 'vaccine' which literally means 'the cow', in reference to the cowpox extract that Dr. Jenner in 1812 to treat smallpox in humans. The concept of attenuated vaccines was introduced by Louis Pasteur. The action of a vaccine is to enhance the immune system of the host and is currently recognised as the most effective method of disease control (Kartikeyan et al. 1991).

Ideally, vaccines are manufactured with killed or attenuated strains that are no longer virulent but still possess 'protective' antigens. An alternate method uses non-pathogenic attenuated or killed strains that are capable of cross-reacting antigenically with the respective pathogen. There is a third approach, which involves only the immunogenic 'subunit(s)' in the preparation of a vaccine. The various leprosy vaccines available thus far have employed the various methods available (Chirmule et al. 1988a; Deo et al. 1981). The prospective vaccines for leprosy eradication are BCG alone, *Mycobacterium vaccae*, BCG and killed *M. leprae* combination, Indian Cancer Research Centre (ICRC) bacillus and *Mycobacterium* '*w*'(*M. indicus pranii* (MIP) (Fine and Dockrell 1991; Gupte 1991).

Parameters for Determining Vaccine Efficacy

The utmost effect of a vaccine is decided by its capacity to reduce the incidence of a disease. Hansen's disease has an incubation period of 3–30 years, which hinders studies regarding the efficacy of the vaccines. However, both clinical and experimental research is essential prior to large trials being initiated, proving that the vaccine in study is efficient and provides 'protective' immunity. It has been found that the cell-mediated immunity (CMI) which is the dominant host defence against *M. leprae* and circulating anti-*M. leprae* antibodies have little role. Vaccines for leprosy were developed in response to results from skin tests using the *M. leprae* antigens (insoluble and soluble) (Lancet 1987). The Mitsuda test is a good indicator of the vaccine capability to the bacteria, while the popular lymphocyte transformation test (LTT) is not as good as an indicator of protective immunity (Bjune et al. 1976). Persons with lower Mitsuda value, from endemic locations, possess a high risk of acquiring multibacillary leprosy (Dharmendra and Chatterjee 1956). It is found that Mitsuda test is indirectly related to the tissue bacillary load in persons that are left untreated (Ridling and Jopling 1966).

As it is a spectral disease, the pathological and clinical features show the CMI state of the host (Ridling and Jopling 1966). The CMI gradually improves as we move from lepromatous (LL) side of the spectrum to the tuberculoid (TT) end showing a fall in the tissue bacillary load. It is mandatory for the candidate vaccine to show immune response in animal models also. However, it must be noted that there is no concrete animal testing done for leprosy vaccines. Studies conducted in the footpad of mice showed variable results in different laboratories.

Animal Studies

Every vaccine in study has to go through the phase of preclinical evaluation done on animals to human clinical trials, a transition that can be challenging. A unique feature of armadillos is that, when they are naturally and experimentally inoculated with *M. leprae*, they manifest histopathological and clinical features of the whole spectrum of the disease identical to that seen in man. National Hansen's Disease Program (NHDP) has done immense groundwork in using armadillos to study *M. leprae*-induced nerve damage, the immune system and armadillo genome (Job et al. 1993; Adams et al. 2005). Despite limitations in using armadillo as a study model, it is still well suited to evaluate vaccines. One of the challenges faced with using armadillo is that it sustains *M. leprae* replication but does not reflect the nerve damage which is manifested in humans (Shepard 1960). Nevertheless, the footpad model is significantly used to analyse drug protocols and the occurrence of drug resistance and for vaccine testing.

BCG

One of the earliest vaccines against leprosy was the introduction of BCG. It proved efficient in battling against the replication of *M. leprae* in mice footpad (Fine 1982). But human trials with the BCG vaccine conducted at four major locations showed varied results (Kirchheimer and Storrs 1972). At Uganda, the average protection rate was 80%, and that of Papua New Guinea showed 46%, whereas, in South India, the studies showed 28% protection and in Burma 20%. It was therefore accepted that the overall efficacy of the vaccine is modest, except in Uganda. But on its own, BCG vaccination is no longer the standard for immunoprophylaxis of the disease. It is still challenging to cultivate *M. leprae* in the laboratory but it propagates in armadillos (Kirchheimer and Storrs 1972). A study by Convit et al. pointed out that the immunogenicity is enhanced when the conventional BCG vaccines are administered in combination with heat-killed armadillo-derived *M. leprae* [*M. leprae*-A' + BCG] (Convit et al. 1980).

The literature review of various studies approximately established the average protective effect to be 61% with the BCG vaccine (95% CI 51–70%), and significant heterogeneity was seen between the studies ($p < 0{\cdot}00001$). It has been suggested by Muliyil et al. (1991) that a change in immune state of the host was brought about by vaccination by BCG responsible for differential protection of multibacillary form and paucibacillary form of leprosy. The administration of BCG and its effect on the immune system will reduce the severity of the attack and manifest only as milder forms of the disease like paucibacillary leprosy and indeterminate leprosy. The efficacy of the vaccine reduces with age, as a drop in the protection was observed. On comparison, women were observed to have more protection than men with regard to observational and experimental studies. BCG also offers higher protection among contacts at home (Rodrigues et al. 1992).

The conventional BCG vaccine in leprosy patients revealed that it eventually led to lepromin conversion, which is indicative of a type of delayed hypersensitivity in man. Ganapati et al. (1989) believed that a combination of BCG and killed *M. leprae* could enhance immune system. Studies have proved that several doses of BCG given to the patient provided greater immunity against the same (Convit et al. 1993; Bertolli et al. 1997).

The differing effect of the BCG vaccine could be explained based on the presence of environmental bacteria present in the study sites. Stanford et al. (1981) and Rook et al. (1981) in their studies show environmental mycobacteria could alter the cell-mediated response and thereby change the protective effect against tuberculosis and leprosy. A study by Colditz et al. (1994) showed the effect of the vaccine (BCG) was better at higher latitudes; i.e. the protection was increased as we moved towards the poles away from the equator. But this finding was contradictory in the case of leprosy, as another study (Fine 1985) argued that the protection of the vaccine was greater at the equator highlighting that environmental and geographic factors play a role in altering the effect of the vaccine.

The present BCG vaccine is a combination of different strains that vary phenotypically and genotypically (Behr and Small 1999). The different results obtained from the various studies across the globe could be due the fact that different strains were used in each study. The studies lacked uniformity. The genetic variation among the different study populations is another contributing factor leading to changing susceptibility to infection (Shields et al. 1987).

Mixed Vaccine

The combination vaccine has immunological effects in patients with leprosy and therapeutic effects in healthy population. But when administered on their own the vaccine proved inefficient. There is neither valid information on the stability of the immune conversion nor details on the antigenic variation between *M. leprae* organisms isolated from different armadillos. The combination vaccine demonstrated the occurrence of lepromin in humans in a study conducted by Stanford (Stanford 1988) The *M. leprae* bacillus has lipids in the cell wall which prevents the recognition of the bacilli by the macrophages in our body and this is responsible for resistance in LL patients. On the contrary, persons with TT leprosy show cell-mediated immune response owing to increased levels of lipase, which eliminates the lipids from the cell wall. Delipidified cell component (DCC) of the bacillus leads to the activation of the macrophages and kills *M. leprae* (Robinson and Mahadevan 1989). However, the toxicity and safety factor has not been studied to date.

M.W. Vaccine

According to another study, it is seen that the vaccine prepared from *Mycobacterium welchii* (M.W.) brings about the conversion of lepromin in BL/LL patients (Chaudhary et al. 1983). M.W. is a fast-growing mycobacterium and can be grown in saprophytic soil (Dharmendra 1985). This vaccine was used against multibacillary leprosy and the outcome was similar to the effect of ICRC vaccine (Deo et al. 1983; Zaheer et al. 1988). But this was an expected finding as ICRC and M.W. are almost similar with respect to antigens (Girdhar and Desikan 1978; Mustafa and Talwar 1978). Studies at Central Drug Research Institute at Lucknow established CMI response in mice, langur and rhesus monkey (Dharmendra 1985) when treated using *M. Habana* vaccine, which is a photochromogenic mycobacterium.

ICRC

In the hunt for an effective vaccine combination, antigenically similar cultivable strains were traced and the Cancer Research Institute located in Mumbai introduced the ICRC vaccine in 1979. ICRC is a cultivable mycobacteria strain belonging to the complex *M. avium-intracellular*e (Deo et al. 1983). It is evident from the results obtained from humans and animal studies that cross-reactivity of antigens is shown by ICRC bacilli with *M. leprae* with respect to both T and B cell antigens (Girdhar and Desikan 1978; Mustafa and Talwar 1978; Gangal and Khanolkar 1974). T4 + clones obtained from tuberculoid leprosy patients have been tried against *M. leprae* soluble protein, as they are produced in large numbers (Emmrich and Kaufmann 1983). The interaction of many several clones with the ICRC bacilli highlights its association with *M. leprae* with respect to T cell antigens. Studies have revealed that as the antigens of the ICRC bacilli are easily accessible, it makes the vaccine overall more immunogenic.

Research on ICRC vaccine has revealed that a single dose brings 53% lingering immune conversion in LL patients who are on chemotherapy, associated conversion in few patients with 'increasing' tissue reaction and faster rate of clearance of bacilli from tissues (Fine 1985). Reversal reactions were observed in about 10% of the participants immediately after vaccination (Bhatki et al. 1983). ENL was noted in around one third of the participants with a high load of bacteria, 10–15 days after vaccination (Zaheer et al. 1988). Newer lesions were not developed in the patients after the dose of vaccination (Zaheer et al. 1988). Another study by Convit et al. also showed similar results (Muliyil et al. 1991). Lepromin conversion was seen is 95% of the cases when treated with ICRC vaccine (Chaturvedi et al. 1987) and this was stable up to 5 years (Chirmule et al. 1986). Hypersensitivity to *M. leprae* antigens was responsible for the pathogenesis of nerve damage observed in patients affected by the disease (Godal 1978; Waters et al. 1971). No corroborating results have been detected during the past 4 years in either the lepromin-positive or lepromin-negative group of healthy household contacts (HHC) of MB leprosy patients, to whom the vaccine was administered (Chaturvedi et al. 1987). The vaccine was reported to be non-toxic and well accepted. It can be conveniently administered as a single dose. The antibody levels remain unaltered (Scollard 2004). There is no defence provided by the anti-*M. leprae* antibodies in the circulation but they are associated with hypersensitivity reactions (Fine and Dockrell 1991). Since this vaccine is sourced from cultivable organisms, it is cost effective and there is no chance of contamination. The immunity conferred is stable in contrast to the armadillo-derived *M. leprae*.

MIP

Also popularly known as *Mycobacterium indicus pranii* (MIP), this anti-leprosy vaccine has an efficacy only below that of the BCG vaccine itself. However, studies from this prospective vaccine were conducted as a field survey with a follow-up period of 9 years (Sharma et al. 2005). The results showed the highest efficacy of 68% for a duration of 3 years, only next to BCG. But this protective efficacy fell to 60% after 6 years and 28% after the 9-year follow-up period. Currently it is still under study in two districts in India, along with a combination of single dose of rifampicin (SDR) (Kumar 2017). Another ongoing study has already been launched in five high-risk areas, employing the autoclaved form of the vaccine. The associated family members are also being vaccinated at an interval of 6 months.

After intense research, it was found that the deficit in immunity was caused due to the inability of the host to react against the microorganisms. In the presence of the bacteria, the lymphocytes of the host remain unaltered and therefore do not produce cytokines in response to the same (Talwar and Gupta 2017).

When used as an adjunct to multidrug treatment (MDT), it hastens bacterial clearance and quickens the recovery period (Chaudhary et al. 1983). It changes nearly 98% of normal negative lepromin persons who are healthy to persons with lepromin positivity status. This gets more interesting when it is seen to clear all granulomas. The patients heal completely and go on to lead normal lives without the scars of the infection. The sensitivity in the peripheral nerves is restored to normal sensitivity as well (Talwar 2014).

Additional Properties of MIP

(i) *Tuberculosis*

The antigens of MIP have commonalities with both *M. leprae* and M. tuberculosis. This has made it an ideal candidate to be employed in treating 'difficult to treat' class II tuberculosis patients (Sharma et al. 2017).

(ii) *Action Against Anogenital Warts and Other Lesions*

When administered intralesionally, the vaccine is capable of clearing warts in the anogenital region (WHO, Global leprosy situation 2009) and other lesions present elsewhere (Singh et al. 2014).

(iii) *Stimulates Humoral and Cellular Response*

MIP may be used as an oral contraceptive adjuvant (Purswani and Talwar 2011).

(iv) *Preventive of Myelomas and Cancers*

MIP has both therapeutic and preventive measures that have been established in SP2/O myelomas in mice, in a study conducted by the Indian Institute of Science (Rakshit et al. 2012). This has been approved by the Drugs Controller General of India (DCGI) for human use and consumption and is currently being employed in treating cancers of various types.

Scope for Future Research

It is an established fact that the small peptides in a protein molecule are responsible for its immunogenicity (Job et al. 1982). These small peptides are target specific in nature and will lead to manufacturing newer vaccines both synthesized chemically or biosynthesized (using recombinant DNA technology) which will be purer. One of the limiting factors encountered is in cultivating the organism to produce sufficient quantities of the subunit vaccine. But this has been overcome using the recombinant technology where the entire genome of the organism is cloned (Young et al. 1985); the coding of genes has established five immunogenic proteins from *M. leprae* using monoclonal antibodies. Once the 'protective' antigen(s) are identified for the immunogenic proteins, the non-cultivability of *M. leprae* will no longer challenge the production of the pure vaccine and the supply of the antigens will not be a constraint.

A technique that has been advocated to isolate the immunogenic antigens at the Cancer Research Institute located at Mumbai is liquid chromatography (Chirmule et al. 1988a, b). It uses columns of gel through which substances can permeate, and a very high molecular weight fraction is obtained under sonicate (approx. 1 million daltons) named PP-1, which is the immunogen with dominant T cell of the ICRC bacilli (Chirmule et al. 1988a, b). On sonicating *M. leprae*, another similar fraction can be isolated. The PP-I fractions obtained from the two different organisms display antigenic cross-reactivity. The glycoprotein PP-I is primarily a component of the cell wall of the bacillus. A recent isolation of a high molecular weight cell wall core (CWC) fraction of *M. leprae* has been achieved. CWC is a strong T cell immunogen (Kaplan et al. 1988). When a vaccine contains PP-I of ICRC bacilli, it promotes lepromin conversion in LL patients (Bhatki et al. 1988). As it is a glycoprotein, PP-I has all essential components for the vaccine. These proteins can thereby act as co antigens on their own or even act as carriers for sugars or fats which play the role of an antigens. Phase I and II trials are ongoing, with regard to this vaccine containing PP-I of ICRC bacilli being established as the ideal vaccine for leprosy.

Subunit Vaccine for Leprosy

An ideal vaccine for leprosy is anticipated to not only protect from the disease but also decrease the transmission rate by instigating a strong, lasting response in T cell directed against *M. leprae.* Subunit vaccines would be more specific and targeted to battle leprosy showing lasting effect against the bacterium. Since the completion of the *M. leprae* genome fully in the year 2001, the production of production of recombinant antigens has been made easier. It is believed that a subunit lymph node (DLN) cellularity can be used to determine the status of infection. Identifying the antigens is important for efficient vaccination against the disease. The American Leprosy Missions supports a project by Infectious Disease Research Institute (IDRI) where they have discovered numerous antigens identified by PB leprosy patients and which in turn stimulate secretion of IFN-γ (Duthie et al. 2008; Sampaio et al. 2011). Increase in T cell concentration suggested a concomitant rise in DLN cellularity at the site of infection. But these changes were not observed when killed *M. leprae* was inoculated and the infection controlled by rifampicin therapy. One of the most recent findings showed strong antigen-specific Th1 responses that reduce the inflammation caused by the disease; however the bacterial load did not reduce (Raman et al. 2009).

From the above studies, it is clear that although there is no effect on the bacterial burden, it is effective in managing the local inflammation. Since a very common problem encountered in leprosy is uncontrolled inflammation, this subunit vaccine would be beneficial to individuals suffering from the disease which otherwise causes significant discomfort, deformity and disability.

One Vaccine for All

It is interesting to note that most vaccines that have their effects in leprosy were initially used to treat tuberculosis worldwide. It was only later that their potential against leprosy was discovered (Wakhlu et al. 2001; Valdes et al. 2014). BCG is still used against tuberculosis all over the world (Kaufmann et al. 1992) and was the first vaccine given to newborns in over 172 countries worldwide (Zwerling et al. 2011). Although it was recognised for its efficacy against the prevention of tuberculosis, it was quickly identified to have effects against *M. leprae* too (Fine 1995). The use of BCG vaccine, as a single vaccine, against both TB and leprosy has been analysed in various clinical and observational studies. BCG's therapeutic effects ranged from 2% to 83% and from 58% to 74% against pulmonary and extrapulmonary TB, respectively (Mangtani et al. 2014); its effect in leprosy ranged from 26% to 41% in experimental studies and 61% in observational studies, respectively. Mild variation was seen in paucibacillary (62%) and multibacillary (76%) forms (Duppre et al. 2008). Aside from its efficacy in TB and leprosy, the vaccine is reported to have a notable impact on diseases that are not associated, perhaps by inducing the innate immune system to react more favourably to other assaults (Blok et al. 2015).

The efficacy of the vaccine against TB and leprosy, however, decreases over a period of time, dropping to 14% after 10–20 years (Mangtani et al. 2017). Revaccination is effective to a certain point in TB and in leprosy, the risk is reduced to 50% (Ponnighaus et al. 1992). Revaccination with BCG was used in countries like Brazil as early as 1970 in order to boost its efficacy (Merle et al. 2010). The immunity conferred by the booster dose of BCG vaccine was 56%; this was independent of its efficacy with previous vaccination (Duppre et al. 2008).

As mycobacterial diseases like tuberculosis and leprosy are diseases encountered in Third World countries, a mixed single vaccine would greatly help in tackling the dual threat. Now *Mycobacterium avium* (an intracellular group of organisms) is also being frequently isolated from patients with HIV infection (Kichn et al. 1985). The future could be in proposing a polyvalent mycobacterial vaccine offering immunization over a wide spectrum of mycobacterial diseases consisting of BCG and ICRC (expand this) bacilli or its 'subunits'. This would subsequently reduce the number of vaccinations and this will be cost effective in mass campaigns.

Subunit Vaccines for Tuberculosis and Leprosy

As the leprosy bacteria *M. leprae* have been subjected to severe gene reduction (Cole et al. 2001), it is evident that not every *Mtb* antigen will be a suitable target for the TB vaccine as they possess corresponding homologs in the leprosy bacteria *M. leprae*. A few instances are ID83/GLA-SE and ID93/GLA-SE, which are two fusion proteins that are recombined, which are formulated with TLR4L having adjuvant GLA-SE, possessing three *Mtb* proteins, namely: Rv1813, Rv2608 and Rv3620, with the additional inclusion of Rv3619 in ID93. The sequence of amino acid (aa) of Rv3620 and Rv3619 is 64% and 58% identical to the corresponding *M. leprae* proteins, namely, ML1056 and ML1055, respectively. It is therefore predictable and has been proved that on account of these similarities, both the *Mtb* hybrid recombinant proteins were identified from the blood in paucibacillary patients. Moreover, when administered subcutaneously, the subunit vaccines decreased inflammation induced by *M. leprae* and reduced the bacterial culture in mice models of leprosy (Duthie et al. 2014), implying that TB subunit vaccines may have beneficial therapeutic effects in leprosy.

With the same idea, a similar TB subunit vaccine candidate is also being tested, possessing two majorly secreted proteins, *Mtb* ESAT6 and *Mtb* Ag85B, which are both present short term in *Mtb* culture filtrates (Sorensen et al. 1995). On comparison, Ag85B-ESAT6 seems a suitable candidate for leprosy as well, as *Mtb* Ag85B and ESAT6 share 89% and 68% amino acid overlap with *M. leprae* homologs, namely, ML0049 and ML2028, respectively. It must be noted that they are widely recognized by antibodies in multibacillary leprosy patients (Spencer et al. 2011) and also by IFN-γ-secreting cells seen in paucibacillary leprosy patients (Duthie et al. 2013). Cross-reactivity of T cells in both *Mtb* and *M. leprae* ESAT6 among leprosy and TB patients has been established (Geluk et al. 2002). Furthermore, another study showed overexpression of Ag85B in BCG significantly raising BCG's therapeutic efficacy against *M. leprae* too (Gillis et al. 2014).

References

Adams, J. E., Pena, M. T., Gillis, T. P., Williams, D. L., Adams, L. B., & Truman, R. W. (2005). Expression of nine-banded armadillo (Dasypus novemcinctus) interleukin-2 in *E. coli*. *Cytokine, 32*, 219–225.

Bakker, M. I., Hatta, M., Kwenang, A., Klatser, P. R., & Oskam, L. (2002). Epidemiology of leprosy on five isolated islands in the Flores Sea, Indonesia. *Tropical Medicine & International Health, 7*, 780–787.

Behr, M. A., & Small, P. M. (1999). A historical and molecular phylogeny of BCG strains. *Vaccine, 17*, 915–922.

Bertolli, J., Pangi, C., Frerichs, R., & Halloran, M. E. (1997). A case-control study of the effectiveness of BCG vaccine for preventing leprosy in Yangon, Myanmar. *International Journal of Epidemiology, 26*, 888–896.

Bhatki, W. S., Chulawala, R. G., Bapat, C. V., & Deo, M. G. (1983). Reversal reaction in lepromatous patients induced by a vaccine containing killed ICRC bacilli a report of five cases. *International Journal of Leprosy, 51*, 466–472.

Bhatki, W. S., Chulawala, R. G., Chaturvedi, R. M., Dixit, G. M., & Deo, M. G. (1988). Lepromin conversion induced by a 'sub-unit' vaccine from ICRC bacilli. *The Indian Journal of Medical Research, 87*, 545–554.

Bjune, G., Barneston, R., St, C., Ridley, D. S., & Kronvall, G. (1976). Lymphocyte transformation test in leprosy-correlation of the response with inflammation of lesions. *Clinical and Experimental Immunology, 25*, 85–94.

Blok, B. A., Arts, R. J., van Crevel, R., Benn, C. S., & Netea, M. G. (2015). Trained innate immunity as underlying mechanism for the long-term, nonspecific effects of vaccines. *Journal of Leukocyte Biology, 98*(3), 347–356.

Cellona, R. V., Balagon, M. F., dela Cruz, E. C., Burgos, J. A., Abalos, R. M., Walsh, G. P., et al. (2003). Long-term efficacy of 2 year WHO multiple drug therapy (MDT) in multibacillary (MB) leprosy patients. *International Journal of Leprosy and Other Mycobacterial Diseases, 71*, 308–319.

Chaturvedi, R. M., Chirmule, N. B., Yellapurkar, M. V., Shaikh, S. U., & Deo, M. G. (1987). Effects of ICRC anti-leprosy vaccine in healthy subjects. *International Journal of Leprosy, 55*, 657–666.

Chaudhary, S., Fotedar, A., & Talwar, G. P. (1983). Lepromin conversion in repeatedly lepromin negative BL/LL patients after immunization with autoclaved Mycobacterium W. *International Journal of Leprosy, 51*, 159–168.

Chen, X. S., Li, W. Z., Jiang, C., & Ye, G. Y. (1999). Studies on risk of leprosy relapses in China: Relapses after treatment with multidrug therapy. *International Journal of Leprosy and Other Mycobacterial Diseases, 67*, 379–387.

Chirmule, N. B., Deo, M. G., Shirodkar, M. V. N., Deshmukh, R., & Chanderkar, N. G. (1986). ICRC vaccine-induced changes in M. leprae-specific cell mediated immunity in langur (Presbytis entellus) monkeys. *International Journal of Leprosy, 54*, 57–62.

Chirmule, N. B., Chaturvedi, R. M., & Deo, M. G. (1988a). Immunogenic "sub-unit" of the ICRC antileprosy vaccine. *International Journal of Leprosy and Other Mycobacterial Diseases, 56*(1), 27–35.

Chirmule, N. B., Mulherkar, R., & Deo, M. G. (1988b). Antigenic profile of ICRC bacilli with special reference to isolation of immunogenic sub-unit. *International Archives of Allergy and Immunology, 86*, 19–27.

Colditz, G. A., Brewer, T. F., Berkey, C. S., et al. (1994). Efficacy of BCG vaccine in the prevention of tuberculosis. Meta-analysis of the published literature. *JAMA, 271*, 698–702.

Cole, S. T., Eiglmeier, K., Parkhill, J., James, K. D., Thomson, N. R., Wheeler, P. R., et al. (2001). Massive gene decay in the leprosy bacillus. *Nature, 409*(6823), 1007–1011.

Convit, J., Uirich, M., & Aranzazu, N. (1980). Vaccination in leprosy-observations and interpretations. *International Journal of Leprosy, 48*, 62–65.

Convit, J., Smith, P. G., Zuniga, M., et al. (1993). BCG vaccination protects against leprosy in Venezuela: A case-control study. *International Journal of Leprosy and Other Mycobacterial Diseases, 61*, 185–191.

De Rojas, V., Hernandez, O., & Gil, R. (1994). Some factors influencing delay in leprosy diagnosis. *Bulletin of the Pan American Health Organization, 28*, 156–162.

Deo, M. G., Bapat, C. V., Chulawala, R. G., & Bhatki, W. S. (1981). Potential anti-leprosy vaccine from killed ICRC bacilli a clinicopathological study. *The Indian Journal of Medical Research, 74*, 164–177.

Deo, M. G., Bapat, C. V., Bhalerao, V., Chaturvedi, R. M., Bhatki, W. S., & Chulawala, R. G. (1983). Antileprosy potentials of ICRC vaccine. A study in patients and healthy volunteers. *International Journal of Leprosy, 51*, 540–549.

Dharmendra (Ed.). (1985). *Leprosy: Volume 2*. Mumbai: Samant and Company.

Dharmendra, K. R., & Chatterjee, K. R. (1956). Prognostic value of the lepromin test in contacts of leprosy cases. *International Journal of Leprosy, 24*, 315–318.

Duppre, N. C., Camacho, L. A., da Cunha, S. S., Struchiner, C. J., Sales, A. M., Nery, J. A., et al. (2008). Effectiveness of BCG vaccination among leprosy contacts: A cohort study. *Transactions of the Royal Society of Tropical Medicine and Hygiene, 102*(7), 631–638.

Duthie, M. S., Goto, W., Ireton, G. C., Reece, S. T., Sampaio, L. H., Grassi, A. B., et al. (2008). Antigen-specific T-cell responses of leprosy patients. *Clinical and Vaccine Immunology, 15*, 1659–1665.

Duthie, M. S., Hay, M. N., Rada, E. M., Convit, J., Ito, L., Oyafuso, L. K., et al. (2011). Specific IgG antibody responses may be used to monitor leprosy treatment efficacy and as recurrence prognostic markers. *European Journal of Clinical Microbiology & Infectious Diseases, 30*, 1257.

Duthie, M. S., Sampaio, L. H., Oliveira, R. M., Raman, V. S., O'Donnell, J., Bailor, H. R., et al. (2013). Development and pre-clinical assessment of a 73 kD chimeric fusion protein as a defined sub-unit vaccine for leprosy. *Vaccine, 31*(5), 813–819.

Duthie, M. S., Coler, R. N., Laurance, J. D., Sampaio, L. H., Oliveira, R. M., Sousa, A. L., et al. (2014). Protection against *Mycobacterium leprae* infection by the ID83/GLA-SE and ID93/GLA-SE vaccines developed for tuberculosis. *Infection and Immunity, 82*(9), 3979–3985.

Ellard, G. A., Pannikar, V. K., Jesudasan, K., & Christian, M. (1988). Clofazimine and dapsone compliance in leprosy. *Leprosy Review, 59*, 205–213.

Emmrich, F., & Kaufmann, S. H. E. (1983). Human T-cell clones with reactivity to Mycobacteritan leprae as tools for the characterization of potential vaccines against leprosy. *Infection and Immunity, 51*, 879–883.

Ferreira, J., Mengue, S. S., Wagner, M. B., & Duncan, B. B. (2000). Estimating hidden prevalence in Hansen's disease through diagnosis delay and grade of disability at time of diagnosis. *International Journal of Leprosy and Other Mycobacterial Diseases, 68*, 464–473.

Fine, P. E. M. (1982). Leprosy: Epidemiology of a slow bacterium. *Epidemiologic Reviews, 4*, 161–188.

Fine, P. E. (1985). The Kellersberger memorial lecture, 1985. The role of BCG in the control of leprosy. *Ethiopian Medical Journal, 23*, 179–191.

Fine, P. E. (1995). Variation in protection by BCG: Implications of and for heterologous immunity. *Lancet, 346*(8986), 1339–1345.

Fine, P., & Dockrell, H. (1991). Leprosy vaccines. *Vaccine, 9*, 291–293.

Ganapati, R., Revankar, C. R., Lockwood, D. N., et al. (1989). A pilot study of three potential vaccines for leprosy in Bombay. *International Journal of Leprosy and Other Mycobacterial Diseases, 57*, 33–37.

Gangal, S. G., & Khanolkar, S. R. (1974). Delayed hypersensitivity in vitro to an acid fast mycobacterium cultivated from human lepromatous leprosy. *The Indian Journal of Medical Research, 62*, 290–296.

Geluk, A., van Meijgaarden, K. E., Franken, K. L., Subronto, Y. W., Wieles, B., Arend, S. M., et al. (2002). Identification and characterization of the ESAT-6 homologue of *Mycobacterium leprae* and T-cell cross-reactivity with *Mycobacterium tuberculosis*. *Infection and Immunity, 70*(5), 2544–2548.

Gillis, T. P., Tullius, M. V., & Horwitz, M. A. (2014). rBCG30-induced immunity and cross-protection against *Mycobacterium leprae* challenge are enhanced by boosting with the *Mycobacterium tuberculosis* 30-kilodalton antigen 85B. *Infection and Immunity, 82*(9), 3900–3909.

Girdhar, B. K., & Desikan, K. V. (1978). Results of skin tests with five different mycobacteria. *Leprosy in India, 59*, 555–559.

Godal, T. (1978). Immunological aspects of leprosy: Present status. *Progress in Allergy, 25*, 211–242.

Gupte, M. D. (1991). Vaccines against leprosy. *Indian Journal of Leprosy, 63*, 342–349.

Honrado, E. R., Tallo, V., Balis, A. C., Chan, G. P., & Cho, S. N. (2008). Noncompliance with the world health organization- multidrug therapy among leprosy patients in Cebu, Philippines: Its causes and implications on the leprosy control program. *Dermatologic Clinics, 26*, 221–229.

Job, C., Kirchheimer, W. F., & Sanchez, R. M. (1982). Tissue response in lepromin, an index of susceptibility of the armadillo to M. leprae infection a preliminary report. *International Journal of Leprosy, 50*, 177–182.

Job, C. K., Sanchez, R. M., Hunt, R., Truman, R. W., & Hastings, R. C. (1993). Armadillos (Dasypus novemcinctus) as a model to test antileprosy vaccines; a preliminary report. *International Journal of Leprosy and Other Mycobacterial Diseases, 61*, 394–397.

Joyce, M. P., & Scollard, D. M. (2004). Leprosy (Hansen's disease). In E. T. Bope (Ed.), *Conn's current therapy* (pp. 100–105). Philadelphia: Saunders.

Kaplan, J. M., Hunter, S. W., McNeil, M., Stewart, C., Modlin, R. L., Rea, T. H., Convit, J., Salgame, P., Mehra, V., Bloom, B. R., Brennan, P. J., et al. (1988). Immunological significance of Mycobacterium leprae cell walls. *Proceedings of the National Academy of Sciences of the United States of America, 5*, 1917–1921.

Kartikeyan, S., Chaturvedi, R. M., & Deo, M. G. (1991). Anti-leprosy vaccines: Current status and future prospects. *Journal of Postgraduate Medicine, 37*, 198–204.

Kaufmann, S. H., Gulle, H., Daugelat, S., & Schoel, B. (1992). Tuberculosis and leprosy: Attempts to identify T-cell antigens of potential value for vaccine design. *Scandinavian Journal of Immunology Supplement, 11*, 85–90.

Kichn, T. E., Edwards, F. F., Brennan, P. J., Tsang, A. Y., Maio, M., Gold, J. W., Whimbey, E., Won, B., McClatchy, J. K., & Armstrong, D. (1985). Infections caused by Mycobacterium avium complex in immunocompromised patients. *Journal of Clinical Microbiology, 21*, 168–173.

Kirchheimer, W. F., & Storrs, E. E. (1972). Attempts to establish the armadillo (Dasypus novemcintus Linn) as a model for the study of leprosy. 1-report of lepromatoid leprosy in an exptally infected armadillo. *International Journal of Leprosy, 39*, 693–702.

Kumar, S. (2017). India resurrects forgotten leprosy vaccine. *Science, 356*(6342), 999.

Lancet. (1987). Editorial. Vaccines against leprosy. 1183–1184.

Mangtani, P., Abubakar, I., Ariti, C., Beynon, R., Pimpin, L., Fine, P. E., et al. (2014). Protection by BCG vaccine against tuberculosis: A systematic review of randomized controlled trials. *Clinical Infectious Diseases, 58*(4), 470–480.

Mangtani, P., Nguipdop-Djomo, P., Keogh, R. H., Sterne, J. A. C., Abubakar, I., Smith, P. G., et al. (2017). The duration of protection of school-aged BCG vaccination in England: A population-based case-control study. *International Journal of Epidemiology, 92*(3), 283–288.

Matsuoka, M., Kashiwabara, Y., & Namisato, M. (2000). A *Mycobacterium leprae* isolate resistant to dapsone, rifampin, ofloxacin and sparfloxacin. *International Journal of Leprosy and Other Mycobacterial Diseases, 68*, 452–455.

Merle, C. S., Cunha, S. S., & Rodrigues, L. C. (2010). BCG vaccination and leprosy protection: Review of current evidence and status of BCG in leprosy control. *Expert Review of Vaccines, 9*(2), 209–222.

Muliyil, J., Nelson, K. E., & Diamond, E. L. (1991). Effect of BCG on the risk of leprosy in an endemic area: A case control study. *International Journal of Leprosy and Other Mycobacterial Diseases, 59*, 229–236.

Mustafa, A. S., & Talwar, G. P. (1978). Five cultivable mycobacterial strains giving blast transformation leukocyte migration inhibition of leukocytes analogous to Mycobacterium leprae. *Leprosy in India, 50*, 498–508.

Norman, G., Joseph, G., & Richard, J. (2004). Relapses in multi- bacillary patients treated with multi-drug therapy until smear negativity: Findings after twenty years. *International Journal of Leprosy and Other Mycobacterial Diseases, 72*, 1–7.

Ponnighaus, J. M., Fine, P. E., Sterne, J. A., Wilson, R. J., Msosa, E., Gruer, P. J., et al. (1992). Efficacy of BCG vaccine against leprosy and tuberculosis in northern Malawi. *Lancet, 339*(8794), 636–639.

Purswani, S., & Talwar, G. P. (2011). Development of a highly immunogenic recombinant candidate vaccine against human chorionic gonadotropin. *Vaccine, 29*(12), 2341–2348.

Rakshit, S., Ponnusamy, M., Papanna, S., Saha, B., Ahmed, A., & Nandi, D. (2012). Immunotherapeutic efficacy of Mycobacterium indicus pranii in eliciting anti-tumor T cell responses: Critical roles of IFNγ. *International Journal of Cancer, 130*(4), 865–875.

Raman, V. S., O'Donnell, J., Bailor, H. R., Goto, W., Lahiri, R., Gillis, T. P., et al. (2009). Vaccination with the ML0276 antigen reduces local inflammation but not bacterial burden during experimental *Mycobacterium leprae* infection. *Infection and Immunity, 77*, 5623–5630.

Ridley, D. S., & Jopling, W. H. (1966). Classification of leprosy according to immunity. A five-group system. *International Journal of Leprosy and Other Mycobacterial Diseases, 34*, 255–273.

Robinson, P., & Mahadevan, P. R. (1989). *Immune modulation of deficient cells from leprosy patients leading to killing of M.leprae in vitro demonstration*. Poster Presentation at XVI I.A.L. Conference, Trichur, November.

Roche, P. W., Neupane, K. D., Failbus, S. S., & Butlin, C. R. (2000). Dapsone drug resistance in the MDT era. *International Journal of Leprosy and Other Mycobacterial Diseases, 68*, 323–325.

Rodrigues, M. L., Silva, S. A., Neto, J. C., de Andrade, A. L., Martelli, C. M., & Zicker, F. (1992). Protective effect of intradermal BCG against leprosy; a case- control study in Central Brazil. *International Journal of Leprosy and Other Mycobacterial Diseases, 60*, 335–339.

Rook, G. A., Bahr, G. M., & Stanford, J. L. (1981). The effect of two distinct forms of cell-mediated response to mycobacteria on the protective efficacy of BCG. *Tubercle, 62*, 63–68.

Sampaio, L. H., Stefani, M. M., Oliveira, R. M., Sousa, A. L., Ireton, G. C., Reed, S. G., et al. (2011). Immunologically reactive *M. leprae* antigens with relevance to diagnosis and vaccine development. *BMC Infectious Diseases, 11*, 26.

Scollard, D. M. (2004). Classification of leprosy: A full color spectrum or black and white? *International Journal of Leprosy and Other Mycobacterial Diseases, 72*, 166–168.

Sharma, P., Mukherjee, R., Talwar, G. P., Sarathchandra, K. G., Walia, R., Parida, S. K., et al. (2005). Immunoprophylactic effects of the anti-leprosy Mw vaccine in house- hold contacts of leprosy patients: Clinical field trials with a follow up of 8–10 years. *Leprosy Review, 76*(2), 127–143.

Sharma, S. K., Katoch, K., Rohit, S., Balambal, R., Nirmal Kumar, J., patel, N., et al. (2017). Efficacy and safety of Mycobacterium indicus pranii as an adjunct therapy in category II pulmonary tuberculosis in a randomized trial. *Scientific Reports, 7*, 3354.

Shepard, C. C. (1960). The experimental disease that follows the injection of human leprosy bacilli into foot-pads of mice. *Journal of Experimental Medicine, 112*, 445–454.

Shields, E. D., Russell, D. A., & Pericak-Vance, M. A. (1987). Genetic epidemiology of the susceptibility to leprosy. *The Journal of Clinical Investigation, 79*, 1139–1143.

Singh, S., Chouhan, K., & Gupta, S. (2014). Intralesional immunotherapy with killed Mycobacterium indicus pranii vaccine for the treatment of extensive cutaneous warts. *Indian Journal of Cutaneous and Aesthetic Surgery, 80*(6), 509–514.

Skinsnes, O. K. (1973). Immuno-pathology of leprosy: The century in review. Pathology, pathogenesis and the development of classification. *International Journal of Leprosy, 41*, 329.

Sorensen, A. L., Nagai, S., Houen, G., Andersen, P., & Andersen, A. B. (1995). Purification and characterization of a low-molecular-mass T-cell antigen secreted by *Mycobacterium tuberculosis*. *Infection and Immunity, 63*(5), 1710–1717.

Spencer, J. S., Kim, H. J., Wheat, W. H., Chatterjee, D., Balagon, M. V., Cellona, R. V., et al. (2011). Analysis of antibody responses to *Mycobacterium leprae* phenolic glycolipid I, lipoarabinomannan, and recombinant proteins to define disease subtype-specific antigenic profiles in leprosy. *Clinical and Vaccine Immunology, 18*(2), 260–267.

Stanford, J. L. (1988). *A pilot study of 3 potential vaccines for leprosy in Mumbai school children*. Proceedings of XIII International Leprosy Congress at the Hague, p. 241 (Abstract).

Stanford, J. L., Shield, M. J., & Rook, G. A. (1981). How environmental mycobacteria may predetermine the protective efficacy of BCG. *Tubercle, 62*, 55–62.

Talwar, G. P. (2014). Leprosy is in principle eradicable: A possible approach. *Current Science, 106*(10), 1344–1345.

Talwar, G. P., & Gupta, J. C. (2017). Launching of immunization with the vaccine Mycobacterium Indicus Pranii for eradication of leprosy in India. *International Journal of Vaccine Research, 2*(3), 1–5.

Talwar, G. P., & Mustafa, A. S., et al. (1978). 14 Papers in golden jubilee issue leprosy in India. 50: 492–597.

Valdes, I., Montoro, E., Mata-Espinoza, D., Asin, O., Barrios-Payan, J., Francisco- Cruz, A., et al. (2014). Immunogenicity and protection conferred by *Mycobacterium habana* in a murine model of pulmonary tuberculosis. *Tuberculosis (Edinburgh, Scotland), 94*(1), 65–72.

Van Veen, N. H., Meima, A., & Richardus, J. H. (2006). The relationship between detection delay and impairment in leprosy control: A comparison of patient cohorts from Bangladesh and Ethiopia. *Leprosy Review, 77*, 356–365.

Wakhlu, A., Gaur, S. P., Kaushal, G. P., Misra, A., Asthana, P., & Sircar, A. R. (2001). Response of *Mycobacterium habana* vaccine in patients with lepromatous leprosy and their household contacts. A pilot clinical study. *Leprosy Review, 72*(2), 179–191.

Waters, M. F. R., Turk, J. L., & Wemambu, S. N. C. (1971). Mechanisms of reaction in leprosy. *International Journal of Leprosy, 39*, 417–428.

WHO. (2007). Global leprosy situation. *Weekly Epidemiological Record, 82*, 225–232.

WHO. (2009). Global leprosy situation. *Weekly Epidemiological Record, 84*, 333–340.

WHO. (2010). Global leprosy situation. *Weekly Epidemiological Record, 85*, 337–348.

WHO. (2011). *Meeting on sentinel surveillance for drug resistance in leprosy* (WHO technical report series). Geneva: World Health Organization. www.who.int/lep/en.

தமிழ் இலக்கியங்களில் அறநெறிகள்

ஔவை அடிப்பொடி

முனைவர் மு.கலைவேந்தன்

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"ஔவை அடிப்பொடி"

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18 ஆவது அறநெறித் தமிழ் ஆய்வு மாநாட்டுக்
கருத்தரங்கக் கட்டுரைத் தொகுப்பு

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56. பறவைகள், விலங்குகளின் வழி அறக்கருத்துகள்

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சென்னை

முன்னுரை

மனிதர்கள் பலரும் பலவித குணங்களை உடையவர்களாக இருக்கின்றனர். மனிதர்கள் மட்டுமா? என்ற கேள்வி எழுப்பினால் பறவைகளும், விலங்குகளும் பலவிதமான குணங்களை உடையனவாகவே இருக்கின்றன. பறவைகளுக்கும், விலங்குகளுக்கும் இத்தகைய குணம் தான் இருக்கிறதென்று எளிதாக அறிந்துகொள்ள முடியும். ஆனால், மனிதனிடம் இந்தக் குணம் தான் இருக்குமென்று எளிதில் அறிந்துகொள்ள முடியாது. ஒருவரின் வெளித்தோற்றத்தைக் கொண்டு எதையும் உணரமுடியாது. ஏனெனில், மனிதர்களில் சிலர் உள்ளொன்று வைத்துப் புறமொன்று பேசக்கூடியவர்களாக இருக்கின்றார்கள். வெளிப்படையாக இருப்பானாகின் அவனை இந்த உலகம் ஏளனம் செய்து, அவனது இயல்பான குணத்தையே மாற்றிவிடுகிறது. மனிதனின் குணங்களை எங்ஙனம் அடையாளம் காண்பது என்பதைப் பறவைகள் மற்றும் விலங்குகளை உதாரணமாகக் காட்டி அறக்கருத்துகளை மூதுரையும், நல்வழியும் எடுத்தியம்புகின்றன. அவற்றைப் பற்றிக் காண்பதே இக்கட்டுரையின் நோக்கமாகும்.

மயிலும் முறையான கல்வியும்

கல்வியை முறையாகக் கற்க வேண்டும். அவ்வாறு கற்காது கற்றவரைப்போல் நடிக்கக்கூடாது. இக்காலத்தில் சிலர் படிக்காமல் பட்டத்தையும், பதவியையும் பணத்தால்

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CONTENTS

CHAPTER 2
EXPORT MANAGEMENT

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1.1 Introduction

Management is terms commonly used in every activity. It means planning, organizing, directing, controlling and coordinating the specific activity so as to achieve its objective. Such activity related may be related to purchase, production, and marketing and as well export.

Export management means conducting the export activity in an orderly efficient and profitable manner. Since of each business is marketing, export management can be termed as export market management. If Export is increased means get more profit and importer should get more satisfaction. Therefore Export management activity is growth oriented and dynamic in nature.

Export market management is more difficult and complicated as compared to domestic marketing due to several factors such as, three faced competition, varied regulations of different countries, language etc. If require systematic approach management involves the study of foreign markets, requirements, of foreign buyers, potential marketing opportunities and using and them tactfully for large-scale exporting.

The scope of export management is vast as everything concerned with exporting comes within the scope of export management. It also argued that export management means what an export manager does.

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15

Impact of COVID-19 On Socio-Economic Conditions Of Construction Workers In India

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Abstract

The construction industry plays a vital role in the economic development of our country. There are several risks related to the construction industry. Management risks in the construction plans have been recognized as a very significant management procedure in order to attain the project objectives in terms of time, cost, quality, safety, and environmental sustainability.

The Spread of the original coronavirus has initiated impacting ongoing construction projects with workers gradually not reporting at the sites even as the most designers have kept the work on, for now, industry insiders said, more than 30% of construction workers are kept on away from the work sites due to nervousness over coronavirus diseases and many of them may have returned to their home towns or are planning to do so, they said. Contractors are also not keen on forcing them either. The building and other construction workers are the most susceptible section of the informal workers in India.

Keywords: *construction industry, coronavirus, unorganized sector, environmental sustainability, BOCW,*

Introduction

They work under irritating conditions with an undefined future. A large number of constructions labourers are migrant labourers working in different states far away from their natives. They play a significant role in nation-building yet find themselves on the limits of the society, it added.

According to a study conducted by Jan Sahas a Non-Government Organization "90% labourers have even now lost their source of income in the last three weeks".

According to the industrial body, there are about 25,000 ongoing projects throughout the country, and construction work is being recognized in about 19,000 of them. This involves a labor force of about 8.50 million in the construction work alone. Magar said, the developers are providing all the necessary support to the workers, from undertaking safety measures such as evading group formation, providing sanitizers, face masks and sterilizing the site and labour camps, to provide medical assistance

Distribution Of Relief Funds

Unorganized workers, immigrants in cities, farmers and small businessmen are worst hit by the COVID-19. Although the central government has announced a relief package, the effective implementation of the welfare scheme postures is a big challenge. In this situation, the role of construction welfare boards is computed, and questions are raised over the proper distribution of direct benefit transfers to the construction workers through CWBs.

The Building and other construction workers (BOCW) have received cash benefits of Rs 4,957 crores during the Covid-19 persuaded lockdown, the Ministry of Labour & Employment said on Tuesday.

"In an important move, the state governments, in answer to the advisory dated 24th March 2020, provided by the Ministry of Labour & Employment, have distributed a minimum standard of living amount of Rs 4,957 crore cash support till date to around twenty million registered construction workers across the country during the lockdown," a labour ministry statement said.

Around 17.5 million transactions were done directly into the bank accounts of the employees over Direct Benefit Transfer (DBT).

Apart from cash support ranging from Rs 1,000 to Rs 6,000 per worker during the quarantine some of the states have also provided food and ration to workers.

Failure in Distribution of Relief Funds

Though the Union government claims crores of rupees for COVID relief package, only meagre allocations are for income support for some sections in need.

In comparison with other states, the Tamil Nadu government has taken much effort to provide free ration and ₹1,000 to economically backward people have reached a large proportion of eligible beneficiaries. Of our respondents, only 89% have received ₹1,000 provided by the state government and 60% received both free ration and ₹1,000. Those who did not receive money are the absence of documentation, crowds in ration shops and other problems in distribution as reasons. The Tamil Nadu government declared ₹2,000 as assistance to be paid in two instalments to informal workers. Compared with free ration and ₹1,000 provided to economically backward people, the informal workers have not received ₹2,000, those who have all registered in several unorganized employees' welfare boards, were benefitted.

As noted above, only 50% of the beneficiaries were registered in several unorganized workers' welfare boards. Even among them, only few had received the first instalment of ₹1,000.

According to the episodic labour force survey 2017-18, urban Tamil Nadu has a minimum of 74 lakh informal workers, while Overall, the state has about two crores, informal workers. According to Sumatran, General Secretary of Center of Indian Trade Unions, Tamil Nadu, there are 74 lakh members registered in 17, several unorganized workers' welfare board across the state, but the TN government relief for informal workers has reached only 23 lakh laborers, including rural informal workers. The mainstream of this has gone to construction workers. The Tamil Nadu labour minister, Nilofer Kafeel, had announced that around 13 lakh construction workers would receive the coronavirus aid amount.

Singaravelan, president of the Construction Workers Federation of India, expressed that a total of 43 lakh construction labourers were registered in construction workers' welfare board, among them only 12-13 lakh have renewed their membership. He said that the renewal of membership was not easy as the labourers were not educated. Also, the renewal was a cumbersome process because the labourers required authorization from multiple government officials and needed to submit several documents.
He further added that the relief amount does not come from the government's corona relief fund, rather it is from the welfare board's fund (1% cess is collected from any construction towards the construction worker's welfare fund).
The Tamil Nadu government was able to recognize only 9,000 beneficiaries out of these 40,000 members. As many as 46 lakh informal workers have not renewed their membership among a total of 74 lakhs registered members in various informal workers' welfare boards. In 2013, the government suspended trade unions' involvement in renewing membership of informal workers, which has contributed to the decline in membership renewal.
The study also found that the coronavirus relief payment had reached less than 20% of unorganized workers in Tamil Nadu. There are three reasons for the failure in distribution: 1) Absence of registration of unorganized workers in welfare boards; 2) deficiency of renewal of membership due to cumbersome procedures, and 3) problems in finding beneficiaries. The government has reduced trade unions' offer to help in finding beneficiaries

Act Now or Matters Will Become Worse

Construction workers have limited or no power to bargain with their employers. This epidemic and lockdown have pushed them to the brink of an informal debt trap which will force them to settle for even lower wages in a post-lockdown world.
While it is the duty of the government to protect the interests of construction workers, both Central and state governments have used this epidemic to extend working hours, and relax other labour guidelines, which will deteriorate the condition of labour in India. If the government does not provide enough relief and protect the construction workers after the lockdown is relaxed, the livelihood of urban poor will become worse in days to come.
The apathy of the government to urban poor will only lead to a severe demand crisis in the Indian economy which is already on the edge of a recession.

Conclusion

COVID-19 has modeled serious challenges for the Indian economy--both regarding health hazards and economic risks. Its suggestions would be severe, given the large size of the population, and the heavy dependence of workers in the informal economy. Due to uncertainties, measuring the full impact of this emergency is not possible now. Its impact will begin to be expressed only in times to come. Nonetheless, preparation regarding policy responses is authoritative to contain the spread of the virus and further economic slowdown as well.

Due to the Coronavirus world, people have been affected for the last few months. Coronavirus creates many problems in society like health, income, business, unemployment, poverty, famine, etc. These problems will be eradicated only by the people's support to the government.

References:

- https://economictimes.indiatimes.com/industry/services/property-/-cstruction/covid-19-impact-construction-projects-hit-as-workers-keep-away/articleshow/74738820.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
- https://economictimes.indiatimes.com/industry/services/property-/- B cstruction/covid-19-impact-construction-projects-hit-as-workers-keep-away/articleshow/74738820.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
- https://economictimes.indiatimes.com/industry/services/property-/-cstruction/covid-19-impact-construction-projects-hit-as-workers-keep-away/articleshow/74738820.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
- https://economictimes.indiatimes.com/industry/services/property-/-cstruction/covid-19-impact-construction-projects-hit-as-workers-keep-away/articleshow/74738820.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

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EFFECTIVE IMPLEMENTATION OF CSR ACTIVITIES THROUGH COMPANIES AMENDMENT ACT 2013

- **Dr. D.Sowmya**[918]

1. INTRODUCTION

1.1 CORPORATE SOCIAL RESPONSIBILITY (CSR)

An awareness introduced in companies Act 2013, whereby businesses established as companies adopt to contribute for the cleaner environment and for the betterment of the society. The corporates assimilate societal values in their operations and in their interaction with their stakeholders on a voluntary basis.

1.1.1 DEFINITION

"Corporate Social Responsibility is the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as

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well as of the local community and society at large" - Lord Holme and Richard Watts.

1.1.2 EVOLUTION

Earlier, the Corporate Social Responsibility was not a compulsory activity for any businesses. Till enactment of Companies Act, 2013, Ministry of Corporate Affairs provided CSR as a voluntary activity. But majority of listed companies adopted corporate social responsibility even before its mandate based on the volume of the business and turnover of their operations. No fixed amount was expended.

TATA, Birla and many listed entities have spent its money for the welfare of the society from long time. One of the best instance is TATA. The company has developed the city of Jamshedpur by providing free education and medical facility.

Every business house has to owe some responsibility towards the society, country and world for its development. Considering the remote future sustainable growth and development, CSR into action is inevitable. The new policies on CSR by the companies must be framed to maintain a balance between company, stake holders, society, country, world and nature.

Corporate Social Responsibility has become an integral and legal aspect of the operations of many organisations, especially the large ones. CSR is an avenue through which companies are made to ‘give back’ to the society on which the company has built itself. This flow of societal benefits from large corporations has become a legal mandate.

“Section 135 of the Companies Act, 2013, states that:

(1) Every company having

   a. net worth of rupees five hundred crore or more, or
   b. turnover of rupees one thousand crore or more or
   c. a net profit of rupees five crore or more during any financial year

shall constitute a Corporate Social Responsibility Committee of the Board consisting of three or more directors, out of which at least one director shall be an independent director.

(3) The Corporate Social Responsibility Committee shall, —

   a. formulate and recommend to the Board, a Corporate Social Responsibility Policy which shall indicate the activities to be undertaken by the company as specified in Schedule VII;
   b. recommend the amount of expenditure to be incurred on the activities referred to in clause (a); and
   c. monitor the Corporate Social Responsibility Policy of the company from time to time.

(5) The Board of every company referred to in sub-section (1), shall ensure that the company spends, in every financial year, at least two per cent. of the average net profits of the company made during the three immediately preceding financial years, in pursuance of its Corporate Social Responsibility Policy:

Provided that the company shall give preference to the local area and areas around it where it operates, for spending the amount earmarked for Corporate Social Responsibility activities.

For the purposes of this section "average net profit" shall be calculated in accordance with the provisions of section 198."

Hence, the companies that fall under the aforesaid category must invest a certain stipulated sum towards CSR activities.

With the constant follow up of the Government, CSR spent by companies shows a great improvement every year.

2. OBJECTIVE OF THE STUDY

To study the effective implementation of CSR by corporates according to Companies Amendment Act among public in India.

3. RESEARCH METHODOLOGY

Two hundred and thirty-six people with different back-ground were chosen by convenience sampling method, to conduct a pilot study.

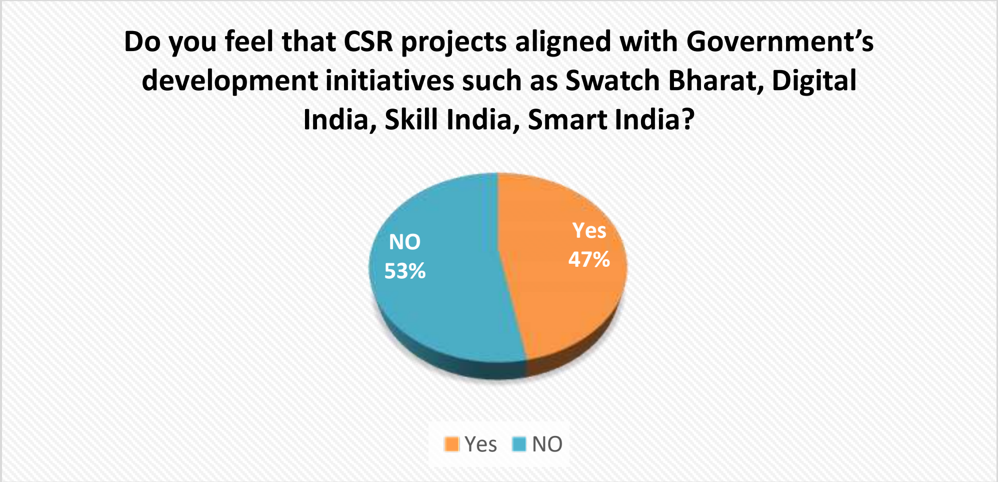
Initially, in order to get the in depth information open-end questions were asked to the public. Questionnaire was prepared under a title ‘Survey on Effectiveness of Corporate Social Responsibility’ and circulated among two hundred and fifty respondents. Polar questions (Yes or No question) were chosen to collect the data. Two hundred and thirty six people responded the questionnaire.

Observation on why corporates adopt CSR	**Yes**	**NO**
Enhanced recognition of companies among public	181	55
Boosting brand image	192	44
Cost savings	188	48
An benefit over competitors.	176	60
Genuinely responsible to the society and environment	135	101
After enforcement of law on CSR, Company's product and services are found to be sensible and responsible	122	114
Companies improved in following the ethical practices	142	94
CSR is a legal mandate	233	3

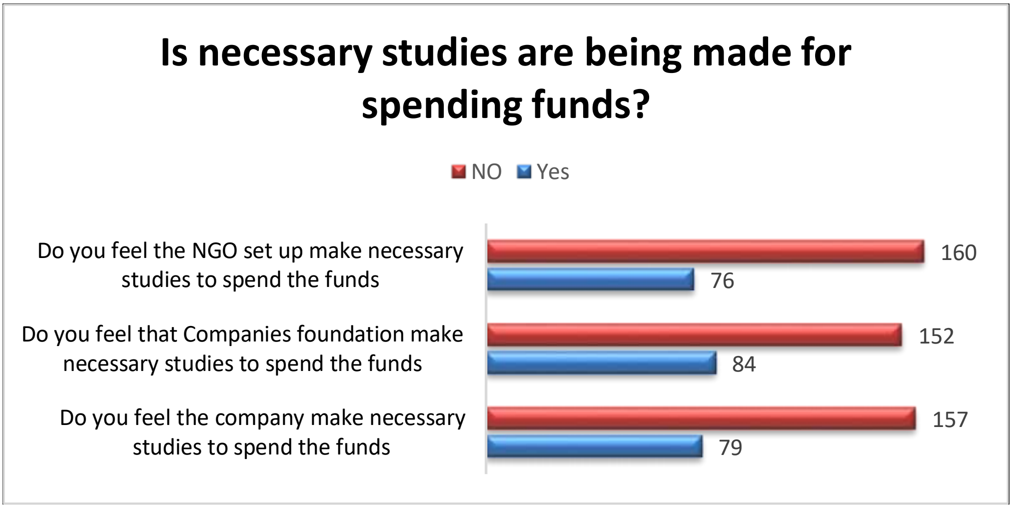
Around 76.69% of the respondents feel that the recognition of the companies are enhanced due to CSR initiatives. 81.36% of the respondents feel that the companies boosts their brand CSR initiatives. Only 57.20% of

the respondents feel that the corporates genuinely being responsible to the society. Around 98% of the respondents feel that CSR is being practiced by all companies as it is a mandatory provision according to Companies Amendment act.

<u>Alignment of CSR Projects and Government's Initiative</u>



Around 111 respondents feel that CSR projects by corporates are aligned with the vision or initiatives of the Government.



Majority of the respondents feel that the corporates should conduct a research study to know the actual requirement of service from them before spending the funds.

The major kinds of CSR activities followed in India by the listed companies under the Companies Act 2013 are:

(1) Measures to promote education

(2) Measures to eradicate starvation, poverty and malnutrition

(3) Environmental related activities

(4) Gender equality.

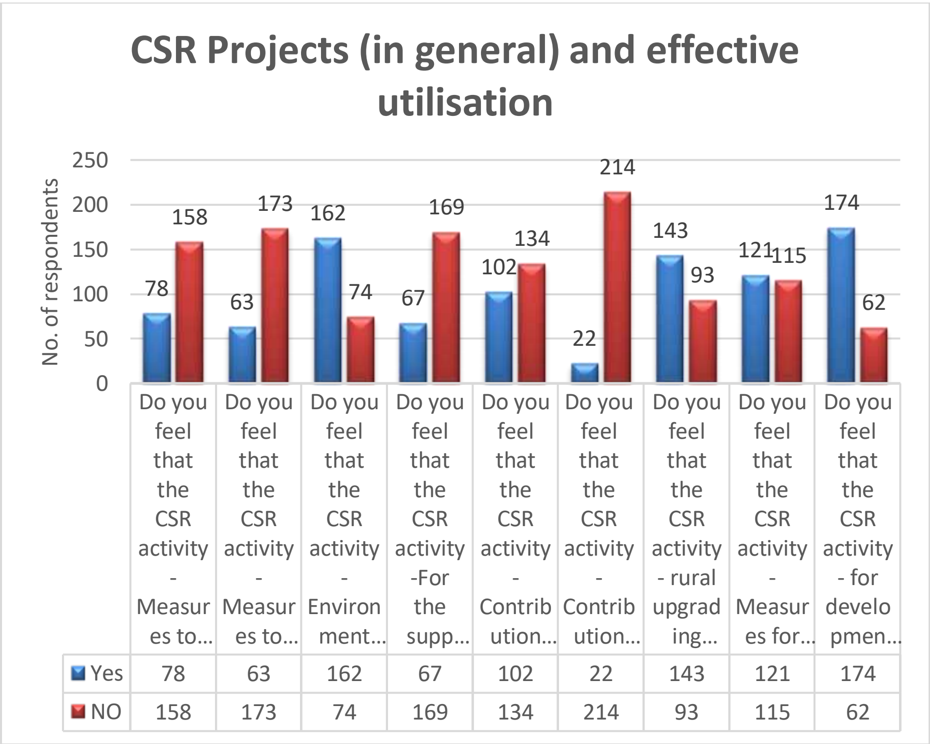
(5) For the support of armed forces veterans, war widows and families.

(6) Measures to protect of national heritage, art and culture

(7) Contributions to the development of technology situated within the central government approved academic institutions.

(8) Contributions can be made towards rural upgrading schemes and slum area improvement.

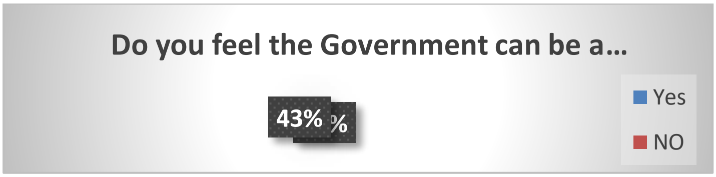
(9) Contriutions to the Prime Minister's National Relief Fund or any other fund set up by the government, for development of women and children.



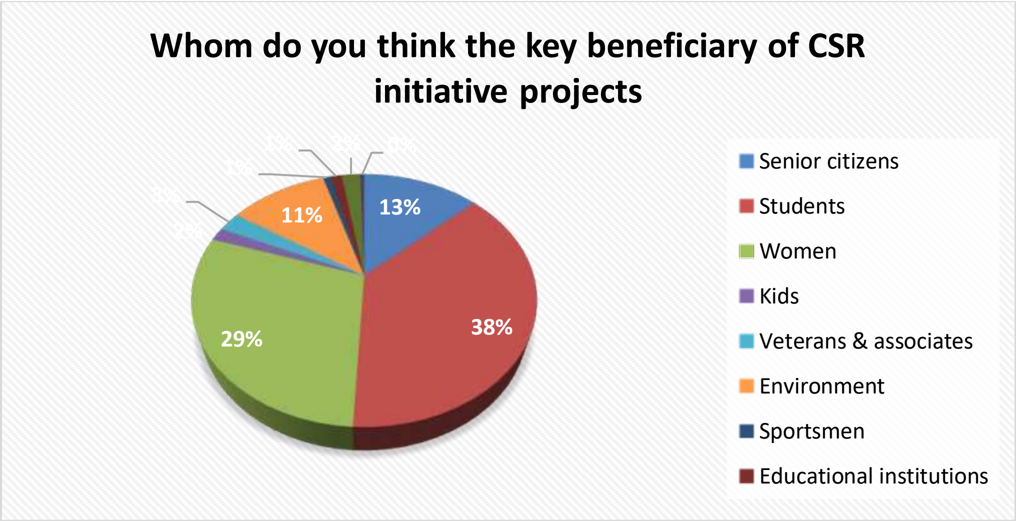
Majority of the respondents feel that the CSR activity is yet to be reached to the exact needy which will be beneficial for the individual, company, society and the country.

	Yes	NO

Do you feel the Government can be a collaborating agency with corporates for spending funds	134	102



Around 57% of the respondents feel that Government either directly or indirectly be a collaborating agency with the corporates for effective utilisation of funds.



38% of the respondents feel that students of various discipline gets benefitted of CSR projects and 28% of respondents feel that women gets aided of CSR initiatives by the companies.

4. EFFECTIVE IMPLEMENTATION OF CSR PROJECTS

On discussion with few corporates, it is found that planning and executing these activities found to be time consuming. Further research can be made compulsory to study the end target community or area to whom the projects are essentially required. External collaborators such as

COVID - 19 PANDEMIC: CHALLENGES AND OPPORTUNITIES IN THE EFFECTS OF GLOBAL ECONOMY

Editors

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CONTENT

CHAPTER – 12

EMPATHY – A GAME CHANGER

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Introduction

Every organization is a blend of all 4 M's. It is

- Men
- Materials
- Money
- Machines

Human resource management can be defined as – "employing people, developing their resource, utilizing maintaining and compensating their services in tune with the job and organizational requirements". Human resource refers to knowledge, skills, education, training and ability of the members of the organization.HR is the valuable and the unique asset of the organization. According to Adi Godrej, "All corporate strengths are dependent on people". HRM is effectively use of people to achieve organizational and individual goals. The real sources of competitive leverage are the culture and capabilities of our organization that derive from how we manage our people.

Importance of HR

❖ **Corporate**

HRM can help an enterprise in the following ways:

- Attracting talent through effective HRP
- Developing necessary skills & attitude with training
- Securing cooperation through motivation
- Retaining talent through the right policies
- Ensuring a team of competent & dedicated employees

❖ **Professional**

HRM helps improve quality of work life and contributes to growth in the following ways:

- Opportunities for personal development

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- Motivating work environment
- Proper allocation of work
- Healthy relationships between individuals & groups
- Promoting team-work & team spirit
- Encourage to work with deligence & commitment

❖ **Social Benefits**

Society benefits from good HRM in many ways:

- Good employment opportunities
- Development of human capital
- Generation of income & consumption
- Better lifestyles
- Lead to productivity gain to society
- Enables managers to reduce cost & save scarce resources

❖ **National**

- Drivers of development of a country
- Deliver economic growth

Now after COVID 19, we could understand that HR department in an organization alone is not enough in an organization. The humanity is necessary in every individual. Relationship Management is important. The ability to establish and maintain mutually satisfying relationships is necessary. Human beings should have Empathy.

Empathy

Empathy is the ability to identify with the feelings of another or… being able to put yourself in someone else's shoes. It is an Ability to "read" the emotions and emotional states of others – Body Language – Voice – Facial Expressions

Why Empathy is Important?

When Leaders listen using empathy to understand employees, leaders can build a sense of trust, thereby strengthening the relationships they have with their employees and consequently, the relationships employees have with one another, leading to greater collaboration and improved productivity.

- Empathy allows people to feel safe and that gives them the freedom to be themselves and perform to their highest potential.
- It encourages leaders to understand the root cause behind poor performance.
- Being empathetic allows leaders to help struggling employees improve and excel.

- Empathy allows leaders to build and develop relationships with those they lead.

Empathy is an important quality that needs to be present in our leaders, bosses and managers. Unfortunately all too often those who are ambitious and rise through the ranks can often be lacking in the empathy department. A truly effective leader can feel what his employees or group members are feeling and relate to what they're going through; and help them get through it.

In an research on empathy at work place – a tool for leadership, it was revealed that empathy is positively related to job performance. Employees who show more empathy toward direct reports are viewed as better performers in their job by their bosses

Listening Skills in Empathy

- The cornerstone for empathy is Listening.

The Benefits of Empathic Listening

- builds trust and respect,
- enables the disputants to release their emotions,
- reduces tensions,
- encourages the surfacing of information, and
- creates a safe environment that is conducive to collaborative problem solving

Seeing the Other Side

The first step in influencing other people is entering their world. This means seeing aside your own point of view, and looking at the situation from another person's perspective. As Atticus Finch in Harper Lee's To Kill a Mockingbird famously said: "You can never understand someone unless you understand their point of view, climb in that person's skin, or stand and walk in that person's shoes."

Why Aren't We Being More Empathetic at Work

If it's part of our make-up to be empathetic and that there are tangible benefits to fostering a sense of empathy within your organization, the question that naturally comes up is why then aren't leaders taking the lead in making empathy a fixture in today's business world. The most obvious reason (or excuse) is that the expression or recognition of any type of emotion in the workplace is still regarded as being a form of weakness

- Demonstrating empathy is hard; it's takes time and effort to demonstrate awareness & understanding.
- It's not always easy to understand why an employee thinks or feels the way they do about a situation.

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- It means putting others ahead of yourself which can be a challenge in today's competitive workplace.
- Many organizations are focused on achieving goals no matter what the cost to employees.

How To Utilise

Whether dealing with an unruly coworker or a demanding boss or When you find yourself in a situation that requires coping skills, do the following:

- **Take a deep breath**: Deep breathing has an amazingly calming effect on the brain.
- **Step away from the issue**: Mentally take yourself away from the situaton and analyze the issue itself.
- Use positive thinking ; get the best of your emotions can benefit your mind, body and soul, which is the ultimate goal
- Many times, it may feel like the workplace is no place for emotions, whether good or bad. But the truth is emotions must be utilized!

Conclusion

Empathy is a choice. We have to choose to improve, to care, to get out of our own way, and to bridge the gaps between us. Empathy allows us to be fully human and gives others permission to do the same.

Web Sources

1. https://www.mbaknol.com/human-resource-management/roles-and-responsibilities-of-human-resource-management/
2. https://corehr.wordpress.com/hrd-strategies/field-of-hrd/
3. https://alison.com/course/diploma-in-emotional-intelligence
4. https://www.tanveernaseer.com/why-empathy-matters-in-leadership/
5. https://www.tonyrobbins.com/business/why-is-empathy-important/
6. https://relivingmbadays.wordpress.com/2013/06/18/types-of-listening/
7. https://cclinnovation.org/wp-content/uploads/2020/03/empathyinthework place.pdf
8. https://healthecareers.com/article/healthcare-news/the-importance-of-empathy-in-the-workplace

CONSUMER BEHAVIOUR ON CONSUMPTION OF ORGANIC FOOD DURING THE PANDEMIC OF COVID – 19 IN CHENNAI CITY

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ABSTRACT

This paper aims to understand the changes in consumer buying preferences during the Covid-19 Pandemic situation. The main focus of the study is organic products and with respect to Chennai city. The primary data for the study is collected through a structured E-Questionnaire. The secondary data were collected from E-Journals and websites. The collected data is analysed with statistical tools such as Percentage Analysis, Descriptive Statistics, and Independent Samples t test & One-Way ANOVA. The study concludes that Gender, Educational qualification and marital status plays a significant role in the consumption of organic products. And this study proves that, there is change among people towards the environmental cause, as considerable number of people chose to buy organic products because it is good for the environment. It can also be inferred that organic vegetable is the most popular category and other categories of products needs to advertised more among the people.

Keywords: Organic Products, Purchase Preference, Pandemic situation, Chennai City.

INRODUCTION:

Organic products are getting popular among the people day by day. Organic products are grown completely with natural manures rather than using chemical fertilizers, pesticides etc.Organic products are available in a wide range like vegetables, fruits, meat, dairy, pulses and food grains etc. Not only is the organic products proved to provide much better health, it is also good to the environment.With India being the second most populated country, there is a huge market for organic products. In this current scenario, with the Covid-19 Pandemic, the lifestyle of people has changed drastically and so is their purchase preference. With the shift in market paradigm, a study on consumer behaviour with respect to consumption of organic food products might prove helpful to the firms.

REVIEW OF LITERATURE:

Sathyendra Kumar AD et.al (2015) stated that availability of organic input and output is critical to improve the organic farming in the country. In India development of efficient organic marketing system is necessary. They tried to understand the consumer perception about organic product and marketing in Mysore city. Marketing of organic product was meagre and demand for organic product had increased. The concluded that major reasons are organic producers are less; adequate market facility is not there on limited of shops, lack of awareness, and so on. They suggested that farmers and government should give importance to organic marketing to improve farming.

K. Sundaresh&Dr. S. Babu (2017)have given opinion that it is incidental that socio- economic variables are associated with consumer positive attitude towards organic foods. Family, self-decision and friends play a vital role in the purchase decision-making process of organic foods. The factors eco-friendly and chemical or pesticides free factor have a great impact on the decision-making process.

According to K. Renugadevi&Dr. M. Ramya, (2017)Organic food product is been accepted as a nutritional food and helps to keep human healthy in spite of busy work schedule, stress and pollution. The short supply and premium price of organic products may disturb the growth of consumption rate.

According to S. Suganya and Dr. S. Aravinth, (2014)in their research concluded that it is evident that people's awareness towards organic products has increased considerably and they are willing to purchase the organic products if it is affordable and available.

According to BrijeshSivathanu, (2015)Consumers consider health as an important parameter and then they buy the product, also there are various factors impacting the preference including demographic characteristics of the consumers.

OBJECTIVES:

- To study about the consumer's mentality during the time of a pandemic situation.
- To analyse the relationship between demographic profile of the consumer and consumption of organic food.

METHODOLOGY:

The data collected were subjected to data analysis and interpretation through SPSS Version 23.0 and statistical tools such as percentage analysis, descriptive statistics, Independent Samples t test and One-Way ANOVA has been applied to draw meaningful findings for the research objectives of the study.

ANALYSIS:

Demographic Profiles of the Respondents

The demographic profiles of the respondents such as, Gender, Educational Qualification, Monthly Income, Marital Status, Place of Organic Product Purchase, Reason for Organic Product Purchase and Nature of Organic Product Preference were observed and presented in Table 1.

Table 1: Demographic Profiles of the Respondents

Demographic Profiles (N = 87)		Frequency	Percent
Gender	Female	48	55.20
	Male	39	44.80
Educational Qualification	High School	6	06.90
	Under-Graduates	19	21.80
	Post-Graduates	32	36.80
	Professionals	30	34.50
Monthly Income	Less than 25,000	47	54.00
	Between 25,000-50,000	27	31.00
	Above 50,000	13	14.90
Marital Status	Married	69	79.30
	Unmarried	18	20.70
Place of Organic Product Purchase	Department Stores	51	58.60
	Online	4	04.60
	Organic Store	32	36.80
Reason for Organic Product Purchase	Doctor's Advice	1	01.10
	Environmental Cause	7	08.00
	Health Consciousness	76	87.40
	Trying out new food items	3	03.40

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Nature of Organic Product Preference	Food Grains	17	19.50
	Fruits	8	09.20
	Meat	2	02.30
	Pulses	4	04.60
	Vegetables	49	56.30
	Dairy Products	7	08.00

Table 1 indicates that Majority of Respondents are Females (55.20%) followed by male (44.80%) respondents in the study area. Sizeable portion of the respondents are post-graduates (36.80%) followed by, professionals (34.50%), under-graduates (21.80%) and high school (6.90%) educated. Majority of respondents are earning monthly family income less than Rs. 25,000 (54.00%) followed by, Between Rs. 25,001 – 50,000 (31.00%) and Above Rs. 50,000 (14.90%). Majority of the respondents are married (79.30%) followed by unmarried (20.70%) respondents. Majority of the respondents purchase organic products from department stores (58.60%) followed by organic stores (36.80%) and online (04.60%). Majority of the Respondents agreed that due to health consciousness (87.40%) they purchase organic products and majority of the respondents agreed that they mostly prefer organic vegetables (56.30%) for the organic consumption in the study area.

Descriptive Statistics of Organic Consumption during COVID-19 Period

The Organic consumption during Covid-19 was measured in 5 point Likert scale and descriptive statistics for the organic consumption variables were presented in Table 2.

Table 2: Descriptive Statistics of Organic Consumption Variables

Particulars		Statistics
Mean		11.2874
95% Confidence Interval for Mean	Lower Bound	10.5534
	Upper Bound	12.0213
5% Trimmed Mean		11.2937
Median		11.0000
Variance		11.8580
Std. Deviation		03.4435
Minimum		04.0000
Maximum		20.0000
Range		16.0000
Inter quartile Range		05.0000
Skewness		00.0910
Kurtosis		-00.3260

Table 2 indicates that mean and standard deviation of organic consumption are at robust measure since; standard deviation value is less than the mean value. The Median value of 11.0000 and Mean Value of 11.2840 indicates that data is normally distributed in the study. The Skewness value of 0.0910 and Kurtosis Value of -0.3260 indicates that data is fit for analysis.

Significance of Difference in Organic Consumption With Respect to Demographic Profiles of the Respondents

Independent Samples t test and One-Way Analysis of Variance has been applied to explore the mean difference in demographic profiles of the respondents with respect to organic products consumption during COVID-19 period. The results are tabulated and discussed in Table 3.

Hypothesis: H0: There is no significant relationship between marital status and the consumption of organic food products.

Table 3: Significance of Difference in Organic Consumption With Respect to Demographic Profiles of the Respondents

Demographic Profiles		Mean	Std. Deviation	t - Value / F-Value	P- Value	Inference
Gender	Female	11.1875	3.13292	2.401	0.125	Not Significant
	Male	11.4103	3.83006			
Eductional Qualification	High School	11.3333	2.65832	0.571	0.636	Not Significant
	Under-Graduates	11.2105	2.87864			
	Post-Graduates	10.7500	3.64559			
	Professionals	11.9000	3.72642			
Monthly Income	Less than 25,000	10.9149	3.26929	1.643	0.2	Not Significant
	Between 25,000-50,000	11.1852	3.53049			
	Above 50,000	12.8462	3.71587			
Marital Status	Married	11.4058	3.64336	5.174	0.025	Significant
	Unmarried	10.8333	2.57248			
Place of Organic Product Purchase	Department Stores	11.3725	2.90490	0.069	0.933	Not Significant
	Online	10.7500	4.34933			
	Organic Store	11.2188	4.17160			
Reason for Organic Product Purchase	Doctor's Advice	07.0000	-	1.221	0.307	Not Significant
	Environmental Cause	10.4286	1.81265			
	Health Consciousness	11.5132	3.56087			
	Trying out new food items	09.0000	1.73205			
Age	Less than 25 Years	11.2500	3.09286	2.009	0.119	Not Significant
	25 - 40 Years	10.9583	3.20212			
	41-55 Years	11.7778	4.10961			
	Above 55 Years	19.0000	-			

* Significant @ 5 % Level of Significance

Table 3 indicates that marital status have significant mean different with respect to organic consumption during COVID-19 period and married respondents have higher organic consumption as compared to unmarried respondents. The other demographic profiles such as Gender, Educational Qualification, Monthly Income, Place of Organic Product Purchase, Reason for Organic Product Purchase and Age do not have significance of mean difference with respect to organic consumption of the respondents.

Influence of Demographic Profiles on Organic Consumption of the Respondents during Covid-19 Period

Multiple regression analysis has been applied to explore the Influence of Demographic Profiles on Organic Consumption of the Respondents during Covid-19 Period and Results are presented in Table 4.

Table 4: Multiple Regression Analysis on Influence of Demographic Profiles on Organic Consumption of the Respondents during Covid-19 Period

Dependent Variable	Independent Variables	F-Value	R	R2	Adjusted R2	β	(t-Value)	Sig.	Inference
Organic Consumption		0.821	0.279	0.078	0.76				
	Gender					0.331	0.413	0.681	Not Significant
	Age					0.310	0.481	0.632	Not Significant
	Educational Qualification					-0.122	-0.272	0.787	Not Significant
	Monthly Income					0.836	1.373	0.174	Not Significant
	Marital Status					-0.308	-0.299	0.766	Not Significant
	Place of Organic Product Purchase					-0.075	-0.185	0.854	Not Significant
	Reason for Organic Product Purchase					1.080	1.091	0.279	Not Significant
	Nature of Organic Product Preference					0.483	1.985	0.048	Significant

* Significant @ 5% Level

Table 4 reveals that OLS Model has a goodness of fit for multiple regression analysis and the linear combination of nature of organic product preference was significantly related to organic product consumption ($F = 0.821$, $p<0.001$). The multiple correlation coefficients is 0.279, indicating that 0.078% of the variance of the respondents' organic consumption can be accounted for by nature of organic product preference during COVID-19 period whereas, gender, age, educational qualification, monthly income, marital status, place of organic product purchase, reason for organic product purchase do not have significant influence on the organic consumption of the respondents.

CONCLUSION:

It is inferred from the study that females buy more organic products and the reason being health consciousness. Education plays a major role in this case as they are more aware of the health benefits of organic produces. In spite of the situation prevailing, people tend to buy the products in departmental stores as other modes of purchase may be inaccessible. Even though people tend to buy organic products for their health benefits, equal amount of people are also concerned about the environment and try to opt for greener options. Organic vegetable are being purchased by a large number of people, which indicates that the other products should be advertised in a more efficient manner. The study shows that there is a significant relationship between marital status and the consumption of organic food. Married people tend to buy organic produce more than the Unmarried people.

REFERENCES

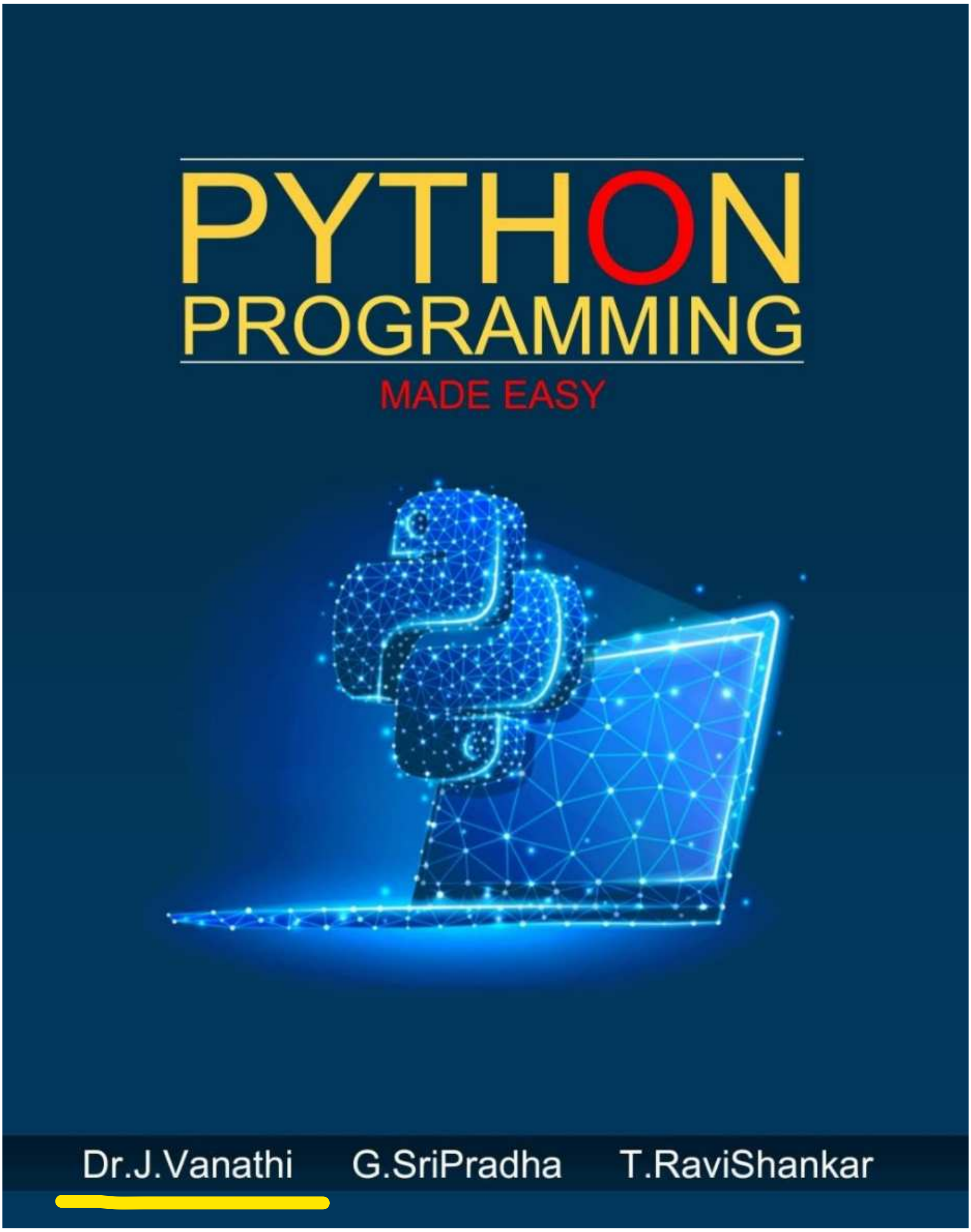
[1] Sathyendra Kumar AD, Dr. H. M. Chandrashekar (2015) "A Study on Consumer Behaviour towards Organic Food Products in Mysore City" ISSN: 2249-7196 IJMRR/Nov. 2015/ Volume 5/Issue 11/Article No-5/1082-1091 Sathyendra Kumar AD et.al. International Journal of Management Research & Review.

[2] K. Sundaresh&Dr. S. Babu (2017), "Coimbatore College Students' Perception And Buying Intention Towards Organic Food Products", Imperial Journal of Interdisciplinary Research (IJIR), 3(7), 472-475. https://www.onlinejournal.in/IJIRV3I7/076.pdf

[3] K. Renugadevi, Dr. M. Ramya. (2017), "A Study On Consumers Attitude Towards Organic Products With Special Reference To Salem City", International Journal of Interdisciplinary Research in Arts and Humanities (IJIRAH), 2(1), 160-162.

[4] S. Suganya, Dr. S. Aravinth. (2014). "Analysis of Consumer's Preference towards Organic Food Products Based on Product Price", Journal of Business Management & Social Sciences Research, 3(12), 73-76. http://www.borjournals.com/a/index.php/jbmssr/article/viewFile/1907/1237

[5] BrijeshSivathanu. (2015). "Factors Affecting Consumer Preference towards the Organic Food Purchases", Indian Journal of Science and Technology, Vol 8(33), 16.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Preface

"Everybody should learn to program a computer, because it teaches you how to think."

- Steve Jobs

This text book titled "Python Programming – Made easy" introduces the readers to Python Programming and is intended for beginners with little or no programming experience. According to us, writing a program is an art. A program is considered well written not only when it solves the problem, but also when it is easy to understand and simple to implement. Hence, every program in this book is kept simple, and well commented, clearly written to teach the mechanics of this language. This handbook will be helpful for the undergraduate students in familiarizing with the features of Python.

Guiding Principles

The main philosophy behind this book are listed below:

1. **Systematically Designed -** Every chapter in this book is designed thoroughly with an idea of one concept at a time.
2. **Reader's Perspective –** This is a student centric book with self- descriptive and simple programs.
3. **Small is the new big –** The book size in intentionally short. Every chapter covers topics in accordance to the course requirements.

About the Authors:

Dr. J. Vanathi, is a quality-oriented professional with a rich 25 years of Teaching experience. She has held various position in Arts & Science as well as in Engineering colleges. She has been awarded Ph.D. in the field of Computer Applications. Dr. J. Vanathi is now working as the HOD, Dept of Information Technology at the Guru Nanak College, Chennai. Her areas of interest include Cloud Computing, Database Management systems, Web Technology, Python Programming and Java Programming.

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CONTENTS

CHAPTER 6

DISASTER MANAGEMENT IN INDIA: AN OVERVIEW

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Introduction

In the ongoing time, disasters are increasing as far as recurrence, multifaceted nature and in destructive capacity. It is found out that, (for the last two decades) the quantity of recorded disasters has multiplied from roughly 200 to more than 400 every year and the vast majority of calamities are climate related. The total number of individuals influenced by catastrophic events in the course of recent decades have purportedly expanded to two billion individuals, and a normal of in excess of 200 million individuals are legitimately influenced every year. The intensity, range and event of occurrence have produced worldwide concern. Also, it is a matter of concern that the recent trends of disasters are a challenging task for mitigation process at global as well as in the national level. Against these backgrounds, it is to be sure to comprehend the fundamental idea of calamity relief procedure and its significance pertinence to the contemporary time.

Meaning and Definition of 'Disaster Management'

Disaster is a sudden, calamitous event bringing great damage, loss and destruction and devastation to life and property. The damage caused by disasters is immeasurable and varies with the geographical location, climate and the type of the earth surface/degree of vulnerability. This influences the mental, socio-economic, political and cultural state of the affected area. Generally, disaster has the following effects in the concerned areas;

1. It completely disrupts the normal day to day life
2. It negatively influences the emergency systems